Valley Water

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Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

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Anderson Dam Seismic Retrofit Project

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Appendix A

Best Management Practices, Santa Clara Valley Habitat Plan Conditions, Avoidance and Minimization Measures, and Mitigation Measures

Appendix A: Best Management Practices, Santa Clara Valley Habitat Plan Conditions, Avoidance and Minimization Measures, and Mitigation Measures

As noted in Chapter 2, *Project Description*, Valley Water would incorporate Valley Water best management practices (BMPs), BMPs included in the *2019–2023 Stream Maintenance Program (SMP) Manual*, Santa Clara Valley Habitat Plan (VHP) Conditions, and Avoidance and Minimization Measures (AMM) to avoid and minimize adverse effects on the environment that may result from the Project. Through the analyses presented in Section 3.0, *Introduction to Environmental Analysis*, Project-specific mitigation measures would also be applied to the Project to further reduce impacts. All relevant BMPs, VHP Conditions, AMMs, and mitigation measures are presented here. Full description of the BMPs are provided in the attached Valley Water BMP handbook (Attachment 1) and SMP BMP handbook (Attachment 2). SMP BMPs are only applicable to Project activities conducted at or near surface waters in areas downstream of Anderson Dam.

3.1 <u>Aesthetics</u>

Applicable Best Management Practices and VHP Conditions

BMPs relevant to the aesthetics analysis include the following:

REVEG-1: Seeding

REVEG-2: Planting Material

BI-8: Choose Local Ecotypes of Native Plants and Appropriate Erosion-Control Seed Mixes

WQ-11: Maintain Clean Conditions at Work Sites

Applicable VHP Conditions:

VHP Condition 7: Rural Development Design and Construction Requirements

Applicable VHP AMMs:

Aquatic 40: Maintain native shrubs, trees and groundcover whenever possible and revegetate disturbed areas with local native or non-invasive plants

Aquatic 71: Preserve existing vegetation to the extent possible

Aquatic 103: All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction.

Applicable Mitigation Measures

AES-1 Replacement Trees on Santa Clara County Parkland

Consistent with the approach in section C16-7 of the County's Tree Preservation and Removal Ordinance, Valley Water will prepare a replanting and/or re-vegetation plan for all County ordinance-sized trees to be removed on County-owned parkland. Replacement trees will be of a like kind and species of tree removed, if native and feasible, or of a kind and species to be determined by Valley Water in coordination with the County. The replacement trees will be replaced in same location of the tree removed, unless otherwise specified by the County Department of Parks and Recreation. Replacement tree planting size and ratio will be as follows, unless the County Department of Parks and Recreation requests a lower replacement ratio:

- For the removal of each small tree (12 to 18 inches): two 24-inch boxed trees or three 15-gallon trees
- For the removal of each medium tree (18 to 24 inches): three 24-inch boxed trees or four 15-gallon trees
- For the removal of each tree larger than 24 inches: four 24-inch boxed trees or five 15-gallon trees

AES-2 Visual Screening of Construction Staging Areas

Throughout the construction period, Valley Water will require contractor(s) to install and maintain visual screening around portions of construction Staging Areas 1 and 4 that would be publicly visible to nearby pedestrians and motorists. Specifically, contractor(s) will install visual screening along the southern perimeter of Staging Area 1 and southwestern perimeter of Staging Area 4, which abut Cochrane Road. Visual screening materials typically used on construction sites may include chain-link fencing with privacy slats, fencing with windscreen material, or wood or other similar barriers, approximately 6 to 8 feet tall, comprised of natural colors (e.g., green, brown, tan) found in the surrounding area.

AES-3 Construction Lighting

Valley Water will require contractor(s) to shield construction lighting used during nighttime construction to implement construction activities associated with the Seismic Retrofit and Ogier Ponds CM. A *light shield* is a product, generally of metal, that blocks the direction of light. The contractor(s) will determine the precise light shield(s) to be used. Installing light shields will minimize the amount of nuisance light that is visible from public roadways throughout the Project Area and the amount that illuminates sensitive habitats and natural lands outside of the construction area. Direct lighting will also be focused downward or oriented such that the light sources are not directed toward nearby public roadways and motorists, or toward sensitive habitats and natural lands outside of the construction area. This will be accomplished through the use of lighting fixtures that are manufactured to limit the candle width for which light is generated from each fixture. The addition of screens (e.g., fencing, vegetation, boards) will also be used if light is highly visible from public roadways, as determined by Valley Water. Additional barriers (i.e., fencing) will also be constructed along access roads that would be used for 24-hour delivery of project materials, such as those required for the construction of the Ogier Ponds CM. The height and materials used for these barriers will be determined by the contractor and approved by Valley Water, depending on the location, light source, and timeline that the barriers will be required to minimize light impacts from the site.

3.2 Agriculture

Applicable Best Management Practices and VHP Conditions

BMPs relevant to agricultural resources include the following:

AQ-1: Use Dust Control Measures

BI-11: Minimize Predator-Attraction

WQ-4: Limit Impacts from Staging and Stockpiling Materials

WQ-11: Maintain Clean Conditions at Work Sites

TR-1: Use Suitable Public Safety Measures

No VHP conditions are applicable to agriculture.

Applicable Mitigation Measures

None required.

3.3 Air Quality

Applicable Best Management Practices and VHP Conditions

There are no relevant VHP conditions that would apply to agricultural resources.

BMPs relevant to agricultural resources include the following:

AQ-1: Use Dust Control Measures[1]

AQ-2: Avoid Stockpiling Odorous Materials

No VHP conditions are applicable to air quality.

Applicable Mitigation Measures

AQ-1 Implement Construction Criteria Air Pollutants Reduction Measures

Prior to any ground disturbing and construction activities, Valley Water and/or its contractor will implement construction-related criteria pollutant emission reduction measures and include all

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[1] BMP AQ-1 in the Valley Water Best Management Practices Handbook (Attachment 1 of this appendix) includes a requirement that vehicles on unpaved roads observe a 15 mile per hour speed limit. To make this BMP feasible for the Project, this BMP would be modified to allow haul trucks to travel up to 25 miles per hour on unpaved roads, except in areas with naturally occurring asbestos where the 15 miles per hour limit would still apply.

such requirements in applicable bid documents, purchase orders, and constructs with successful contractors demonstrating the ability to supply the compliant on-or off-road construction equipment for use. The reduction measures to implement and include on such documentation are as follows:

a. Ensure all off-road construction equipment with greater than 25 hp and operating for more than 20 hours total over the entire duration of construction activities have engines that meet or exceed either USEPA or CARB Tier 4 Final offroad emission standards. In the event that a Tier 4 final engine is not readily available for a specialized piece of equipment, the contractor must demonstrate its attempts to secure a Tier 4 engine, prior to the use of any such engine.
b. Ensure that all on-road trucks and boat engines used during construction are of model year 2010 or newer.
c. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than 2 minutes. Provide clear signage that posts this requirement for workers at the entrances to the site and develop an enforceable mechanism to monitor idling time to ensure compliance with this measure.
d. Require that all construction equipment is maintained and properly tuned in accordance with manufacturer's specification. Equipment should be checked by a certified mechanic and determined to be running in proper condition prior to operation.

AQ-2 Implement Construction Blasting Fugitive Dust Emissions Reduction

Valley Water and/or its contractor will implement construction-related fugitive dust emission reduction measures and include all requirements in applicable bid documents, purchase orders, and contracts with successful contractors demonstrating the ability to supply the blasting screens for use prior to any ground disturbing and construction activities. The Contractor will install three-sided wind screens during blasting activities. Wind screens should be made of a solid fabric or other material capable of catching at least 75 percent of particulate matter greater than 2.5 micrometers in diameter. Screens should be used in combination with watering of the blasting area.

AQ-3 Implement BAAQMD Enhanced Construction BMPs

To further reduce construction-related emissions that exceed the BAAQMD's thresholds of significance, Valley Water will require its construction contractors to comply with the following enhanced BMPs during construction:

- Vegetative ground cover (e.g., fast-germinating native grass seed) will be planted in disturbed areas as soon as possible in light of construction phasing and scheduling by Valley Water and watered appropriately until vegetation is established. Where vegetative ground cover is not feasible, soil stabilizer will be used.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time will be limited whenever feasible. Activities will be phased to reduce the amount of disturbed surfaces at any one time as permitted by construction phasing and scheduling.

3.4 Biological Resources – Fisheries

Applicable Best Management Practices and VHP Conditions

BMPs relevant to Biological Resources – Fisheries include the following:

BMPs:

ANI-5: Slurry Mixture near Waterways

BI-2: Minimize Impacts to Steelhead

BI-3: Remove Temporary Fills

BI-8: Choose Local Ecotypes of Native Plants and Appropriate Erosion-Control Seed Mixes

BI-9: Restore Riffle/Pool Configuration of Channel Bottom

BI-11: Minimize Predator-Attraction

GEN-1: In-Channel Work Window (For Maintenance)

GEN-4: Minimize Disturbance Area

GEN-16: In-Channel Minor Activities

GEN-17: Employee/Contractor Training

GEN-20: Erosion and Sediment Control Measures

GEN-21: Staging and Stockpiling of Materials

GEN-22: Sediment Transport

GEN-23: Stream Access

GEN-24: On-Site Hazardous Materials Management

GEN-25: Existing Hazardous Materials

GEN-26: Spill Prevention and Response

GEN-28: Fire Prevention

GEN-30: Vehicle Maintenance

GEN-31: Vehicle Cleaning

GEN-32: Vehicle and Equipment Fueling

GEN-35: Pump/Generator Operations and Maintenance

HM-8: Vehicle Fuel and Maintenance

REVEG-1: Seeding

REVEG-2: Planting Material

SED-1: Groundwater Management

SED-2: Prevent Scour

SED-3: Restore Channel Features

SED-4: Berm Bypass

VEG-1: Minimize Local Erosion Increase from In-Channel Vegetation Removal

VEG-2: Non-Native Plant Removal

VEG-3: Use Appropriate Equipment for Instream Removal

WQ-1: Conduct Work from Top of Bank

WQ-2: Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms

WQ-3: Limit Impact of Pump and Generator Operation and Maintenance

WQ-4: Limit Impacts from Staging and Stockpiling Materials

WQ-5: Stabilize Construction Entrances and Exits

WQ-6: Limit Impact of Concrete Near Waterways

WQ-8: Minimize Hardscape in Bank Protection Design

WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement

WQ-10: Prevent Scour Downstream of Sediment Removal

WQ-11: Maintain Clean Conditions at Work Sites

WQ-15: Prevent Water Pollution

WQ-16: Prevent Stormwater Pollution

WQ-17: Manage Sanitary and Septic Waste

VHP Conditions:

Condition 3: Maintain Hydrologic Conditions and Protect Water Quality

Condition 4: Avoidance and Minimization for In-stream Projects

Condition 5: Avoidance and Minimization for In-stream Operations and Maintenance

Condition 11: Stream and Riparian Setbacks

VHP-Required AMMs Related to Conditions 3, 4, 5, and 11 that are Applicable to Each Project Impact on Fisheries Resources

General

2: Reduce stream pollution by removing pollutants from surface runoff before the polluted surface runoff reaches local streams.

3: Maintain the current hydrograph and, to the extent possible, restore the hydrograph to more closely resemble predevelopment conditions.

4: Reduce the potential for scour at stormwater outlets to streams by controlling the rate of flow into the streams

5: Invasive plant species removed during maintenance will be handled and disposed of in such a manner as to prevent further spread of the invasive species

6: Activities in the active (i.e., flowing) channel will be avoided, or AMMs in this table will be applied.

7: Personnel shall prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels.

8: Spill prevention kits shall always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations).

9: Personnel shall implement measures to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means when removing sediments from streams

11: Vehicles shall be washed at approved areas. No washing of vehicles shall occur at job sites.

12: No equipment servicing shall be done in the stream channel or immediate floodplain unless equipment cannot be readily relocated.

13: Personnel shall use the appropriate equipment for the job that minimizes disturbance to the stream bottom.

14: If high groundwater is present in a work area, pump it out of the work site carefully to remove sediment prior to the water re-entering a creek.

15: Implement native aquatic vertebrate relocation plan when ecologically appropriate as determined by a qualified biologist.

17: Install cofferdams both upstream and downstream not more than 100 feet from the extent of the work areas.

18: Small in-channel berms that deflect water to one side of the channel may be constructed of channel material in channels with low flows.

20: Diversions shall maintain ambient stream flows below the diversion, with no reduction or degradation.

21: If stream bed design changes are not part of the project, the stream bed will be returned to as close to pre-project condition as appropriate.

22: Remove all temporary diversion structures and the supportive material no more than 48 hours after work is completed.

23: Temporary fills, such as for access ramps, diversion structures, or cofferdams, shall be completely removed upon finishing the work.

24: To prevent increases in temperature and decreases in dissolved oxygen (DO), properly size bypass pipes or use a low-flow channel.

25: Diversions shall maintain fish passage under specified project conditions.

26: Any sediment removed from a project site shall be stored and transported in a manner that minimizes water quality impacts.

28: Where practical, the removed sediments and gravels will be re-used

29: Existing native vegetation shall be retained by removing only as much vegetation as necessary to accommodate the trail clearing width. Maintenance roads should be used to avoid effects on riparian corridors.

30: Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited.

31: When conducting vegetation management, retain as much understory brush and as many trees as feasible.

32. The top of the bank shall be protected by leaving vegetation in place to the maximum extent possible.

33: Regional Board objectives for temperature change in receiving waters shall not be exceeded.

Project Design

34: Use the minimum amount of impermeable surface (building footprint, paved driveway, etc.) practicable.

35: Use pervious materials, such as gravel or turf pavers, in place of asphalt or concrete to the extent practicable.

36: Use flow control structures such as swales, retention/detention areas, and/or cisterns to maintain the existing (pre-Project) peak runoff.

38: Use flow dissipaters at runoff inlets (e.g., culvert drop-inlets) to reduce the possibility of channel scour at the point of flow entry.

39: Minimize alterations to existing contours and slopes, including grading the minimum area necessary.

40: Maintain native shrubs, trees, and groundcover whenever possible and revegetate disturbed areas with local native or non-invasive plants.

41: Combine flow-control with flood control and/or treatment facilities in the form of detention/retention basins, ponds, and/or constructed wetlands.

42: Use flow-control structures, permeable pavement, cisterns, and other methods to ensure no change in peak runoff.

43: Assess site conditions to determine if designs such as bioengineered bank treatments with live vegetation can be successfully utilized.

44: Maintain natural stream characteristics, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and a natural channel bed.

45: Stream crossings shall incorporate a free-span bridge unless infeasible due to engineering or cost constraints or unsuitable based on minimal size of stream. If a bridge design cannot free-span a stream, bridge piers and footings will be designed to have minimum impact on the stream.

49: The project or activity must be designed to avoid the removal of riparian vegetation, if feasible.

51: All projects will be conducted in conformance with applicable County and/or city drainage policies.

53: When possible, maintain a vegetated buffer strip between staging or excavation areas and receiving waters.

54: Outside of the construction footprint, maintain deep pools within stream reaches as refugia for fish and wildlife.

55: For stream maintenance projects that result in alteration of the stream bed during project implementation, its low-flow channel shall be returned to its approximate prior location with appropriate depth for fish passage without creating a potential future bank erosion problem.

56: Bank stabilization site design shall consider hydraulic effects immediately upstream and downstream of the work area.

58: Use existing access routes/levee roads to minimize impacts of new construction in special-status species habitats and riparian zones.

61: Minimize ground disturbance to the smallest area feasible.

62: Use existing roads for access and disturbed area for staging as site constraints allow.

63: Prepare and implement sediment erosion control plans.

64: No winter grading shall occur unless approved by City Engineer and specific erosion control measures are incorporated.

65: Control exposed soil by stabilizing slopes (e.g., with erosion control blankets) and protecting channels.

66: Control sediment runoff using sandbag barriers or straw wattles.

67: No stockpiling or placement of erodible materials shall occur in waterways or along areas of natural stormwater flow.

68: Stabilize stockpiled soil with geotextile or plastic covers.

69: Maintain construction activities within a defined project area to reduce the amount of disturbed area.

70: Only clear/prepare land which will be actively under construction in the near term.

71: Preserve existing vegetation to the extent possible.

72: Equipment storage, fueling, and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel.

73: Avoid wet season construction.

74: Stabilize site ingress/egress locations.

75: Dispose of all construction waste in designated areas and prevent stormwater from flowing onto or off of these areas.

76: Prevent spills and clean up spilled materials.

78: In-stream projects occurring while the stream is flowing must use appropriate measures to protect water quality and native aquatic species.

80: All personnel working in or adjacent to the stream setback will be trained by a qualified biologist in AMMs.

83: Sediments will be stored and transported in a manner that minimizes water quality impacts.

84: Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site.

87: Vehicles operated within and adjacent to streams will be checked and maintained daily to prevent leaks.

88: Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.

90: All trash will be removed from the site daily to avoid attracting potential predators to the site.

91: To prevent the spread of exotic species and reduce the loss of natives, aquatic species will be netted; natives will be released, exotics removed.

92: To minimize the spread of pathogens, all staff working in aquatic systems will adhere to equipment decontamination guidelines.

94: Personnel shall use existing access ramps and roads if available.

97: Erosion control measures shall be in place at all times during construction.

98: When needed, utilize in-stream grade control structures to control channel scour, sediment routing, and headwall cutting.

Post-Construction

100: Potential contaminating materials must be stored in covered storage areas or secondary containment impervious to leaks and spills.

101: Runoff pathways shall be free of trash containers or trash storage areas. Trash storage areas shall be screened or walled.

102: Immediately after project completion and before close of seasonal work window, stabilize all exposed soil.

103: All disturbed soils will be revegetated with native plants and/or grasses or sterile non-native species.

104: Measures will be utilized on site to prevent erosion along streams (e.g., from road cuts or other grading).

110: If debris blockages threaten bank stability and may increase sedimentation of downstream reaches, debris will be removed.

111: If bank failure occurs due to debris blockages, bank repairs will use compacted soil and reseeding with native/sterile non-native plants.

112: Pumps and generators shall be maintained and operated in a manner that minimizes impacts on water quality and aquatic species.

Applicable Mitigation Measures

None required.

3.5 <u>Biological Resources – Terrestrial</u>

Applicable Best Management Practices and VHP Conditions

BMPs relevant to Biological Resources – Terrestrial include the following:

BMPs:

AQ-1: Use Dust Control Measures

BI-2: Minimize Impacts to Steelhead

BI-3: Remove Temporary Fills

BI-4: Minimize Adverse Effects of Pesticides on Non-Target Species

BI-5: Avoid Impacts to Nesting Migratory Birds

BI-6: Avoid Impacts to Nesting Migratory Birds from Pending Construction

BI-8: Choose Local Ecotypes of Native Plants and Appropriate Erosion-Control Seed Mixes

BI-9: Restore Riffle/Pool Configuration of Channel Bottom

BI-10: Avoid Animal Entry and Entrapment

BI-11: Minimize Predator-Attraction

HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance

HM-9: Ensure Proper Hazardous Materials Management

HM-10: Utilize Spill Prevention Measures

HM-12: Incorporate Fire Prevention Measures

WQ-1: Conduct Work from Top of Bank

WQ-2: Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms

WQ-3: Limit Impact of Pump and Generator Operation and Maintenance

WQ-4: Limit Impacts from Staging and Stockpiling Materials

WQ-5: Stabilize Construction Entrances and Exits

WQ-6: Limit Impact of Concrete Near Waterways

WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement

WQ-11: Maintain Clean Conditions at Work Sites

WQ-15: Prevent Water Pollution

WQ-16: Prevent Stormwater Pollution

Santa Clara VHP Conditions Applicable to Each Project Impact on Terrestrial Biological Resources

Condition 1: Avoid Direct Impacts on Legally Protected Plant and Wildlife Species

Condition 3: Maintain Hydrologic Conditions and Protect Water Quality

Condition 4: Avoidance and Minimization for In-stream Projects

Condition 5: Avoidance and Minimization for In-stream Operations and Maintenance

Condition 7: Rural Development Design and Construction Requirements

Condition 11: Stream and Riparian Setbacks

Condition 12: Wetland and Pond Avoidance and Minimization

Condition 13: Serpentine and Associated Species Avoidance and Minimization

Condition 17: Tricolored Blackbird

Condition 19: Plant Salvage When Impacts Are Unavoidable

Condition 20: Avoid and Minimize Impact to Covered Plant Occurrences

Santa Clara VHP-Required AMMs Related to Conditions 3, 4, and 5 That Are Applicable to Each Project Impact on Terrestrial Biological Resources

General

1: Minimize potential impacts on covered species most likely to be affected by changes in hydrology and water quality.

2: Reduce stream pollution by removing pollutants from surface runoff before the polluted surface runoff reaches local streams.

3: Maintain the current hydrograph and, to the extent possible, restore the hydrograph to more closely resemble predevelopment conditions.

6: Activities in the active (i.e., flowing) channel will be avoided, or AMMs in this table will be applied.

7: Personnel shall prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels.

8: Spill prevention kits shall always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations).

11: Vehicles shall be washed at approved areas. No washing of vehicles shall occur at job sites.

12: No equipment servicing shall be done in the stream channel or immediate floodplain, unless equipment cannot be readily relocated.

13: Personnel shall use the appropriate equipment for the job that minimizes disturbance to the stream bottom.

14: If high groundwater is present in a work area, pump it out of the work site carefully to remove sediment prior to the water re-entering a creek.

15: Implement native aquatic vertebrate relocation plan when ecologically appropriate as determined by a qualified biologist.

17: Install cofferdams both upstream and downstream not more than 100 feet from the extent of the work areas.

18: Small in-channel berms that deflect water to one side of the channel may be constructed of channel material in channels with low flows.

20: Diversions shall maintain ambient stream flows below the diversion, with no reduction or degradation.

21: If stream bed design changes are not part of the project, the stream bed will be returned to as close to pre-project condition as appropriate.

22: Remove all temporary diversion structures and the supportive material no more than 48 hours after work is completed.

23: Temporary fills, such as for access ramps, diversion structures, or cofferdams, shall be completely removed upon finishing the work.

24: To prevent increases in temperature and decreases in dissolved oxygen (DO), properly size bypass pipes or use a low-flow channel.

25: Diversions shall maintain fish passage under specified project conditions.

26: Any sediment removed from a project site shall be stored and transported in a manner that minimizes water quality impacts.

29: Existing native vegetation shall be retained by removing as much vegetation as necessary to accommodate the trail clearing width.

30: Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited.

31: When conducting vegetation management, retain as much understory brush and as many trees as feasible.

32: The top of the bank shall be protected by leaving vegetation in place to the maximum extent possible.

33: Regional Board objectives for temperature change in receiving waters shall not be exceeded.

Project Design

34: Use the minimum amount of impermeable surface (building footprint, paved driveway, etc.) practicable.

35: Use pervious materials, such as gravel or turf pavers, in place of asphalt or concrete to the extent practicable.

36: Use flow control structures such as swales, retention/detention areas, and/or cisterns to maintain the existing (pre-project) peak runoff.

39: Minimize alterations to existing contours and slopes, including grading the minimum area necessary.

40: Maintain native shrubs, trees, and groundcover whenever possible and revegetate disturbed areas with local native or non-invasive plants.

42: Use flow-control structures, permeable pavement, cisterns, and other methods to ensure no change in peak runoff.

43: Assess site conditions to determine if designs such as bioengineered bank treatments with live vegetation can be successfully utilized.

44: Maintain natural stream characteristics, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and a natural channel bed.

45: Incorporate free-span bridges that allow for upland habitat under bridges.

49: The project or activity must be designed to avoid the removal of riparian vegetation, if feasible.

51: All projects will be conducted in conformance with applicable County and/or city drainage policies.

52: Adhere to the siting criteria described for the borrow site covered activity (see Section 2 for details).

53: When possible, maintain a vegetated buffer strip between staging or excavation areas and receiving waters.

54: Outside of the construction footprint, maintain deep pools within stream reaches as refugia for fish and wildlife.

56: Bank stabilization site design shall consider hydraulic effects immediately upstream and downstream of the work area.

58: Use existing access routes/levee roads to minimize impacts of new construction in special-status species habitats and riparian zones.

61: Minimize ground disturbance to the smallest area feasible.

62: Use existing roads for access and disturbed area for staging as site constraints allow.

63: Prepare and implement sediment erosion control plans.

64: No winter grading shall occur unless approved by City Engineer and specific erosion control measures are incorporated.

65: Control exposed soil by stabilizing slopes (e.g., with erosion control blankets) and protecting channels.

66: Control sediment runoff using sandbag barriers or straw wattles.

67: No stockpiling or placement of erodible materials shall occur in waterways or along areas of natural stormwater flow.

68: Stabilize stockpiled soil with geotextile or plastic covers.

69: Maintain construction activities within a defined project area to reduce the amount of disturbed area.

70: Clear/prepare land which will be actively under construction in the near term.

71: Preserve existing vegetation to the extent possible.

72: Equipment storage, fueling, and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel.

73: Avoid wet season construction.

74: Stabilize site ingress/egress locations.

75: Dispose of all construction waste in designated areas and prevent stormwater from flowing onto or off of these areas.

76: Prevent spills and clean up spilled materials.

77: Sweep nearby streets at least once a day.

78: In-stream projects occurring while the stream is flowing must use appropriate measures to protect water quality and native aquatic species.

80: All personnel working in or adjacent to the stream setback will be trained by a qualified biologist in AMMs.

83: Sediments will be stored and transported in a manner that minimizes water quality impacts.

84: Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site.

86: Topsoil removed during soil excavation will be preserved and used as topsoil during revegetation when it is necessary.

87: Vehicles operated within and adjacent to streams will be checked and maintained daily to prevent leaks.

88: Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.

89: The potential for traffic impacts on terrestrial animal species will be minimized by adopting traffic speed limits.

90: All trash will be removed from the site daily to avoid attracting potential predators to the site.

91: To prevent the spread of exotic species and reduce the loss of natives, aquatic species will be netted; natives will be released, exotics removed.

92: To minimize the spread of pathogens, all staff working in aquatic systems will adhere to equipment decontamination guidelines.

93: When accessing upland areas adjacent to riparian areas or streams, access routes on slopes > 20% should generally be avoided.

94: Personnel shall use existing access ramps and roads if available.

95: To minimize entrapment of animals, the project biologist or job foreman will survey the work area at the end of daily activities to identify and remediate conditions that might trap animals.

97: Erosion control measures shall be in place at all times during construction.

98: When needed, utilize in-stream grade control structures to control channel scour, sediment routing, and headwall cutting.

Post-Construction

99: Conduct street cleaning on a regular basis.

100: Potential contaminating materials must be stored in covered storage areas or secondary containment impervious to leaks and spills

101: Runoff pathways shall be free of trash containers or trash storage areas. Trash storage areas shall be screened or walled.

102: Immediately after project completion and before close of seasonal work window, stabilize all exposed soil.

103: All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species.

104: Measures will be utilized on site to prevent erosion along streams (e.g., from road cuts or other grading).

110: If debris blockages threaten bank stability and may increase sedimentation of downstream reaches, debris will be removed.

111: If bank failure occurs due to debris blockages, bank repairs will use compacted soil and reseeding with native/sterile nonnative plants.

112: Pumps and generators shall be maintained and operated in a manner that minimizes impacts to water quality and aquatic species.

Applicable Mitigation Measures

TERR-1a(1) Invasive Plant Management at Coyote Ridge Tiburon Paintbrush Population

Valley Water will offset impacts from Project-related nitrogen deposition on Tiburon paintbrush by providing for invasive plant management in and around the two Tiburon paintbrush populations currently known to occur on Coyote Ridge, including the “Paintbrush Hill” population on Valley Water’s Coyote Ridge property and the “Paintbrush Canyon” population on land owned by Waste Management, Inc. Nitrogen deposited on nutrient-poor serpentine soils facilitates the ability of nonnative grasses and forbs to compete with serpentine endemic plants such as Tiburon paintbrush, so invasive plant management would directly address and reduce the impacts of nitrogen deposition. During each year of construction for the Ogier Ponds CM, as well as the year following completion of that CM, Valley Water will perform manual weeding of plants considered to be of moderate or high invasiveness by Cal-IPC (2022) on the Paintbrush Hill population and perform manual weeding or fund weeding at the Paintbrush Canyon population. Weeding may be performed by hand or using hand-held motorized tools (e.g., line trimmers) as long as no impacts to individual Tiburon paintbrush plants would occur. Special care will be taken to avoid trampling individual Tiburon paintbrush plants, which are quite fragile.

TERR-1a(2) Implementation of Avoidance and Minimization Measures during Post-Construction Maintenance at Anderson Dam and Conservation Measures Facilities to Reduce the Potential for Introduction or Spread of Phytophthora

Valley Water will develop and implement AMMs to reduce the potential for introduction and spread of *Phytophthora* during post-construction maintenance at Anderson Dam, because the DMP (under which post-construction maintenance would occur) does not include AMMs for this purpose. AMMs will also be implemented during maintenance of Conservation Measures facilities to reduce the potential for introduction and spread of *Phytophthora* during post-construction maintenance to affect sensitive communities. The AMMs will include a description of areas that are contaminated with *Phytophthora*; sensitive habitats that are not contaminated with *Phytophthora*; procedures for decontamination of tools, equipment, vehicles, and maintenance personnel clothing and footwear prior to accessing those sensitive habitats; procedures for ensuring that water for irrigation or dust suppression, soil, mulch, plant material, and other materials are free from *Phytophthora* if used in, near, or upslope from sensitive habitats that are not contaminated with *Phytophthora*; decontamination procedures for vehicles, equipment, tools, footwear, and personnel clothing after working in areas contaminated by Phytophthora; and other procedures deemed necessary. Details of the BMPs will be developed following Project completion, as they will be informed by the results of *Phytophthora* monitoring during, and following completion of, Project construction.

TERR-1a(3) Special-Status Plant Survey in the Previously Unsurveyed Portions of the Seismic Retrofit Area

Valley Water will conduct a survey for special-status plants in the limited portions of the Seismic Retrofit Area that provide potential special-status plant habitat but have not yet been surveyed (see **Figure 3.5-10**). The survey will be conducted according to VHP standards and protocols, by a VHP-approved botanist, and will be floristic in nature so that all potentially occurring special-status plants are detected if present. Multiple site visits will be necessary to detect all the potentially occurring species by targeting their flowering periods. If any San Francisco collinsia are detected, impacts will be mitigated by adding those detected individuals to the population that will be created by **Mitigation Measure TERR-1a(4)**. If other special-status plants are detected, impacts will be reduced with implementation of **Mitigation Measure TERR-1a(2).**

TERR-1a(4) San Francisco Collinsia Conservation Measures

Valley Water will compensate for impacts on San Francisco collinsia by performing weed management in the existing population during Seismic Retrofit construction, collecting seed from San Francisco collinsia plants at Anderson Reservoir; storing some of the seed in an accredited seed bank; and prepping, seeding, managing, and monitoring suitable habitat at one or more sites outside the Project Area to create one or more new populations of the species. The mitigation will be commensurate with the impacts, targeting at least 0.6 acres of occupied habitat supporting at least 3,022 individuals, based on the average population size and extent between 2011 and 2022, plus any individuals that might be detected in the previously unsurveyed portions of the Seismic Retrofit Area during the survey described in **Mitigation Measure TERR-1a(3)**. Prior to Project implementation, a qualified biologist will prepare an HMMP that will include, at a minimum, the following information:

- summary of impacts and proposed mitigation

- description of the location and boundaries of the proposed mitigation site(s) and description of existing site conditions
- description of the mitigation design and any measures to be undertaken to enhance (e.g., through focused management) the mitigation site for San Francisco collinsia, which may include prescribed burning or other habitat management strategies
- identification of an adequate funding mechanism for long-term management of the mitigation site
- description of management and maintenance measures intended to maintain and enhance habitat for San Francisco collinsia (e.g., weed control or fencing maintenance)
- description of germination methods and planting techniques that will be used to introduce the species into the mitigation site, although this information on San Francisco collinsia may not be well known, the related native annual species purple collinsia (*Collinsia heterophylla*) is available commercially and is described as easy to grow, requiring no pre-treatments, and with seeds shallowly sown into loosened topsoil (Everwilde Farms 2022, Swallowtail Garden Seeds 2022)
- description of habitat and species monitoring measures on the mitigation site, including specific, objective performance criteria (e.g., rate of germination and survival to seed-set; at a minimum, performance criteria will include presence of at least as many individuals as were impacted within the population by Year 7 of monitoring), monitoring methods, data analysis, reporting requirements, and monitoring schedule; monitoring will document compliance with each element requiring habitat compensation or management
- a contingency plan for mitigation elements that do not meet performance or final success criteria within described periods. The plan will include specific triggers for remediation if performance criteria are not met and a description of the process by which remediation of problems within the mitigation site (e.g., presence of noxious weeds) will occur
- a requirement that Valley Water will be responsible for monitoring, as specified in the HMMP, for at least 7 years post-construction

Valley Water has already been collecting seed from San Francisco collinsia plants at Anderson Reservoir and has banked this seed at the California Botanic Garden (formerly known as Rancho Santa Ana Botanic Garden) and the University of California, Santa Cruz Arboretum. Given the ease with which another native collinsia species, purple collinsia, can be cultivated and grown as a landscape plant (Everwilde Farms 2022, Swallowtail Garden Seeds 2022), it is likely that growing San Francisco collinsia by seed and establishing a new population to compensate for any affected occurrences is feasible if a suitable introduction site is identified. While some of the seed collected from this population will be used in the mitigation effort, the remaining seed will continue to be maintained in permanent conservation storage at the California Botanic Garden.

Although the majority of the collinsia population will be impacted directly when the reservoir is refilled following completion of Seismic Retrofit construction, maintaining a healthy collinsia population until the reservoir refills is important to allow for collection of seed as described above and to maximize the number of individuals that might persist along the shoreline after the reservoir is refilled. During Seismic Retrofit construction, Valley Water will remove weedy vegetation that threatens to outcompete San Francisco collinsia by encroaching into the area occupied by San Francisco collinsia due to the reservoir drawdown. At least once each spring or summer, a qualified botanist will determine which weedy vegetation (which may include both native and nonnative species encroaching into the collinsia population) needs to be removed to maintain suitable habitat conditions for collinsia. That vegetation will be removed under the direction of the qualified botanist.

TERR-1c(1) Special-Status Species Avoidance and Minimization Measures During Year 6 Reservoir Dewatering

Valley Water and/or its contractor will implement the following AMMs during Year 6 construction activities (i.e., dewatering; movement of construction personnel, vehicles, and equipment; or storage or stockpiling of equipment or materials) in the dewatered bed of Anderson Reservoir:

- Prior to Year 6 construction activities, Valley Water will obtain approval from USFWS and CDFW of appropriate relocation sites for all life forms of the California tiger salamander, California red-legged frog, foothill yellow-legged frog, and northwestern pond turtle.
- A qualified biologist approved by USFWS and CDFW (hereafter "approved biologist") will conduct a preactivity survey for all life forms of the California tiger salamander, California red-legged frog, and northwestern pond turtle (as well as the foothill yellow-legged frog, even though it is unlikely to be present) in areas where they could be stranded or desiccated as those pools are pumped out or dry out. Any individuals detected will be moved to USFWS/CDFW-approved relocation sites.
- Within 48 hours prior to the start of construction or other activities within the bed of the reservoir, following dewatering in the spring of Year 6, an approved biologist will conduct a preactivity survey for all life forms of the California tiger salamander, California red-legged frog, foothill yellow-legged frog, and northwestern pond turtle in areas where they could be subject to impacts from activities in the bed of the reservoir during Year 6 construction. Any individuals detected will be moved to USFWS/CDFW-approved relocation sites.
- Before any heavy equipment stored overnight is moved, a dedicated member of the construction crew trained by an approved biologist will inspect the area underneath and around the equipment to determine that no California tiger salamanders, California red-legged frogs, foothill yellow-legged frogs, or northwestern pond turtles are present and at risk of being crushed by moving equipment. If an individual of one of these species is present in an area where it could be killed or injured by Project activities, that member of the construction crew will contact the approved biologist, who will capture and relocate the animal to a USFWS/CDFW-approved relocation site.
- An approved biologist will be onsite or on-call during all activities that could result in the take of the California tiger salamander, California red-legged frog, foothill yellow-legged frog, or northwestern pond turtle to determine that all Conservation Measures are being implemented appropriately and to relocate any individual of these species that needs to be relocated to avoid injury or mortality.

TERR-1c(2) Nonnative Species Management in Upper Penitencia Creek Watershed

During each year in which steelhead relocation to Upper Penitencia Creek occurs during Project construction, prior to relocation, Valley Water will perform management of nonnative species that could adversely affect special-status amphibians and reptiles on Valley Water-owned properties in the Upper Penitencia Creek watershed. Such management will include the removal and euthanasia of bullfrogs, nonnative fish, and/or nonnative turtles from selected ponds on Valley Water's Upper Penitencia Creek watershed properties. Prior to performing annual nonnative species management, Valley Water will provide the USFWS and CDFW a description of the proposed nonnative species management and obtain those agencies' approval of the management activities. Following the implementation of the annual nonnative species management, Valley Water will provide the USFWS and CDFW a brief report summarizing the management actions performed.

TERR-1e Nesting Eagle Avoidance and Minimization Measures

Valley Water and/or its contractor will implement the following avoidance and minimization measures during Seismic Retrofit construction:

- Prior to drawdown of Anderson Reservoir and commencement of work activities within the reservoir bed during each year of construction (which would occur around April 15), Valley Water will perform surveys to identify the locations of active bald and golden eagle nests in areas where they might be disturbed by upcoming construction activities that would occur during the eagle breeding season and post-fledging dependency period for juvenile eagles (January 1 through August 31). Such surveys will focus on areas within 0.5 miles for blasting, 330 feet for nonmotorized human activities, and 660 feet for other project activities for bald eagle nests, and within 2 miles for blasting and 1 mile for other project activities for golden eagle nests.
- To the extent feasible, as determined by Valley Water's Project engineer, based on their assessment of whether alternative locations for Project activities that can maintain the appropriate buffers can be used during construction, construction activities will maintain buffers of 0.5 miles for blasting, 330 feet for nonmotorized human activities, and 660 feet for other project activities for bald eagle nests and 2 miles for blasting and 1 mile for other project activities for golden eagle nests, during the breeding season and post-fledging dependency period for juvenile eagles (January 1 through August 31). These buffers would apply during the courtship and egg-laying phases of the breeding season (January 1 through April 15). After April 15, if a qualified biologist confirms that the eagles did not lay eggs, or that a nest is no longer in use because the nest has failed or young are no longer dependent on adults, the buffers would not be necessary around that nest during that construction season.
- If Valley Water's Project engineer determines that the aforementioned buffers cannot feasibly be maintained around an active nest, as described above:
    - Valley Water will coordinate with CDFW and USFWS to determine whether there are feasible minimization measures that can be implemented to avoid or minimize disturbance of nesting eagles.
    - For nests that can be observed from accessible areas, a qualified biologist will monitor the eagles' behavior at the nest as work occurs to determine whether

there are any specific work activities that would disturb the birds, which may inform the identification of additional minimization measures.

If Valley Water determines that a work activity in the coming year must occur so close to a routinely used eagle nest (i.e., a nest used in the prior 2 years) that there is a high likelihood of nest abandonment once work commences in spring of a given year, Valley Water will coordinate with CDFW and USFWS to determine whether deterring nesting, prior to egg-laying, is appropriate.

TERR-1g Burrowing Owl Impact Avoidance

Although burrowing owls have not been observed breeding in the Project Area, preconstruction surveys will be conducted, regardless of the season, prior to construction in any area providing burrowing owl refugia, as determined by a qualified biologist retained by Valley Water, due to the potential occurrence of migrant, wintering, or dispersing burrowing owls. A qualified biologist will determine whether potential roost sites (e.g., burrows of California ground squirrels, or riprap) is present in, or within 250 feet of, the work area. If suitable habitat is present within these areas, a preconstruction survey will be performed within 7 days of the start of work activities. If a burrow with signs of burrowing owl presence (e.g., whitewash, pellets, and/or feathers) is observed during the preconstruction survey but no burrowing owl is present, a second survey will be performed within 24 hours prior to the start of work to determine whether burrowing owls are present. The second survey will occur between morning civil twilight and 10:00 a.m., or between 2 hours before sunset and evening civil twilight, to provide the highest detection probability. If no burrowing owls are found during the preconstruction surveys, the work may proceed. If burrowing owls are detected during the surveys and/or during the course of construction activities, the following measures will be implemented.

- If occupied burrows are identified, no new activities (i.e., activities that were not ongoing when the burrow was established) will occur within a 250-foot buffer zone during the nesting season (defined as February 1 to August 31). However, the buffer may be reduced with CDFW and SCVHA approval.
- After the nesting season, work may occur within the 250-foot buffer zone provided:
  - A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction).
  - The same qualified biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities.
  - If there is any change in owl foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer.
  - If the owls are gone for at least one week, the Project proponent may request approval from the SCVHA that a qualified biologist excavate the usable burrows to prevent owls from re-occupying the site. After the usable burrows are excavated, the buffer zone will be removed, and construction may continue.
  - Monitoring must continue as described above for the nonbreeding season as long as the burrow remains active.
- In the event that passive relocation of burrowing owls from burrows must occur for Project activities to continue, Valley Water will coordinate with the CDFW and SCVHA to determine the appropriate procedures for relocation.

TERR-1h(1) Avoid Disturbance of the Cochrane Road Barn Roost

The most important component of the pallid bat population near Anderson Dam is the offsite Cochrane Road barn in which the maternity colony is located. Measures to avoid and minimize disturbance of bats using the barn could avoid causing the abandonment of this roost. To the extent feasible (as determined by Valley Water's Project engineer, based on their assessment of whether Project activities can proceed while implementing the appropriate measures during construction), Valley Water will implement the following measures during the maternity season (April 1 to August 31), if bats are using the barn in a given year:

- With the exception of vehicular use of Cochrane Road, Project-related activities, including staging of equipment and laydown of materials, will maintain a buffer from the barn of at least 65 feet for foot traffic; 90 feet for motor vehicles; 120 feet for operation of heavy equipment; 150 feet for trenching; 250 feet for idling equipment or generators; 250 feet for shielded lighting; and 400 feet for unshielded lighting.
- Lighting, both for construction and Project operations, will be directed away from the barn and designed to minimize any increase in lighting around the barn. Examples of design features that may be implemented to minimize lighting increases include shielding of lights, adaptation of light pole arm length and mast height to site-specific conditions, and placing light poles at non-standard intervals.
- All light-emitting diodes (LEDs) or bulbs installed for Project construction or operation will be rated to emit or produce light at or under 2700 Kelvin unless higher-Kelvin lighting is necessary for the particular activity being performed.

Fencing or other appropriate materials will be placed around the Cochrane Road barn to indicate to construction personnel the limits of the buffers listed above. These measures can be relaxed (e.g., buffers reduced) if a qualified biologist, in consultation with the CDFW, determines that the risk to the colony of evicting the bats (per **Mitigation Measure TERR-1h(2)** below), so that they are not present in the barn during the maternity season, exceeds the risk of allowing Project activities to occur within buffers less than those described above. These measures will also be implemented, to the extent feasible (as determined by Valley Water's Project engineer, based on their assessment of whether Project activities can proceed while implementing the appropriate measures during construction), during the remainder of the year (September 1 to March 31) to avoid causing disturbance to the point that bats abandon the barn roost. Again, a qualified biologist, in consultation with CDFW, may determine that the risk to the colony of evicting the bats (per **Mitigation Measure TERR-1h(2)** below) exceeds the risk of allowing Project activities to occur within buffers smaller than those described above, allowing these measures to be relaxed.

A biological monitor will observe the Cochrane Road barn during initial activities conducted within the buffers described above, and periodically (weekly or more frequently) during Seismic Retrofit construction to determine whether there is any evidence that the colony is being disturbed by construction activities. If the biological monitor observes any such evidence of disturbance, the monitor will notify a qualified biologist who would determine (in consultation with CDFW) whether any feasible measures, such as increased buffers, can be implemented to avoid or reduce disturbance.

TERR-1h(2) Evict Pallid Bats prior to Initiating Maternity-Season Disturbance near the Cochrane Road Barn Roost

If prior to the maternity season it is determined by Valley Water's project engineer that it will not be feasible to maintain the buffers described in **Mitigation Measure TERR-1h(1)**, Valley Water may need to evict the bats roosting in the Cochrane Road barn prior to the maternity season to prevent abandonment of young (e.g., if construction starts during the maternity season) and to provide females with the opportunity to look for alternative, less disturbed roost sites in which to bear young. A qualified biologist retained by Valley Water (in consultation with CDFW) will determine, based on the type and level of disturbance that would occur during the upcoming maternity season, whether it is appropriate for the bats to be evicted or whether the proposed disturbance is of such a minor nature that eviction is unnecessary. In some circumstances, it may be preferable to allow roosting bats to continue using a roost while construction is occurring near the roost site. If it is determined that the risks to bats from eviction (e.g., increased predation or exposure, competition for roost sites, or long-term abandonment of the roost) are greater than the risk of colony abandonment, then the bats will not be evicted.

If the qualified biologist determines that eviction of bats is necessary to avoid abandonment of young, eviction will occur at night to decrease the likelihood of predation (compared to eviction during the day). Eviction will occur between September 1 and March 31, outside the maternity season. For example, if Valley Water and the qualified biologist determine that the Project activities planned for the upcoming maternity season are likely to disturb roosting bats to the point of causing abandonment of an active maternity colony, the bats will be evicted prior to the beginning of that maternity season. Eviction will not occur during long periods of inclement or cold weather (as determined by the qualified biologist) when prey is not available or bats are in torpor. Eviction activities will be planned by and performed under the supervision of a qualified biologist (in consultation with CDFW).

The precise eviction methods will be determined by the qualified biologist to minimize physical alterations of the Cochrane Road barn, recognizing its historical importance. Eviction may occur via removal of some of the boards on the barn to increase airflow through the barn, thereby reducing the suitability of thermal conditions within the roost. Alternatively, one-way doors may be installed in crevices being used for roosting to allow bats to exit the roost at night but not to re-enter. Following eviction, bat exclusion devices may be installed or left in place to prevent bats from taking up occupancy of the structure prior to the onset of the Project activities.

Exclusion devices may be removed after Project activities within the buffers described in **Mitigation Measure TERR-1h(1)** have reached their peak intensity in terms of level of activity of heavy equipment and night lighting, and proximity of those activities to the barn roost. At that point, removal of exclusion devices will allow those bats tolerant of such activities to resume use of the barn, without risk that activities will increase in intensity. Any exclusion devices in place when Project construction has been completed will be removed at that time.

TERR-1h(3) Minimize Impacts on Pallid Bats Roosting Outside the Cochrane Road Barn

Although the Cochrane Road barn is the center of activity for the female pallid bats associated with this roost, males likely roost during the day in smaller groups (or singly) in other locations nearby, and females may day-roost in other locations as well, particularly during the nonbreeding season. In addition, pallid bats could roost in trees outside the Seismic Retrofit

Area, such as in the Conservation Measure Project Area. Because pallid bats may use a variety of such nonbreeding day-roosts, it is unknown which roosts may be occupied by pallid bats when Project activities disturb various locations. Therefore, Valley Water will implement measures during construction to minimize the likelihood of injury or mortality of individual pallid bats using roosts other than the Cochrane Road barn.

Prior to removal of any trees greater than 8 inches in diameter at breast height, a qualified biologist retained by Valley Water will inspect trees identified for removal for cavities, crevices, or deep bark fissures that may be suitable for use by roosting pallid bats. If any trees contain such features, potential for bat presence will be presumed. All suitable roost trees will be removed over a 2-day period under the supervision of a qualified biologist according to the following procedures. On the first day, the trees will be limbed but not entirely removed. In the afternoon, chainsaws will be used to remove tree limbs that do not contain suitable bat roosting habitat (e.g., cavities, crevices, and deep bark fissures); the disturbance and modification of the tree will discourage any bats roosting within from returning to the roost the next morning. On day 2, the rest of the tree with suitable roosting features will be removed.

Similarly, prior to activities involving physical impacts on rock outcrops providing crevices suitable for roosting pallid bats, a qualified biologist will inspect the outcrops to identify suitable crevices. Depending on the locations and dimensions of the crevices, the qualified biologist will identify the most suitable means of encouraging bats to leave the crevices before rock outcrops are removed or destroyed. Examples of measures may include removal of portions of the outcrop, so that the disturbance and modification of the roost site discourages bats from returning once they have departed the roost; using bright, portable lights to illuminate the crevices, discouraging bats from returning to the crevices once they have exited; or installation of one-way doors in the crevices. Such measures will be implemented under the supervision of a qualified biologist.

Removal of potentially suitable bat roosting trees and eviction of bats from rock outcrops will not occur under unfavorable weather conditions (i.e., when nighttime temperatures are below 45°F or when it is rainy) and will occur outside the April 1-August 31 maternity season unless a qualified biologist surveys the trees or outcrops and determines that no maternity roost is present.

Similar preactivity surveys will be performed prior to any work within 120 feet of potential roost trees or rock outcrops for operation of heavy equipment; 150 feet for trenching; 250 feet for idling equipment or generators; 250 feet for shielded lighting; and 400 feet for unshielded lighting. Such surveys will be conducted by a qualified biologist within 2 weeks prior to the initiation of these activities near mature trees or structures that could provide suitable roost sites. If active pallid bat roosts are detected, the buffers, as described above, will be maintained during the maternity season. Outside the maternity season, the bats will be evicted under the direct supervision of the qualified biologist.

TERR-1h(4) Provide Alternative Pallid Bat Maternity Roost Structures

It is possible that Project disturbance, including construction activity and lighting near the Cochrane Road barn roost, the large-scale (albeit temporary) disturbance of foraging habitat on Anderson Dam, and/or eviction of bats per **Mitigation Measure TERR-1h(2)**, will cause the pallid bats to abandon the barn altogether or to return in reduced numbers. Therefore, if construction cannot comply with the buffers described in **Mitigation Measure TERR-1h(1)**, or if bats are evicted from the barn, Valley Water will provide an alternative bat roost and install it in an appropriate location near the Project Area at least six months prior to the initiation of Project construction or eviction of bats from the barn. A qualified biologist retained by Valley Water will design and determine an appropriate location for an alternative roost structure, based on the location of the original roost, habitat conditions in the vicinity, and areas of Project disturbance. The roost structure may be built to specifications determined by a qualified biologist or may be purchased from an appropriate vendor (although the qualified biologist must determine that the roost is appropriate for pallid bats). The bat roost structure will be installed in a location close to the barn but far enough from planned Project activities that Project construction is unlikely to disturb bats. The design and location of any alternative bat roost will be determined by the qualified biologist in coordination with CDFW.

Valley Water will monitor the alternative roost and the existing Cochrane Road barn for up to 3 years following Seismic Retrofit completion to determine use by bats. This mitigation measure will be deemed successful if at least 79 female pallid bats (or 75 percent of the highest number documented during the maternity season in any year between 2022 and start of construction, if additional monitoring is performed) are observed using a combination of the artificial roost and the barn following Project completion. Monitoring need not continue once this performance standard has been reached, even if 3 years of monitoring have not been completed. If by Year 3, at least 79 female pallid bats have not been recorded using a combination of the alternative roost structure and the barn, a qualified biologist, in consultation with CDFW, will identify alternative roost designs or locations for placement of the roost (or additional roost structures), and Valley Water will monitor the new roost structure(s) for an additional three years (or until the success criterion has been met, whichever occurs first).

TERR-1j Contribution to Baylands Predator Management and High Tide Refugia Enhancement

Valley Water will contribute funds to be used for predator management and enhancement of vegetation providing high tide refugia in areas where predation of the California Ridgway's rail, California black rail, salt marsh harvest mouse, and/or salt marsh wandering shrew could occur in South San Francisco Bay. For predator management, Valley Water will provide $22,500 in funding (approximately half of the entire 2022 predator management budget for the Don Edwards San Francisco Bay National Wildlife Refuge [Refuge]) for each year during Seismic Retrofit construction in which flows through Anderson Dam exceed 2,500 cfs. Valley Water will develop and implement an agreement with the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS), which performs predator management in coordination with the Refuge. That agreement will specify the funding that Valley Water will provide for management of avian and mammalian predators and, generally, how APHIS personnel will use those funds. In any given year, how those funds are spent will be determined by Refuge biologists, who routinely work with APHIS to prioritize predator management needs based on the most pressing predation issues occurring around the Refuge, on special-status species, at that time.

Prior to the start of Seismic Retrofit construction, Valley Water will provide APHIS with $45,000 in funding, representing 2 years of predator management activities. This funding will be provided in advance of impacts from greater than 2,500-cfs flows through the dam actually occurring, and for more than 1 year of predator management, to assist APHIS in planning for its staffing needs to perform the necessary predator management. Subsequently, during each year of Seismic Retrofit construction, Valley Water will monitor whether flows through Anderson Dam exceed 2,500 cfs. If such flows occur in a given calendar year, $22,500 will be debited from the initial payment of $45,000. If flows exceed 2,500 cfs in 2 years during construction, Valley Water will provide another $22,500 payment for another, future year of predator management. Valley Water will continue to make such payments for each year in which flows exceed 2,500 cfs during Seismic Retrofit construction.

For enhancement of high tide refugia, Valley Water will contribute funds to one or more ongoing programs that focus on removal of nonnative marsh vegetation and/or planting or management of native marsh vegetation that provides suitable high tide refugia for species such as the California Ridgway's rail and salt marsh harvest mouse. Examples of programs to which Valley Water might contribute include the San Francisco Bay Sea Lavender Control Program, the Invasive Spartina Project (to which Valley Water might contribute funds for restoration rather than invasive Spartina control), or revegetation efforts performed by Save the Bay or other organizations. Valley Water will contribute $20,000 to such programs for each year in which flows exceed 2,500 cfs during Seismic Retrofit construction.

3.6 Cultural Resources

Applicable Best Management Practices and VHP Conditions

BMPs relevant to cultural resources include the following:

AQ-1: Use Dust Control Measures

CU-1: Accidental Discovery of Archaeological Artifacts or Burial Remains

No VHP conditions are applicable to Cultural Resources.

Applicable Mitigation Measures

CR-1 Preconstruction Cultural Resources Awareness Training

Valley Water will provide a cultural resources awareness training program to all construction personnel within the various construction areas during earth moving activities throughout the duration of Project construction. The training will be conducted in person, or via a video or PowerPoint presentation to be viewed by all construction personnel involved in ground-disturbing activities prior to working on the Project. The training will be developed and conducted in coordination with a qualified archaeologist who meets the U.S. Secretary of the Interior Professional Qualifications Standards for Archeology, as well as a representative from culturally affiliated California Native American Tribe(s) who have participated in consultations with Valley Water. The program will include relevant information regarding sensitive cultural resources (including human remains and burials), applicable regulations, protocols for avoidance, and consequences of violating state laws and regulations. The worker cultural resources awareness program will also describe appropriate avoidance and minimization measures for resources that have the potential to be located within the Project construction area and will outline what to do and whom to contact if any potential archaeological resources, human remains and burials, or artifacts are encountered. The program will emphasize the requirement of confidentiality and culturally appropriate treatment of any finds of significance to Native Americans, and behaviors consistent with Native American Tribal values.

CR-2 Prepare a Data Recovery and Treatment Plan for Historical Resources that cannot be Avoided

The preferred treatment for impacts to archaeological sites, including those identified as Tribal cultural resources, is avoidance, as directed under *CEQA Guidelines* 15126.4(b)(3)(b)(1) and PRC 21084.3. Valley Water has designed the Project to avoid archaeological sites that are historical resources, where feasible; however, not all archaeological sites could be avoided by design. As a result, a Data Recovery and Treatment Plan will be prepared by a qualified archaeologist who meets the U.S. Secretary of the Interior Professional Qualifications Standards for Archeology, to address impacts to those archaeological historical resources that cannot be avoided by Project construction. The Data Recovery and Treatment Plan will be developed consistent with requirements in PRC Section 21083.2 and Section 15126.4(b) of the *CEQA Guidelines*. The Data Recovery and Treatment Plan will include a research design to identify research questions as the focus of data recovery efforts, as well as detail the field and laboratory methods to address the questions. The Data Recovery and Treatment Plan will also include a specific discussion of the methods and level of effort at each site for data recovery excavations, which are an acceptable form of mitigation under Section 15126.4(b)(3)(c) of the *CEQA Guidelines*. Specific plans for Native American sites will be prepared in consultation with Native American Tribes who participated in EIR Tribal consultation. Valley Water will require that data recovery and treatment be scheduled such that the actions will be completed in advance of construction involving impacted sites. The Data Recovery and Treatment Plan protocols will also be used for addressing accidental discoveries, as discussed in **Mitigation Measure CUL-3**.

The Plan will specify that if human remains are discovered, procedures for notification of the County Coroner and for the disposition of Native American human remains under Health and Safety Code Section 7050.5 and PRC Section 5097.5 will be followed.

CR-3 Prepare a Monitoring and Unanticipated Discoveries Plan

Valley Water will prepare a Monitoring and Unanticipated Discoveries Plan in consultation with participating Native American Tribes prior to the initiation of Project construction. The Monitoring and Unanticipated Discoveries Plan will provide that a qualified archaeologist will monitor ground disturbance (e.g., grading, trenching, vegetation clearing and grubbing with a backhoe or other mechanical methods, etc.) in all areas sensitive for archaeological sites, such as those adjacent to Coyote Creek or other water sources. Valley Water will coordinate with participating Native American Tribes to retain a tribal monitor to work in tandem with the archaeological monitor. Monitoring will take place at locations within 50 feet of known archaeological historical resources and at locations identified as cultural resource environmentally sensitive areas in the Plan. Monitoring will also occur in areas identified by the archaeological principal investigator as sensitive for buried archaeological deposits. Protocols for monitoring, such as scheduling, personnel responsibilities, chain of command, and reporting, will be detailed in the Monitoring and Unanticipated Discoveries Plan.

The Monitoring and Unanticipated Discoveries Plan will also address the accidental discovery of archaeological resources and incorporate the guidelines of BMP CU-1(accidental discovery of archaeological artifacts or burial remains), including issuance of a stop work order and establishment of a no work zone in the immediate vicinity of the find. The area of the discovery will be flagged to delineate the boundary of the sensitive zone. If either an archaeological or Tribal monitor are not present at the time of the discovery, a qualified archaeologist, who meets the U.S. Secretary of the Interior Professional Qualifications Standards for Archeology, will visit the discovery site, as soon as practicable for identification and evaluation pursuant to Section 21083.2 of the PRC and Section 15064.5 of the *CEQA Guidelines*. If the archaeologist determines that the archaeological find is not a “historical” or “unique archaeological” resource and thus not significant, construction may resume. If the archaeologist determines that the archaeological find is significant, the archaeologist will determine if the find can be avoided and, if so, will detail avoidance procedures. If the archaeological find cannot be avoided, the archaeologist will develop an Action Plan within 48 hours which will include provisions to minimize impacts and, if required, a Data Recovery and Treatment Plan that will follow the protocols outlined in the Data Recovery and Treatment Plan described in Mitigation Measure CR-2.The Plan will specify that if human remains are discovered, procedures for notification of the County Coroner and for the disposition of Native American human remains under Health and Safety Code Section 7050.5 and PRC Section 5097.5 will be followed.

Valley Water will also retain a qualified archaeologist to implement monitoring every five years of the vicinity of the nine archaeological sites that are historical resources within the reservoir fluctuation zone, including the two sites that are known to contain human remains (P-43-004083, P-43-004085). A Data Recovery and Treatment Plan will be prepared for any sites exposed by reservoir fluctuations. The Plan will specify that any remains exposed during reservoir fluctuations will be treated consistent with Health and Safety Code Section 7050.5 and PRC Section 5097.5 procedures, and in accordance with the desires of the culturally affiliated California Native American Tribes. The specifics of the monitoring and treatment protocols will be developed in consultation with participating Tribes and also detailed in the Monitoring and Unanticipated Discoveries Plan.

3.9 Energy

Applicable Best Management Practices

BMPs relevant to energy include the following:

AQ-1: Use Dust Control Measures

No VHP conditions are applicable to Energy.

Applicable Mitigation Measures

AQ-1 Implement Construction Criteria Air Pollutants Reduction Measures

GHG-1 Utilize Electrification and Renewable Fuels During Construction

3.8 Geology and Soils

Applicable Best Management Practices, VHP Conditions, and VHP Avoidance Minimization Measures

BMPs relevant to geology and soils include the following:

GEN-20: Erosion and Sediment Control Measures

GEN-21: Staging and Stockpiling of Materials

AQ-1: Use Dust Control Measures

BI-3: Remove Temporary Fill

BI-8: Choose Local Ecotypes of Native Plants and Appropriate Erosion Control Seed Mixes

WQ-4: Limit Impacts from Staging and Stockpiling Materials

WQ-5: Stabilize Construction Entrances and Exits

WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement

BANK-1: Bank Stabilization Design to Prevent Erosion Downstream

REVEG-1: Seeding

VHP Conditions:

- Condition 3, Maintain Hydrologic Conditions and Protect Water Quality
- Condition 4, Avoidance and Minimization for In-Stream Projects
- Condition 5, Avoidance and Minimization for In-Stream Operations and Maintenance
- Condition 7, Rural Development Design and Construction Requirements
- Condition 8, Implement Avoidance and Minimization Measures for Rural Road Maintenance
- Condition 11, Stream and Riparian Setbacks
- Condition 12, Wetland and Pond Avoidance and Minimization

In addition, the following VHP AMMs would apply to geology and soils relate to erosion control, slope stability, and paleontological resources (that could be unearthed through erosion or landslide).

VHP Aquatic AMMs

3: Maintain the current hydrograph and, to the extent possible, restore the hydrograph to more closely resemble predevelopment conditions.

4: Reduce the potential for scour at stormwater outlets to streams by controlling the rate of flow into the streams.

6: Activities in the active (i.e., flowing) channel will be avoided.

13: Personnel shall use the appropriate equipment for the job that minimizes disturbance to the stream bottom. Appropriately-tired vehicles, either tracked or wheeled, shall be used depending on the situation

16: When work in a flowing stream is unavoidable, the entire streamflow shall be diverted around the work area by a barrier, except where it has been determined by a qualified biologist that the least environmentally disruptive approach is to work in a flowing stream. Where feasible, water diversion techniques shall allow stream flows to gravity flow around or through the work site.

17: Coffer dams shall be installed both upstream and downstream not more than 100 feet from the extent of the work areas. Coffer dam construction shall be adequate to prevent seepage into or from the work area. Stream flow will be pumped around the work site using pumps and screened intake hoses. All water shall be discharged in a nonerosive manner (e.g., gravel or vegetated bars, on hay bales, on plastic, on concrete, or in storm drains when equipped with filtering devices, etc.).

18: Small in-channel berms that deflect water to one side of the channel during project implementation may be constructed of channel material in channels with low flows.

20: Diversions shall maintain ambient stream flows below the diversion, and waters discharged below the project site shall not be diminished or degraded by the diversion. All materials placed in the channel to dewater the channel shall be removed when the work is completed. Normal flows shall be restored to the affected stream as soon as is feasible and safe after completion of work at that location.

21: To the extent that stream bed design changes are not part of the project, the stream bed will be returned to as close to pre-project condition as appropriate

23: Temporary fills, such as for access ramps, diversion structures, or cofferdams, shall be completely removed upon finishing the work.

26: Any sediment removed from a project site shall be stored and transported in a manner that minimizes water quality impacts.

29: Existing native vegetation shall be retained by removing only as much vegetation as necessary to accommodate the trail clearing width. Maintenance roads should be used to avoid effects on riparian corridors.

30: Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited to removal necessary for facility inspection purposes, or to meet regulatory requirements or guidelines.

31: When conducting vegetation management, retain as much understory brush and as many trees as feasible, emphasizing shade producing and bank stabilizing vegetation.

32: In-channel vegetation removal may result in increased local erosion due to increased flow velocity. To minimize the effect, the top of the bank shall be protected by leaving vegetation in place to the maximum extent possible.

34: Use the minimum amount of impermeable surface (building footprint, paved driveway, etc.) as practicable.

35: Use pervious materials, such as gravel or turf pavers, in place of asphalt or concrete to the extent practicable.

36: Use flow control structures such as swales, retention/detention areas, and/or cisterns to maintain the existing (preproject) peak runoff.

38: Use flow dissipaters at runoff inlets (e.g., culvert drop-inlets) to reduce the possibility of channel scour at the point of flow entry.

39: Minimize alterations to existing contours and slopes, including grading the minimum area necessary.

40: Maintain native shrubs, trees and groundcover whenever possible and revegetate disturbed areas with local native or non-invasive plants.

41: Combine flow-control with flood control and/or treatment facilities in the form of detention/retention basins, ponds, and/or constructed wetlands.

42: Use flow control structures, permeable pavement, cisterns, and other runoff management methods to ensure no change in post-construction peak runoff volume from pre-project conditions for all covered activities with more than 5,000 square feet of impervious surface.

44: Maintenance of natural stream characteristics, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and a natural channel bed, will be incorporated into the project design

45: Stream crossings shall incorporate a free-span bridge unless infeasible due to engineering or cost constraints or unsuitable based on minimal size of stream (swale without bed and banks or a very small channel). If a bridge design cannot free-span a stream, bridge piers and footings will be designed to have minimum impact on the stream.

47: If a culvert is used, up- and downstream ends of the culvert must be appropriately designed so that the stream cannot flow beneath the culvert or create a plunge pool at the downstream end. Preference will be given to designs that allow a natural bottom (arch culvert) and/or which do not alter natural grade

48: Trails will be sited and designed with the smallest footprint necessary to cross through the in-stream area. Trails will be aligned perpendicular to the channel and be designed to avoid any potential for future erosion. New trails that follow stream courses will be sited outside the riparian corridor.

49: The project or activity must be designed to avoid the removal of riparian vegetation, if feasible. If the removal of riparian vegetation is necessary, the amount shall be minimized to the amount necessary to accomplish the required activity and comply with public health and safety directives.

51: All projects will be conducted in conformance with applicable County and/or city drainage policies.

52: Adhere to the siting criteria described for the borrow site covered activity (see Chapter 2 for details).

53: When possible, maintain a vegetated buffer strip between staging/excavation areas and receiving waters.

55: For stream maintenance projects that result in alteration of the stream bed during project implementation, its low flow channel shall be returned to its approximate prior location with appropriate depth for fish passage without creating a potential future bank erosion problem.

56: Increased water velocity at bank protection sites may increase erosion downstream. Therefore, bank stabilization site design shall consider hydraulic effects immediately upstream and downstream of the work area.

57: When parallel to a stream or riparian zone and not located on top of a levee, new trails shall be located behind the top of bank or at the outside edge of the riparian zone except where topographic, resource management, or other constraints or management objectives make this not feasible or undesirable.

58: Existing access routes and levee roads shall be used if available to minimize impacts of new construction in special status species habitats and riparian zones.

59: Trails in areas of moderate or difficult terrain and adjacent to a riparian zone shall be composed of natural materials or shall be designed (e.g., a bridge or boardwalk) to minimize disturbance and need for drainage structures, and to protect water quality.

60: Trail crossings of freshwater stream zones and drainages shall be designed to minimize disturbance, through the use of bridges or culverts, whichever is least environmentally damaging. Structures over water courses shall be carefully placed to minimize disturbance. Erosion control measures shall be taken to prevent erosion at the outfalls of drainage structures.

61: Minimize ground disturbance to the smallest area feasible.

62: Use existing roads for access and disturbed area for staging as site constraints allow.

63: Prepare and implement sediment erosion control plans.

64: No winter grading unless approved by City Engineer and specific erosion control measures are incorporated.

65: Control exposed soil by stabilizing slopes (e.g., with erosion control blankets) and protecting channels (e.g., using silt fences or straw wattles).

66: Control sediment runoff using sandbag barriers or straw wattles.

67: No stockpiling or placement of erodible materials in waterways or along areas of natural stormwater flow where materials could be washed into waterways.

68: Stabilize stockpiled soil with geotextile or plastic covers.

69: Maintain construction activities within a defined project area to reduce the amount of disturbed area.

70: Only clear/prepare land which will be actively under construction in the near term.

71: Preserve existing vegetation to the extent possible.

72: Equipment storage, fueling and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel.

73: Avoid wet season construction.

74: Stabilize site ingress/egress locations.

80: All personnel working within or adjacent to the stream setback (i.e., those people operating ground-disturbing equipment) will be trained by a qualified biologist in these avoidance and minimization measures and the permit obligations of project proponents working under this Plan.

81: Temporary disturbance or removal of aquatic and riparian vegetation will not exceed the minimum necessary to complete the work.

82: Channel bed temporarily disturbed during construction activities will be returned to pre-project or ecologically improved conditions at the end of construction.

83: Sediments will be stored and transported in a manner that minimizes water quality impacts. If soil is stockpiled, no runoff will be allowed to flow back to the channel.

84: Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into wetlands, ponds, streams, or riparian vegetation. … Erosion control measures will be placed between the outer edge of the buffer and the project site.

86: Topsoil removed during soil excavation will be preserved and used as topsoil during revegetation when it is necessary to conserve the natural seed bank and aid in revegetation of the site.

88: Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.

93: When accessing upland areas adjacent to riparian areas or streams, access routes on slopes of greater than 20% should generally be avoided. Subsequent to access, any sloped area should be examined for evidence of instability and either revegetated or filled as necessary to prevent future landslide or erosion.

94: Personnel shall use existing access ramps and roads if available. If temporary access points are necessary, they shall be constructed in a manner that minimizes impacts to streams.

96: Isolate the construction area from flowing water until project materials are installed and erosion protection is in place.

97: Erosion control measures shall be in place at all times during construction. Do not start construction until all temporary control devices (straw bales, silt fences, etc.) are in place downstream of project site.

98: When needed, utilize in-stream grade control structures to control channel scour, sediment routing, and headwall cutting.

102: Immediately after project completion and before close of seasonal work window, stabilize all exposed soil with mulch, seeding, and/or placement of erosion control blankets

103: All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. … All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding. Cut-and-fill slopes will be planted with local native or non-invasive plants suitable for the altered soil conditions.

104: Measures will be utilized on site to prevent erosion along streams (e.g., from road cuts or other grading), including in streams that cross or are adjacent to the project proponent's property. Erosion control measures will utilize natural methods such as erosion control mats or fabric, contour wattling, brush mattresses, or brush layers.

106: Prior to undertaking stream maintenance activities, reach conditions will be assessed to identify tasks that are necessary to maintain the channel for the purpose for which it was designed and/or intended (e.g., flood control, groundwater recharge). Only in-stream work that is necessary to maintain the channel will be conducted.

107: On streams managed for flood control purposes, when stream reaches require extensive vegetation thinning or removal (e.g., when the channel has been fully occluded by willows or other vegetation), removal will be phased so that some riparian land cover remains and provides some habitat value. In addition, vegetation removal will be targeted and focused on removing the least amount of riparian vegetation as possible while still meeting the desired flood control needs. For example, vegetation removal should be focused on shrubby undergrowth at the toe-of-slope that is most likely to increase roughness and create a flooding hazard.

108: When reaches require sediment removal, approaches will be considered that may reduce the impacts of the activity. Examples of potential approaches include phasing of removal activities or only removing sediment along one half of the channel bed, allowing the other half to remain relatively undisturbed.

109: In streams not managed for flood control purposes, woody material (including live leaning trees, dead trees, tree trunks, large limbs, and stumps) will be retained unless it is threatening a structure, impedes reasonable access, or is causing bank failure and sediment loading to the stream.

110: If debris blockages threaten bank stability and may increase sedimentation of downstream reaches, debris will be removed. When clearing natural debris blockages (e.g., branches, fallen trees, soil from landslides) from the channel, only remove the minimum amount of debris necessary to maintain flow conveyance (i.e., prevent significant backwatering or pooling). Non-natural debris (e.g., trash, shopping carts, etc.) will be fully removed from the channel.

111: If bank failure occurs due to debris blockages, bank repairs will only use compacted soil, and will be re-seeded with native grasses or sterile nonnative hybrids and stabilized with natural erosion control fabric. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. If compacted soil is not sufficient to stabilize the slope, bioengineering techniques must be used. No hardscape (e.g., concrete or any sort of bare riprap) or rock gabions may be utilized in streams not managed for flood control except in cases where infrastructure or human safety is threatened (e.g., undercutting of existing roads). Rock riprap may only be used to stabilize channels experiencing extreme erosion, and boulders must be backfilled with soil and planted with willows or other native riparian species suitable for planning in such a manner. If available, local native species will be utilized as appropriate.

113: The channel bottom shall be re-graded at the end of the work project to as close to original conditions as possible.

114: Erosion control methods shall be used as appropriate during all phases of routine maintenance projects to control sediment and minimize water quality impacts.

Rural Road Maintenance AMMs

1: Incorporate erosion control into the planning, construction, and follow up phases for all road activities.

2: If working during times when rain might be possible, always have erosion control measures onsite in case of a storm event.

4: Set up the work and staging area to minimize the area of soil that will be disturbed and the tracking of soil out of the work area by vehicles and equipment

5: When possible, avoid staging projects in areas where runoff will be concentrated.

6: Do not stage maintenance equipment in riparian areas or adjacent to streams with the exception of emergency or public safety related projects where no other staging options exist.

7: Use appropriate erosion and sediment control avoidance and minimization measures to secure the staging and project area so that sediment runoff is avoided.

8: Protect storm drain inlets and watercourses using appropriate avoidance and minimization measures.

9: Mulch or revegetate bare soil adjacent to stream channels, or other flow transport paths, to the break-in-slope near those areas.

12: Dewater active gullies to prevent their enlargement and to reduce their capacity for sediment transport.

13: Dewater old gullies, even if they are not actively eroding, so they no longer carry fine sediment to streams.

14: Prevent accelerated landsliding by avoiding, minimizing or eliminating future sidecasting on steep or streamside hillslopes.

15: When possible, divert surface runoff and subsurface drainage to stable sites away from steep, unstable or potentially unstable slopes.

16: Fit shotgun culvert (culverts with outlets above grade) outlets with downspouts or energy dissipation. When reconstructing culverts, also set the slope of the culvert to match the grade of the streambed.

17: Maintain culvert inlets, outlet, and bottom in open and sound condition.

18: Identify storm drain inlets, manholes, and watercourses before beginning work. If there is any risk of discharge of sediment or road-related material, protect storm drains with appropriate erosion control and sediment management avoidance and minimization measures.

20: Avoid sidecasting of soil in all cases where it could be delivered into a watercourse, riparian area, roadside ditch or storm drain. Do not sidecast at all if the slope is sparsely vegetated and it appears that sediment will travel with rain runoff into a stream or estuary system.

21: Temporary spoils stockpiles should be located in areas that are relatively level; relatively free of vegetation and away from streams and wetlands areas.

23: Do not leave loose soil piled in berms alongside the road or ditch. Loose or exposed soil berms are erodible and readily flushed into waterways and storm drains.

24: If any berm is left in place it must be compacted and stabilized with seeding or asphalt. Frequent well placed breaks in the berms are necessary to allow water to drain from road, preserving the natural drainage pattern of the slope.

25: Avoid concentrating sidecasting repeatedly in the same place. Never sidecast large amounts of soil from major landslides.

26: In general, maintain unpaved roads to obtain a less erosive running surface and to minimize the need for frequent surface grading. Blade and compact a smooth surface and compact loose soils as needed.

29: Avoid disturbance of vegetation outside the essential shoulder area, especially near ditches, streams or watercourses. These vegetated areas help filter sediment from water run-off into ditches or streams and helps prevent erosion.

30: Grade ditches only when necessary to keep the ditchlineditch line free flowing and restore capacity. Unnecessary mechanical grading can cause excess erosion, undermine banks, and expose the toe of the cutslopecut slope to erosion or slope failure.

31: To control vegetation (rather than remove it entirely), use methods like mowing or weed-whacking when feasible. Vegetation prevents scour and filters out sediment.

32: Whenever feasible, maintain a buffer of vegetation between the ditch and the road. This helps filter sediment from runoff and can be accomplished by using a steeper angle on the grader blade.

33: Avoid harming existing vegetation on the cut bank above the ditch to reduce erosion and prevent slope failure

34: When "pulling" a ditch (mechanically grading and removing fine sediment), when possible, avoid spreading ditch spoils across or into the surface rock of the road or shoulder. Consider incorporating the removed soil into localized infrastructure (e.g., trails) and compact soil in place.

37: Implement energy dissipation avoidance and minimization measures at cross drain outlets to prevent erosion. Discharges from cross drains onto road fill or other erosive areas often cause significant erosion and slope failure. Make sure that newly installed cross drains are properly designed to minimize erosion problems. Where erosion is already occurring, work to halt and reverse it with appropriate erosion control avoidance and minimization measures.

46: Perform all in-stream work in dry conditions, and do not work in flowing waters. If a stream is flowing, use a cofferdam or other dewatering avoidance and minimization measures as needed.

48: Minimize disturbance of ground cover or grass on the shoulder to the extent possible (the shoulder is part of the road right-of-way and may need to be kept clear for safety purposes), near ditches and outside of the road right-of-way. If the ground is bladed clean during mowing, the exposed soil will be vulnerable to erosion and could run-off into a creek.

49: General guidelines for working within the road right-of-way: Do not mow beyond 8 feet from the edge of the pavement unless that vegetation must be removed to retain existing drainage patterns or for safety reasons. Do not remove brush more than 20 feet on either side of the road at bridge structures, unless additional removal is required to address safety concerns or to control noxious weeds. Do not remove brush more than 10 feet on either side of a culvert, or 10 feet up and downstream from culverts that are 6-feet in diameter or larger, unless management is required for safety concerns or to control noxious weeds.

50: Small quantities of cut brush and trees may be left in riparian areas, adjacent to streams, when cut vegetation: Does not cause a safety concern or fire hazard; Does not disturb existing drainage patterns. Does not contain noxious weeds (consult with appropriate staff about types and locations of noxious weeds); Is not stockpiled in concentrated areas that can release leachate to surface water.

Applicable Mitigation Measures

GEO-1 Repair Landslides Caused by Construction Activities

Valley Water will reduce impacts to less than significant with mitigation by requiring Valley Water to monitor the five active landslide areas during the Seismic Retrofit Construction and initial filling of the reservoir. If landslide movement is determined to have been caused by the Seismic Retrofit Construction activities and found to impact existing improvements, then Valley Water will implement ground stabilization methods to prevent further movement. Existing improvements include roads, utilities, structures, fill or cut slopes, and other man-made features. Ground stabilization methods may include removal of slumped or cracked material, placement of engineered fill, slope drainage, retaining walls, slope reinforcement, anchor installation, or other ground stabilization work.

GEO-2 Paleontological Initial Survey

Valley Water will require that a trained Paleontological Monitor under the supervision of a qualified Paleontologist (as defined by the BLM 2008) conduct initial field surveys of the Conservation Measures area prior to any ground-disturbing activities. The qualified paleontologist will meet the Society for Vertebrate Paleontology’s criteria for a qualified paleontologist. The initial survey will map the lithologic boundaries and sedimentary facies of the survey area. If any fossils are discovered during surveys, the Paleontological Monitor will recommend that no Project activities will occur within 50 feet of the discovery, and the Qualified Paleontologist will assess the significance of the fossil and to document the discovery.

GEO-3 Paleontological Detailed Survey and Construction Monitoring

Prior to excavation activities, Valley Water will require that a trained Qualified Paleontological Monitor reporting to a Qualified Paleontologist conduct a detailed field survey of the Project area, consistent with recommendations in BLM (2016) to establish the boundaries of the Santa Clara Formation and the surrounding units and provide an estimate on the thickness of the Quaternary alluvium near Santa Clara Formation outcroppings.

A Paleontological Monitor reporting to a Qualified Paleontologist will further be present during excavation activities occurring in the Santa Clara Formation and other locations having a high potential for fossils according to the PFYC (BLM 2016), as identified by the results of the more detailed survey conducted. Depending on the results of the field survey, namely, the likelihood that significant paleontological resources would be uncovered based on depth of excavation and location of ground disturbance, monitoring will either involve constant monitoring (at locations of direct excavation into Santa Clara Formation (QTs) or into other geologic units underlain at excavation depth near Santa Clara Formation) or spot monitoring (at locations of excavation into other geologic units underlain by Santa Clara Formation below that depth of excavation). Monitoring will not be required into geologic units with low or moderate paleontological sensitivity not underlain by a geologic unit with high paleontological sensitivity. Monitoring will also follow protocols outlined in Scott and Springer (2003) and Murphey et al. (2019), with field monitor(s) reporting to a Qualified Paleontologist.

GEO-4 Paleontological Discoveries Treatment Plan

In the event of a fossil discovery, Valley Water and its contractors will require that all work cease within a 50-foot radius of the discovery and that the discovery be protected from further impacts until the qualified Paleontologist assesses the significance of the fossil and documents its discovery. The Paleontologist will make recommendations regarding the fossil's significance. If the paleontologist determines the fossil to be significant (i.e., the fossil can provide significant information about the history of life), the following treatment actions will be implemented as appropriate for the resource.

For each encountered paleontological resource, selected treatment actions would range from excavation with protective jackets to surface collection to notation only, depending on the value of the resource. The choice of treatment actions will depend on the condition of the fossil, the potential for articulation of separate elements, and the nature of the enclosing sediments. Potential treatment actions include, but are not limited to:

1. Salvage unearthed paleontological resources, including simple excavation of exposed specimens or, if necessary, plaster-jacketing of large and/or fragile specimens or more elaborate quarry excavations of extensive paleontological resources
2. Record stratigraphic and geologic data to provide context for the recovered resources, typically including detailed descriptions of all resource locations and the associated rock types
3. Prepare collected resources for curation

4. Curate, catalog and identify all resources to the lowest taxon possible and document with site records and photographs
5. Transfer resources to an accredited institution (e.g., University of California, Berkeley) for archival storage and/or display
6. Prepare a report that documents the discovery, and steps taken to protect and conserve the discovery~~.~~

3.9 Greenhouse Gas Emissions

Applicable Best Management Practices and VHP Conditions

No Valley Water BMPs or VHP Conditions are applicable to GHG emissions.

Applicable Mitigation Measures

GHG-1 Utilize Electrification and Renewable Fuels During Construction

During Project construction, and including in construction bid specifications, Valley Water will require all construction contractors to use engine electrification (including hybrid equipment) and renewable diesel or biodiesel for on- and off-road construction equipment. Use of electric or hybrid equipment and renewable diesel or biodiesel fuels will be subject to technical and economic feasibility findings by Valley Water as well as availability in the region prior to the commencement of construction activities.

GHG-2 Offset GHG Emissions Prior to and During Construction

Valley Water will offset Project-related construction GHG emissions to achieve no net increase in Project-related construction GHG emissions. Options for offsetting construction-related GHG emissions will include GHG reduction measures or programs related to Valley Water projects and operations as guided by the GHGRP once adopted, and/or the purchase of carbon offsets. Annual estimates of GHG mass emissions (including from maintenance activities at the North Channel and at Live Oak Restoration Reach) will be prepared by a qualified GHG specialist retained by Valley Water throughout the construction period and will be utilized to determine which option(s) to proceed with.

Valley Water will assess opportunities to reduce and/or offset construction-related Project emissions as guided by the GHGRP once it is adopted. Reduction or offset measures from the GHGRP may be applied to the Project to reduce the amount of offsets that must be purchased to achieve net-zero GHG emissions from Project construction as discussed as an additional option below.

As another option, carbon offsets will be purchased annually to offset GHG emissions for the coming construction year and prior to commencement of construction activities for that 12-month period. Purchased carbon offsets will be based on annual GHG estimates of mass GHG emissions based on Table 3.9-7 in conjunction with calculated GHG emission reductions resulting from implementation of GHG-1 and/or use of other new GHG-efficient construction equipment technologies that may be available in the future.

Valley Water will prioritize purchase of offsets that are not "otherwise required" (CEQA Guidelines Section 15126.4(c)(3)) using the following preference hierarchy: within the San Francisco Bay Area Air Basin, originating within California, and originating in other states with offset laws at least as strict as California's. However, all offset credits will meet the following validation criteria as defined by 17 CCR 95802: the offset credits must be real, permanent, quantifiable, verifiable, enforceable, and additional. Offset protocols must also be consistent with CARB requirements under 17 CCR 95972. Offset credits will be registered with a recognized and reputable carbon registry, e.g., Climate Action Reserve, the American Carbon Registry, or Verra. Annual estimates of GHG emissions and corresponding annual carbon offsets will be reported publicly by Valley Water annually in a publicly-available mitigation monitoring report. The mitigation monitoring report will also include documentation of any revised estimates of GHG emissions pursuant to the first paragraph.

If, based on the mitigation monitoring report, additional GHG offsets are required, they will be purchased at that time. If purchased offsets exceeded the preceding year's emissions, they will be applied to the GHG emissions for the next 12-month period.

3.10 Hazards and Hazardous Materials

Applicable Best Management Practices and VHP Conditions

BMPs relevant to hazards and hazardous materials include the following:

AQ-1: Use Dust Control Measures

HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance

HM-9: Ensure Proper Hazardous Materials Management

HM-10: Utilize Spill Prevention Measures

HM-13: Avoid Impacts from Naturally Occurring Asbestos

WQ-6: Limit Impact of Concrete Near Waterways

WQ-17: Manage Sanitary and Septic Waste

TR-1: Use Suitable Public Safety Measures

No VHP conditions are applicable to Hazards and Hazardous Materials.

Applicable Mitigation Measures

HAZ-1 Construction and Grading Operations Dust Control Measures.

The Construction Contractor for Seismic Retrofit and Conservation Measure construction will be responsible for implementing the following construction and grading operations dust control measures, including in areas containing NOA (as identified in the NOA and Metals Evaluation Report [URS 2021c)], consistent with the BAAQMD NOA Technical Advisory Requirements:

- Prior to any ground disturbance, areas to be graded or excavated will be kept adequately wet with water to prevent visible emissions from the release of particulate matter into the air.

- Adequately wetted areas will produce no visible dust emissions as determined by the Construction Engineer.
- Storage piles will be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile. Covers, when used, will be physically secured and maintained throughout their use.
- Equipment will be washed down after use and prior to the equipment moving from the work area onto a paved public road. Wheels will be washed prior to moving equipment from construction areas containing NOA to areas that do not contain NOA.
- Haul roads will be kept wet while in use on days that trucks drive on the roads. If haul roads are on a disturbed surface, they will be kept wet at all times, including days when they are not in use.
- Construction vehicles will be limited to 15 miles per hour (mph) or less. Vehicles hauling NOA-containing materials outside NOA-containing areas will have loads wetted and/or covered such that no visible emissions are generated and will also not exceed 15 mph. Under no circumstances will haul trucks be allowed to transport NOA-containing materials in a manner that allows visible particle emissions from either the wheels while traveling over NOA-containing materials or from the load of the truck.
- Suspension of all excavation, grading, and demolition activities will be required when wind speeds exceed 20 mph for a minimum of 30 minutes. Wind speeds will be monitored using a weather station located onsite with alarms set for this condition, and an automated data recording system. An automated text message will be sent to the Engineer when wind speeds exceed the specified limits. The Engineer will enforce suspension of activities, as feasible. The construction manager will keep records of time periods where excavation, grading, and demolition activities are suspended due to high wind conditions.
- Work boot wash stations will be provided at various locations throughout the site, including at site offices, staging areas, and other locations, as appropriate.

HAZ-2 Track Out Control Measures for Roads from NOA-Containing Areas.

The Construction Contractor for Seismic Retrofit Construction will be responsible for implementing the track out prevention and control measures listed below. These measures will be implemented to prevent track out from construction areas to public roads.

- Removal of any visible track-out from a paved public road at any location where vehicles exit the work site; this will be accomplished using a wet sweeping or a high efficiency particle air (HEPA) filter equipped vacuum device at the end of 10-hour shift or at least one time per day
- Installation will require one or more of the following track-out prevention measures:
  - A gravel pad to clean the tires of exiting vehicles
  - A tire shaker
  - A wheel wash system
  - Pavement extending for not less than 50 consecutive feet from the intersection with the paved public road. Any excess water from the wheel wash system will be collected as necessary or used for dust control in NOA-containing areas.

Wash water will be treated with an oil/water separator prior to use for dust control.

Vehicles that exit the site to a public paved road from unpaved construction areas will utilize track-out prevention and control measures will include the following:

- Utilization of at least one of the track-out prevention and control measures described above
- Removal of any visible track-out from a paved public road at any location where vehicles exit the work site; this will be accomplished using wet sweeping or a HEPA filter or vacuum device equipped with an equivalent particulate filter at the end of each day.

HAZ-3 Traffic Control Measures within NOA-Containing Construction Areas.

The Construction Contractor for Seismic Retrofit Construction will be responsible for implementing these traffic control measures. These measures will apply to traffic within construction areas containing NOA.

- A maximum vehicle speed limit of 15 mph or less
- One of the following:
  - Paving or maintaining a minimum 3-inch depth gravel cover with a silt content of less than 5 percent and asbestos content of less than 0.25 percent (as determined using an approved bulk test method by the Construction Engineer)
  - Watering road surfaces every 2 hours of active operations or sufficiently often to keep the area adequately wetted
  - Applying chemical dust suppressants consistent with manufacturer's directions and any other permit requirements
  - Any other measure deemed as effective as those above and approved by the BAAQMD as part of the ADMP
- Sweeping daily (with water sweepers) all paved access roads, parking areas, and staging areas

HAZ-4 Dust Control Measures During Earthmoving Activities.

The Construction Contractor for Seismic Retrofit and Conservation Measure construction will be responsible for implementing one or more of the following dust control measures during earthmoving activities (e.g., pushing of soils, using bulldozers, breaking rock, hauling materials to disposal sites) in areas containing NOA:

- Pre-wetting the ground to the depth of the anticipated cuts, as feasible, and wetting the ground concurrent with excavation;
- Suspending grading operations when winds exceeding 20 miles per hour for more than 30 minutes generate visible dust emissions crossing the limits of work. Limits of work are shown on Project Plans;
- Application of water prior to any land clearing; or
- Any other measure deemed as effective as those above and approved by the BAAQMD as part of the ADMP.

HAZ-5 Dust Control Measures During Tunneling Activities.

The Construction Contractor for Seismic Retrofit construction will be responsible for implementing dust control measures during tunneling work. Tunneling work will be conducted in a manner that minimizes the potential for the generation of dust, especially if it has the potential to contain asbestos and will include the following measures:

- Spraying water on the tunnel and shaft work surfaces, and the materials derived from them, prior to excavation/disturbance and whenever these materials are being excavated or disturbed. Water will be applied as frequently as needed in order to avoid the generation of visible dust.
- The use of compressed air for drilling, jack hammering or for any other activity with the potential to disturb NOA will be prohibited unless means (e.g., wet suppression, HEPA vacuum dust collection system) are implemented to capture and control all the airborne dust generated by the process, as feasible.
- Whenever rock or soil are being removed using mechanical processes, such as shovels, excavator buckets, hydraulic breakers, water will be applied as frequently as needed to avoid the generation of visible dust.

HAZ-6 Separation of Rock Containing NOA.

The Construction Contractor for Seismic Retrofit construction will prepare and implement an Excavated Materials Management Plan for Valley Water review and approval prior to construction that specifies how excavated rock will be properly classified and managed during construction activities. During construction activities, rock containing NOA will be separated from other rock types by following the procedures included in the Excavated Materials Management Plan. The Excavated Materials Management Plan will detail the documentation and procedural requirements for tracking soil quality, managing stockpiles, and disposal of soil and debris from excavation including soils containing NOA. Implementation of this plan will require the proper disposal of NOA containing material, which would include the covering of trucks transporting soil and rock that contains NOA.

HAZ-7 Soil Testing and Proper Disposal of Potentially Contaminated Soils

In the event that soils suspected of being contaminated (on the basis of visual, olfactory, or other evidence) are exposed during site grading or excavation activities, Valley Water or its Contractor will test the excavated soil prior to removal to determine whether hazardous levels of contaminants are present and work will stop. The test results will be compared against state environmental screening levels (ESLs) from the San Francisco RWQCB for the protection of human health, groundwater quality, and terrestrial receptors. If hazardous levels of contaminants (as defined by federal and State regulations) are present, the materials will be taken to a permitted hazardous waste facility. The required handling, storage, and disposal methods will depend on the types and concentrations of chemicals identified in the soil. Any site investigations or remedial actions will comply with applicable federal, State, and local hazardous materials and waste laws. The presence of known or suspected contaminated soil will require testing and investigation procedures to be supervised by a hazardous materials specialist who meets State and federal regulatory requirements related to handling and disposal of hazardous materials.

PS-1 Prepare and Implement Traffic Management Plan

Refer to Section 3.17, Public Services.

WF-1 Reduce Emergency Response and Evacuation Interference during Construction and Develop a Response and Evacuation Strategy (RES)

Refer to Section 3.22, Wildfire.

3.11 Hydrology

Applicable Best Management Practices and VHP Conditions

BMPs:

AQ-1: Use Dust Control Measures

HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance

HM-9: Ensure Proper Hazardous Materials Management

HM-10: Utilize Spill Prevention Measures

WQ-1: Conduct Work from Top of Bank

WQ-2: Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms

WQ-4: Limit Impacts from Staging and Stockpiling Materials

WQ-5: Stabilize Construction Entrances and Exits

WQ-8: Minimize Hardscape in Bank Protection Design

WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement

WQ-10: Prevent Scour Downstream of Sediment Removal

WQ-11: Maintain Clean Conditions at Work Sites

WQ-16: Prevent Stormwater Pollution

VEG-1: Minimize Local Erosion Increase from In-channel Vegetation Removal

BANK-1: Bank Stabilization Design to Prevent Erosion Downstream

BANK-3: Bank Stabilization Post-Construction Maintenance

REVEG-1: Seeding

Applicable VHP Conditions:

- Condition 3: Maintain Hydrologic Conditions and Protect Water Quality
- Condition 4: Avoidance and Minimization for In-Stream Projects
- Condition 5: Avoidance and Minimization for In-Stream Operations and Maintenance
- Condition 7: Rural Development Design and Construction Requirements

- Condition 11: Stream and Riparian Setbacks
- Condition 12: Wetland and Pond Avoidance and Minimization

Applicable VHP AMMs:

2: Remove pollutants from surface runoff

4: Reduce the potential for scour at stormwater outlets to streams by controlling the rate of flow into the streams

7: Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels

8: Spill prevention kits shall always be in close proximity when using hazardous materials

9: Personnel shall implement measures to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means when removing sediments from streams

11: Vehicles shall be washed at approved areas

12: No equipment servicing shall be done in the stream channel or immediate floodplain

13: Personnel shall use the appropriate equipment for the job that minimizes disturbance to the stream bottom

16: When work in a flowing stream is unavoidable, the entire streamflow shall be diverted around the work area by a barrier, except where it has been determined by a qualified biologist that the least environmentally disruptive approach is to work in a flowing stream

17: Install cofferdams both upstream and downstream not more than 100 feet from the extent of the work areas

20: Diversions shall maintain ambient stream flows below the diversion, with no reduction or degradation

21: If stream bed design changes are not part of the project, the stream bed will be returned to as close to pre-project condition as appropriate

22: Remove all temporary diversion structures and the supportive material no more than 48 hours after work is completed

23: Temporary fills, such as for access ramps, diversion structures, or cofferdams, shall be completely removed upon finishing the work

24: To prevent increases in temperature and decreases in dissolved oxygen (DO), properly size bypass pipes or use a low-flow channel.

26: Any sediment removed from a project site shall be stored and transported in a manner that minimizes water quality impacts

30: Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited

31: When conducting vegetation management, retain as much understory brush and as many trees as feasible

32: The top of the bank shall be protected by leaving vegetation in place to the maximum extent possible

38: Use flow dissipaters at runoff inlets (e.g., culvert drop-inlets) to reduce the possibility of channel scour at the point of flow entry

39: Minimize alterations to existing contours and slopes, including grading the minimum area necessary

40: Maintain native shrubs, trees, and groundcover whenever possible and revegetate disturbed areas with local native or non-invasive plants

44: Maintain natural stream characteristics, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and a natural channel bed

50: If levee reconstruction requires the removal of vegetation that provides habitat value to the adjacent stream (e.g., shading, bank stabilization, food sources, etc.), then the project will include replacement of the vegetation/habitat that was removed during reconstruction unless it is determined to be inappropriate to do so by the relevant resource agencies

51: All projects will be conducted in conformance with applicable County and/or city drainage policies

52: Adhere to the siting criteria described for the borrow site covered activity

53: When possible, maintain a vegetated buffer strip between staging or excavation areas and receiving waters

55: For stream maintenance projects that result in alteration of the stream bed during project implementation, its low-flow channel shall be returned to its approximate prior location with appropriate depth for fish passage without creating a potential future bank erosion problem

56: Bank stabilization site design shall consider hydraulic effects immediately upstream and downstream of the work area

61: Minimize ground disturbance to the smallest area feasible

62: Use existing roads for access and disturbed area for staging as site constraints allow

63: Prepare and implement sediment erosion control plans

64: No winter grading shall occur unless approved by City Engineer and specific erosion control measures are incorporated

65: Control exposed soil by stabilizing slopes (e.g., with erosion control blankets) and protecting channels

66: Control sediment runoff using sandbag barriers or straw wattles

67: No stockpiling or placement of erodible materials shall occur in waterways or along areas of natural stormwater flow

68: Stabilize stockpiled soil with geotextile or plastic covers

69: Maintain construction activities within a defined project area to reduce the amount of disturbed area

70: Clear/prepare land which will be actively under construction in the near term

71: Preserve existing vegetation to the extent possible

72: Equipment storage, fueling, and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel

73: Avoid wet season construction

74: Stabilize site ingress/egress locations

75: Dispose of all construction waste in designated areas and prevent stormwater from flowing onto or off of these areas

76: Prevent spills and clean up spilled materials

82: Channel bed temporarily disturbed during construction activities will be returned to pre-project or ecologically improved conditions at the end of construction

83: Sediments will be stored and transported in a manner that minimizes water quality impacts. If soil is stockpiled, no runoff will be allowed to flow back to the channel.

84: Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used onsite

87: Vehicles operated within and adjacent to streams will be checked and maintained daily to prevent leaks

88: Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas

93: When accessing upland areas adjacent to riparian areas or streams, access routes on slopes > 20 percent should generally be avoided

94: Personnel shall use existing access ramps and roads if available

96: Isolate the construction area from flowing water until project materials are installed and erosion protection is in place

97: Erosion control measures shall be in place at all times during construction

100: Potential contaminating materials must be stored in covered storage areas or secondary containment impervious to leaks and spills

102: Immediately after project completion and before close of seasonal work window, stabilize all exposed soil

103: All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species

104: Measures will be utilized on site to prevent erosion along streams

108: When reaches require sediment removal, approaches will be considered that may reduce the impacts of the activity. Examples of potential approaches include phasing of removal activities or only removing sediment along one half of the channel bed, allowing the other half to remain relatively undisturbed.

111: If bank failure occurs due to debris blockages, bank repairs will use compacted soil and reseeding with native/sterile nonnative plants

113: The channel bottom shall be re-graded at the end of the work project to as close to original conditions as possible

114: Erosion control methods shall be used as appropriate during all phases of routine maintenance projects to control sediment and minimize water quality impacts.

Applicable Mitigation Measures

WQ-1. Develop and Implement an In-Reservoir Construction Area Water Quality Monitoring and Protection Plan.

Refer to Section 3.14*, Water Quality.*

3.12 Groundwater

Applicable Best Management Practices and Valley Habitat Plan Conditions

BMPs relevant to groundwater include the following:

HM-1: Comply with All Pesticide Application Restrictions and Policies

HM-2: Minimize Use of Pesticides

HM-4: Comply with All Pesticide Usage Requirements

HM-5: Comply with Restrictions on Herbicide Use in Upland Areas

HM-6: Comply with Restrictions on Herbicide Use in Aquatic Areas

HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance

HM-9: Ensure Proper Hazardous Materials Management

HM-10: Utilize Spill Prevention Measures

SED-1: Groundwater Management

Applicable VHP Conditions:

- Condition 3: Maintain Hydrologic Conditions and Protect Water Quality
- Condition 4: Avoidance and Minimization for In-Stream Projects

- Condition 5: Avoidance and Minimization for In-Stream Operations and Maintenance
- Condition 7: Rural Development Design and Construction Requirements
- Condition 11: Stream and Riparian Setbacks
- Condition 12: Wetland and Pond Avoidance and Minimization

Applicable VHP AMMs:

Additionally, the following VHP AMMs would serve to minimize impacts on groundwater resources from the Project:

7: Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels

8: Spill prevention kits shall always be in close proximity when using hazardous materials

9: Personnel shall implement measures to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means when removing sediments from streams

11: Vehicles shall be washed at approved areas.

12: No equipment servicing shall be done in the stream channel or immediate floodplain

14. Prevent accelerated landsliding by avoiding, minimizing or eliminating future sidecasting on steep or streamside hillslopes.

72: Equipment storage, fueling, and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel

87: Vehicles operated within and adjacent to streams will be checked and maintained daily to prevent leaks

88: Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.

100: Potential contaminating materials must be stored in covered storage areas or secondary containment impervious to leaks and spills

Applicable Mitigation Measures

GW-1 Provide Alternative Water Supplies

During the Seismic Retrofit construction period, while Anderson Reservoir is dewatered, Valley Water will provide alternative water supplies to any well owner(s) in proximity to the reservoir (within 0.5-miles) whose well(s) have gone dry or whose water quality has become unacceptable, as a result of the reservoir being maintained in a dewatered state. With the reservoir being dewatered, this could reduce percolation through the reservoir bottom and reduce groundwater levels in the immediately surrounding area. Alternative water supplies will include water to be supplied by water truck, or via another method, that is treated to an appropriate level for the required use (e.g., drinking water standards, if to be used for domestic purposes).

At the start of construction, Valley Water will establish a contact person and method of contact (phone, email) for members of the public to submit requests for accommodation under this mitigation measure. Valley Water will also establish a system whereby it will evaluate the requests and whether the well(s) have been adversely affected by the reservoir dewatering, or unacceptable water quality. This may include visiting the well owner's property to observe the well(s), comparing groundwater levels and water quality in and around the affected area based on monitoring data, or other methods. Valley Water will make a determination of whether the well(s) has/have gone dry or have unacceptable water quality, as a result of the dewatering—if no other cause can be determined, Valley Water will assume that the reservoir being dewatered will have played a role and alternative water supplies will be provided.

Any alternative water supplies under this mitigation measure will be provided in a quantity and at a frequency to meet the needs of the individual or entity consistent with the existing beneficial uses of the water, and commensurate with the lost production from the well(s). As indicated above, the water will be treated to a level that is appropriate for the intended use. The alternative water supplies will be provided for as long as the well(s) are rendered incapable of production.

GW-2 Perchlorate Best Management Practices

To minimize the risk of perchlorates from explosives Valley Water and/or the contractor will do the following:

- Conduct a thorough assessment of the explosives to be used, identifying perchlorate content and potential alternatives with lower perchlorate levels.
- If more than 500 pounds of solid perchlorate material or 55 gallons of liquid perchlorate material is on-site at any one time, submit to DTSC a one-time notification about their perchlorate materials and related activities.
- Train personnel in proper handling techniques to minimize perchlorate release during explosive loading, assembly, and transportation.
- Store explosives in secure and properly designed magazines to prevent leaks or spills that could lead to perchlorate contamination of the surrounding environment.
- Dispose of perchlorate-containing solid material to either a hazardous waste landfill or a composite-lined portion of a non-hazardous waste landfill.
- Collect and properly dispose any spills of perchlorate products.
- Collected and properly manage any un-ignited explosive material found during the inspection of the site after blasting work.

3.13 Water Supply

Applicable Best Management Practices and VHP Conditions

The BMPs and VHP Conditions and AMMs that would help reduce impacts related to water supply are the same ones that would serve to protect water quality. Therefore, refer to the list of applicable BMPs and VHP Conditions and AMMs provided in Section 3.14, "Water Quality."

Applicable Mitigation Measures

GW-1 Provide Alternative Water Supplies

Refer to Section 3.12, Groundwater Resources.

GW-2 Perchlorate Best Management Practices

Refer to Section 3.12, Groundwater Resources.

3.14 Water Quality

Applicable Best Management Practices and VHP Conditions

BMPs relevant to water quality include the following:

AQ-1: Use Dust Control Measures

HM-1: Comply with All Pesticide Application Restrictions and Policies

HM-2: Minimize Use of Pesticides

HM-4: Comply with All Pesticide Usage Requirements

HM-5: Comply with Restrictions on Herbicide Use in Upland Area

HM-6: Comply with Restrictions on Herbicide Use in Aquatic Areas

HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance

HM-9: Ensure Proper Hazardous Materials Management

HM-10: Utilize Spill Prevention Measures

WQ-1: Conduct Work from Top of Bank

WQ-2: Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms

WQ-3: Limit Impact of Pump and Generator Operation and Maintenance

WQ-4: Limit Impacts From Staging and Stockpiling Materials

WQ-5: Stabilize Construction Entrances and Exits

WQ-6: Limit Impact of Concrete Near Waterways

WQ-8: Minimize Hardscape in Bank Protection Design

WQ-9: Use Seeding for Erosion Control, Weed Suppression, and Site Improvement

WQ-11: Maintain Clean Conditions at Work Sites

WQ-15: Prevent Water Pollution

WQ-16: Prevent Stormwater Pollution

GEN-1: In-Channel Work Window

GEN-20: Erosion and Sediment Control Measures

GEN-21: Staging and Stockpiling of Material

GEN-26: Spill Prevention and Response

GEN-30: Vehicle and Equipment Maintenance

GEN-31: Vehicle Cleaning

GEN-32: Vehicle and Equipment Fueling

GEN-35: Pump/Generator Operations and Maintenance

VEG-1: Minimize Local Erosion Increase from In-channel Vegetation Removal

BANK-1: Bank Stabilization Design to Prevent Erosion Downstream

BANK-2: Concrete Use Near Waterways

BANK-3: Bank Stabilization Post-Construction Maintenance

REVEG-1: Seeding

VHP conditions:

Condition 3: Maintain Hydrologic Conditions and Protect Water Quality

Condition 4: Avoidance and Minimization for In-Stream Projects

Condition 5: Avoidance and Minimization Measures for In-Stream Operations and Maintenance

Condition 7: Rural Development Design and Construction Requirements

Condition 11: Stream and Riparian Setbacks

Condition 12: Wetland and Pond Avoidance and Minimization

Additionally, the following VHP conditions would serve to minimize impacts on hydrology from the Project:

2: Remove pollutants from surface runoff

7: Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels

8: Spill prevention kits shall always be in close proximity when using hazardous materials

9: Personnel shall implement measures to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means when removing sediments from streams

11: Vehicles shall be washed at approved areas.

12: No equipment servicing shall be done in the stream channel or immediate floodplain

66: Control sediment runoff using sandbag barriers or straw wattles

67: No stockpiling or placement of erodible materials shall occur in waterways or along areas of natural stormwater flow

68: Stabilize stockpiled soil with geotextile or plastic covers

72: Equipment storage, fueling, and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel

75: Dispose of all construction waste in designated areas and prevent stormwater from flowing onto or off of these areas

76: Prevent spills and clean up spilled materials

84: Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site

87: Vehicles operated within and adjacent to streams will be checked and maintained daily to prevent leaks

97: Erosion control measures shall be in place at all times during construction

100: Potential contaminating materials must be stored in covered storage areas or secondary containment impervious to leaks and spills

Applicable Mitigation Measures

GW-2 Perchlorate Best Management Practices

Refer to Section 3.12*, Groundwater Resources.*

WQ-1 Develop and Implement an In-Reservoir Construction Area Water Quality Monitoring and Protection Plan

Prior to construction, Valley Water will prepare and submit to the State Water Resources Control Board for approval a site- and discharge-specific Water Quality Monitoring and Protection Plan (WQMPP) for stormwater discharges associated with in-reservoir construction-related activities. The WQMPP will specify water quality control measures to minimize release of construction-related pollutants and associated water quality impacts to Coyote Creek downstream of Anderson Dam in accordance with the Clean Water Act and Porter Cologne Water Quality Control Act, taking into account fundamental differences in ADSRP in-reservoir construction areas and activities as compared to typical construction sites and activities.

The WQMPP will be implemented through Year 8 of construction when the reservoir is refilled and restrictions on impoundment within the reservoir are lifted. The WQMPP will include, at a minimum, the following elements:

- A detailed description of site conditions and the proposed in-reservoir construction activities and areas of disturbance.
- Detailed descriptions, design drawings, and specific locations of water quality control measures (Best Management Practices [BMPs]) that can feasibly be implemented to control pollutants in stormwater discharges associated with in-reservoir construction

activities given unique characteristics of those construction activities and areas. Control measures may include, but not be limited to the following BMPs:

    - Limiting impacts from construction related staging and stockpiles.
    - Maintaining clean conditions at the work site.
    - Implementing spill prevention and response controls, including secondary containment.
    - Limiting locations for vehicle cleaning, fueling and maintenance to areas where unintentional spills do not threaten a discharge to waters;

- A technical demonstration that the BMPs satisfy Clean Water Act requirements for fundamentally different construction activities (including 33 USC sections 1342(p)(3) and 40 CFR sections 125.30-125.32)
- Ongoing evaluation and consideration during ADSRP construction of monitoring data collected and reported pursuant to the water quality monitoring program described in Final EIR section 2.7.1, including temperature, DO, pH and turbidity data collected pursuant to the Water Quality Sampling Plan, turbidity and TSS data collected pursuant to the Sediment Monitoring Plan, and sediment data collected pursuant to the Sediment Deposition Monitoring Plan. This mitigation measure may also rely on other data collected pursuant to existing FOCP and/or other water quality monitoring plans when appropriate to avoid duplicative data collection.

The WQMPP will be kept up to date to reflect any changes in site conditions and project activities, and to address controllable water quality factors in response to monitoring data.

3.15 Land Use

Applicable Best Management Practices and VHP Conditions

BMPs relevant to the land use analysis include the following:

GEN-36: Public Outreach

GEN-37: Implement Public Safety Measures

GEN-39: Planning for Pedestrians, Traffic Flow, and Safety Measures

AQ-1: Use Dust Control Measures

AQ-2: Avoid Stockpiling Odorous Materials

TR-1: Use Suitable Public Safety Measures

No VHP conditions are applicable to land use.

Applicable Mitigation Measures

None Required.

3.16 Noise and Vibration

Applicable Best Management Practices and VHP Conditions

No BMPs or VHP conditions are applicable to noise and vibration.

Applicable Mitigation Measures

NOI-1 Implement Construction Noise Reduction Measures

Prior to the start of construction, Valley Water shall prepare a Construction Management Plan. Valley Water will include the following construction noise reduction measures in the Construction Management Plan:

- At least 30 days prior to the start of construction activities, all offsite businesses and residents within 500 feet of the Project Area will be notified of the planned construction activities. The notification will include a brief description of the Project, the activities that would occur, the hours when construction would occur, and the construction period's overall duration. The notification will include the telephone numbers of Valley Water's and the contractor's authorized representatives that are assigned to respond in the event of a noise complaint.
- At least 30 days prior to the start of construction activities, a sign will be posted at each construction site entrance, or other conspicuous location, that includes a 24-hour telephone number for Project information, and a procedure in which a construction manager will respond to and investigate noise complaints and take corrective action, if necessary, in a timely manner. The sign will have a minimum dimension of 48 inches wide by 24 inches high with a 1-inch minimum font height and will also include contact information for Valley Water staff. The sign will be placed 5 feet above ground level.
- If a construction noise complaint(s) is registered and if Valley Water or its contractor are not available to make noise measurements, Valley Water will retain a noise consultant to conduct noise measurements at the properties that registered the complaint. The noise measurements will be conducted for a minimum of 1 hour. Valley Water will prepare a letter report summarizing the measurements, calculation data used in determining impacts, and potential measures to reduce noise levels to the maximum extent feasible.
- Prior to the start of and for the duration of construction, the contractor will properly maintain and tune all construction equipment in accordance with the manufacturer's recommendations to minimize noise emissions.
- Prior to use of any construction equipment, the contractor will fit all equipment with properly operating mufflers, air intake silencers, and engine shrouds no less effective than as originally equipped by the manufacturer.
- Material hauling and deliveries will be coordinated by the construction contractor to reduce the potential of trucks waiting to unload for protracted periods of time.
- To the extent feasible, hydraulic equipment will be used instead of pneumatic impact tools, and electric powered equipment will be used instead of diesel-powered equipment.

- Stationary noise sources (e.g., generators) will be located as far from sensitive receptors as practicable, and they will be muffled and enclosed within temporary sheds, or insulation barriers.
- The use of bells, whistles, alarms, and horns will be restricted to safety warning purposes only.
- Signs will be posted at the job site entrance(s), within the onsite construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment will be turned off if not in use for more than five minutes. The construction manager will be responsible for enforcing this.

NOI-2 Implement Seismic Retrofit Construction Noise Reduction Measures

Valley Water and/or its contractor will implement the following noise mitigation measures as part of the Seismic Retrofit construction component:

- For Staging Area 1, as much as is feasible, limit activity of construction equipment within 300 feet of nearby residences.
- Install temporary noise barriers between Staging Area 1 and noise-sensitive receptors, as feasible. The barriers will be at least 12-feet high and have no cracks or gaps, except where access is required (e.g., options for noise barriers include field-constructed wood or masonry walls, manufactured noise curtains [e.g., Kinetics KBC], and semi-truck trailers) and provide a minimum noise reduction of 15 dBA.
- For track drill rigs, when they are not in a tunnel or shaft, install manufacturer-provided or third-party noise reduction systems, or install a sound barrier between the track drill rigs and noise-sensitive receptors to reduce noise levels to 86 dBA at 50 feet.
- Limit activity at Stockpile Areas K North and South to daytime (7:00 a.m. to 5:00 p.m.) hours as feasible.
- To reduce offsite construction noise, the following measures will be implemented:
    - Route truck traffic and worker vehicles along Route 1a and avoid Route 1b to the extent feasible.
    - Temporarily reduce worker vehicle and truck speeds along East Main Avenue between Hill Road and Cochrane Road and on Cochrane Road between East Main Avenue and Half Road by 5 mph below the speed limit.
    - Reduce worker vehicle and truck speeds along the section of Cochrane Road closed to through traffic from the currently posted speed limit 45 mph to 35 mph.
- Prior to the start of construction, Valley Water will retain a qualified acoustical consultant to conduct construction noise monitoring during the nighttime work of Project construction at select locations in the surrounding community. The number and location of monitoring positions will be determined by Valley Water in consultation with the acoustical consultant. All sound level meters used during monitoring will satisfy the American National Standards Institute (ANSI) standard of Type 2 instrumentation or higher. All measurements will be at least 5 feet above the ground and away from reflective surfaces. The noise monitoring data and results will be submitted in a memorandum to Valley Water on a weekly basis along with comparison to the 50 dBA $_{Leq}$ nighttime construction noise limit. If exceedances of the construction noise limit are

found, the construction contractor will modify construction techniques and equipment to reduce the construction noise below the 50 dBA $_{Leq}$ limit, to the degree feasible.

NOI-3 Implement Ogier Ponds CM Construction Noise Reduction Measures

Valley Water and/or its contractor will implement the following noise mitigation measures as part of the Ogier Ponds CM construction component:

- Install temporary noise barriers between regions of significant activity and noise-sensitive receptors. The barriers will be at least 12-feet high and have no cracks or gaps, except where access is required (e.g., options for noise barriers include field-constructed wood or masonry walls, manufactured noise curtains [e.g., Kinetics KBC]), and semi-truck trailers) and provide a minimum noise reduction of 15 dBA.

NOI-4 Seismic Retrofit and Sediment Augmentation Program Construction Vibration Reduction

Valley Water and/or its contractor will implement the following vibration mitigation measures for the Seismic Retrofit and Sediment Augmentation Program construction:

- Use of oscillatory or static rollers (which maintains constant contact with the ground) in lieu of vibratory rollers (which lifts off and pounds the ground) for compaction near residential structures (within 150 feet)

NOI-5 Implement Blasting Plan

Valley Water and/or its contractor will implement a Blasting Plan that requires vibration and air overpressure monitoring be conducted by a qualified engineer or acoustical consultant while initial blasting activities occur. Monitoring results will be used to adjust blast loading limits to properly reflect site-specific conditions to prevent vibration impacts from blasting from exceeding the building damage threshold of 0.1884 in/sec PPV if blasting frequency is below 1 Hz, 0.5 in/sec PPV if blasting frequency is 3 Hz to 40 Hz, 2.0 in/sec PPV ay 40 Hz and above, or the air overpressure threshold of 133 dBL. The allowable explosive loading in lb. of TNTe per delay will be converted to explosive material used on the Project and provided to the construction contractor. The allowable maximum loading may be adjusted up based on the frequency (Hz) of blasting and the results of blasting vibration and air overpressure monitoring at the recommendation of the monitoring engineer or qualified acoustical consultant conducting the blasting monitoring. The Blasting Plan will restrict blasting activities to between the hours of 8:00 a.m. and 5:00 p.m. The Blasting Plan will also include details regarding outreach to nearby sensitive receptors to notify them in advance of days in which blasting will occur and contact information on who to reach out to regarding complaints from the blasting.

3.17 Public Services

Applicable Best Management Practices and VHP Conditions

BMPs relevant to public services include the following:

HM-8: Ensure Proper Vehicle and Equipment Fueling and Maintenance

HM-9: Ensure Proper Hazardous Materials Management

HM-12: Incorporate Fire Prevention Measures

TR-1: Use Suitable Public Safety Measures

No VHP conditions are applicable to public services.

Applicable Mitigation Measures

PS-1 Prepare and Implement Traffic Management Plan

Before construction of Project components, Valley Water and its contractors will prepare and implement a TMP to minimize traffic delays and safety hazards that may result from lane restrictions or closures in the work zone. TMP strategies will manage the mobility as well as safety for the traveling public and construction workers and will be consistent with applicable provisions of the Caltrans Transportation Management Plan Guidelines (2015). Overall TMP strategies will include:

- Public Information – Valley Water will keep the local and state agencies, as well as the public informed at the beginning of the Project, and periodically as construction proceeds with work zone information using the Project website, communication with selected stakeholders, and public outreach meetings.
- Motorist Information – Motorists will be provided with information regarding the work zone using Changeable Message Signs and Portable Changeable Message Signs. These signs notify the users of lane and road closures, work activities, traffic queues, delay, or travel time information.
- Incident Management – Incidents occurring in or near work zones will be addressed by employing construction tow services, and dedicated law enforcement and other first responders as necessary.
- Construction will be coordinated with the CHP, CAL FIRE, and other state and local agencies such as the Morgan Hill Fire Department, the San José Fire Department, and SSCFPD that provide public and/or emergency services for the study area. These agencies would be made aware of any traffic management issues and would share that information with first responders.
- Construction worker evacuation routes: Efficient construction worker evacuation routes will be designated, including use of the of north and south haul roads.

WF-1 Reduce Emergency Response and Evacuation Interference during Construction and Develop a Response and Evacuation Strategy (RES)

Refer to Section 3.22, Wildfire.

3.18 Recreation

Applicable Best Management Practices and VHP Conditions

BMPs relevant to recreational resources include the following:

GEN-36: Public Outreach

GEN-37: Implement Public Safety Measures

GEN-39: Planning for Pedestrians, Traffic Flow, and Safety Measures

AQ-1: Use Dust Control Measures

AQ-2: Avoid Stockpiling Odorous Materials

TR-1: Use Suitable Public Safety Measures

No VHP conditions are applicable to recreation.

Applicable Mitigation Measures

REC-1 Funding and Implementation of Park Facility Improvements within the Coyote Creek Corridor

Consistent with a December 2024 agreement between Valley Water and Santa Clara County, Valley Water will contribute funding to support SCCDPR's future relocation and/or modification of recreational facilities within the Coyote Creek corridor to mitigate for inundation and other Project impacts on those facilities. Improvements would include repairs, relocation, and/or realignment of trails, bank stabilization, and installation of bridges and culvert crossings. The County will be responsible for the planning, design, and construction of these improvements, which will not be implemented until CEQA review, if required, is completed.

3.19 Transportation

Applicable Best Management Practices and VHP Conditions

BMPs relevant to transportation include the following:

TR-1: Use Suitable Public Safety Measures

No VHP conditions are applicable to transportation.

Applicable Mitigation Measures

REC-1 Funding and Implementation of Park Facility Improvements within the Coyote Creek Corridor

Refer to Section 3.18, Recreation.

PS-1 Prepare and Implement Traffic Management Plan

Refer to Section 3.17, Public Services.

WF-1 Reduce Emergency Response and Evacuation Interference during Construction and Develop a Response and Evacuation Strategy (RES)

Refer to Section 3.22, Wildfire.

3.20 Tribal Cultural Resources

Applicable Best Management Practices and VHP Conditions

BMPs relevant to tribal cultural resources include the following:

CU-1: Accidental Discovery of Archaeological Artifacts or Burial Remains

No VHP conditions are applicable to tribal cultural resources.

Applicable Mitigation Measures

CR-1 Preconstruction Cultural Resources Awareness Training

Refer to Section 3.6, Cultural Resources.

CR-2 Prepare a Data Recovery and Treatment Plan for Historical Resources that cannot be Avoided

Refer to Section 3.6, Cultural Resources.

CR-3 Prepare a Monitoring and Unanticipated Discoveries Plan

Refer to Section 3.6, Cultural Resources.

3.21 Utilities and Service Systems

Applicable Best Management Practices and VHP Conditions

BMPs relevant to utilities and service systems include the following:

WQ-16: Prevent Stormwater Pollution

WQ-17: Manage Sanitary and Septic Waste

No VHP conditions are applicable to utilities and service systems.

Applicable Mitigation Measures

None required.

3.22 Wildfire

Applicable Best Management Practices and VHP Conditions

BMPs relevant to wildfire risk include the following:

HM-12: Incorporate Fire Prevention Measures

TR-1: Use Suitable Public Safety Measures

No VHP conditions are applicable to wildfire.

Applicable Mitigation Measures

WF-1 Reduce Emergency Response and Evacuation Interference during Construction and Develop a Response and Evacuation Strategy (RES)

Before construction of Project components, Valley Water will prepare an RES and coordinate with local and state emergency response agencies through regular meetings, written communications, and review of construction schedules so that adequate emergency response and evacuation routes are maintained through construction of the Project in locations where Project construction substantially interferes with emergency access and evacuation. Emergency response agencies will be notified in advance of all lane and road closures, reducing the potential for construction activities to significantly interfere with emergency response or designated and functional community evacuation routes. The RES will include a communication protocol outlining how Valley Water will provide construction updates to local agencies, such as traffic control plans and road closure schedules, to assist with emergency response planning and facilitate timely evacuation notifications to residents. The communication protocol will also establish procedures for how Valley Water and/or the construction contractor will quickly notify emergency responders should a wildfire or other emergency situation be detected.

Prior to commencement of the Project construction, Valley Water will coordinate with local and state emergency response agencies to allow emergency response vehicles to access all areas affected by construction activities. In locations where Project construction substantially interferes with use of designated and functional community evacuation routes, the RES will also include alternate evacuation routes that are passable to allow residents to evacuate an affected area. The draft RES, including the alternate evacuation routes and communication protocol, will be provided to representatives of Holiday Lakes Estates and Jackson Oaks for review before being finalized.

PS-1 Prepare and Implement Traffic Management Plan

Refer to Section 3.17, Public Services.

Attachment 1

Best Management Practices Handbook

BEST MANAGEMENT PRACTICES HANDBOOK
(APPENDIX A - ATTACHMENT 1)

SANTA CLARA VALLEY WATER DISTRICT
COMPREHENSIVE LIST

Table of Contents

List of Tables

Purpose

The Best Management Practices Handbook (Handbook) provides a list of Santa Clara Valley Water District (District) Best Management Practices (BMPs), intended to be incorporated into projects or activities. It aids in accomplishment of the stewardship component of the District Ends Policies by incorporating the basic principle of avoiding or minimizing the potential to impact the environment negatively in projects and activities.

Process

The Handbook is a controlled ISO document. It is a technical guidance document (W751M01) under ISO 14001 Environmental Management System Environmental Planning Q520D01 designed to ensure that the District meets its responsibilities under the California Environmental Quality Act (CEQA).[1] Work Instruction *W520M03 Section 3 – Mitigation, Monitoring and Reporting Programs* describes the standard policies for environmental review process used to apply these BMPs to projects and activities, consistent with CEQA Guidelines §15097(e).

The handbook is an electronic repository of information that allows staff to access and incorporate standardized BMPs, as/if appropriate, into CEQA documents efficiently, BMPs are incorporated into project design or activity implementation during an analytical process to identify and avoid or minimize project impacts for a particular project. They can be included as a component of the project description for projects at all levels of review, including categorical and/or statutory exemptions. The BMPs are selected by an Environmental Planner, with assistance from other project team members, (including Biologists, as well as design-, construction-, and maintenance engineers), to identify the appropriate BMPs for the proposed work activities. Thus, they only become official for the project after the CEQA document for that project has been certified or approved.

For projects or activities where implementation of BMPs would not suffice to avoid or minimize the impacts to a level below that of significance, a higher level of environmental evaluation would be required, leading to a higher level of documentation (e.g., MND or EIR). In instances where a project requires additional avoidance or minimization measures not included in this handbook, such practices and/or measures would be evaluated appropriately during the environmental review process and incorporated as project-specific mitigation measures and, potentially, be incorporated in a future revision of the Handbook.

Organization

For ease in application, the BMPs have been organized into the standard environmental factors found in the Initial Study Checklist, which is consistent with the CEQA Guidelines.[2] This supports the ‘activities and impacts matrix’ (AIM) approach contained in *W520M03 Section 3 – Mitigation, Monitoring and Reporting Program.* Generally, these practices are either structural treatments (e.g., devices) or non-structural behaviors, methods, actions, procedures, or other management practices that have been shown to avoid or minimize potential adverse environmental effects.

The Handbook also includes sets of BMPs grouped together to address more commonly conducted activities such as bank protection; storm water management; discharge activities; grading and excavation; pesticide use; sediment removal and storage; vegetation management; and, well and exploratory boring construction-, modification-, and destruction operations. These ‘*BMP Suites*’ make it easier for environmental planners to include the applicable BMPs consistently in a project’s environmental document. When using a set of activity-based BMPs, individual practices should be reviewed to ensure its applicability.

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[1] Public Resources Code Section 21000 *et seq.*

[2] Title 14 Code of Regulations Section 15000 *et seq.* Appendix G

Limitations

Under no circumstances should the entire contents of the Handbook be included as supporting information in an Initial Determination Memorandum (IDM), or in a project's design (i.e., plans and specifications) to circumvent an analysis of impacts from project activities. The consideration of the suitability of *individual* BMPs, to avoid or minimize the significance of impacts, is central to the environmental review process.

Furthermore, since BMPs are District standard operating procedures, and are not project-specific, they are not mitigations and are not to be used as a substitute for proper environmental evaluation and mitigation.

The BMPs reflect how the District currently conducts business. They are updated as new methods or industry standards are identified that provide an opportunity to further improve upon our practice of environmental stewardship, while maintaining a high level of service to the public. Thus, these BMPs are a guideline and not a substitute for analytical decision-making on how to avoid and minimize impacts.

QEMS Elements

Reference Documents:

See page 32 for a listing of both external and internal references

Requirements:

ISO 9001

7.5.1 Control of Production and Service Provision

ISO 14001

4.4.6 Operational Control

Quality Records:

None

Change History:

DATE	REVISION	COMMENTS
11/2006	A	Converted Watershed QEMS WW75109 into W751M01
1/2009	B	BMP updated
03/22/10	C	The Process Owner was changed from Debra Caldon to Jennifer Castillo
08/31/10	D	Stakeholder working group (WG) made some final changes including: Bill Smith, David Dunlap, Jamie McLeod and Janell Hillman and Jennifer Castillo. Prior to the WG, the document was sent for review by biologists, environmental planners and vegetation specialists.
01/24/11	E	Added QEMS Elements (Reference documents, Requirements, Quality Records. Added references to CEQA, Q520D01, & Q751D02 on last page. Changed BI-7 Avoid Secondary Poisoning from Rodenticide Use to inspect on a weekly basis instead of the fifth day.
01/08/14	F	Updated BMPs based on updated Stream Maintenance Program and other standard practices incorporated into District projects and activities.
9/15/14	G	Removed BMPs BI-3, -8, -10, -11; CU-2; WQ-4, -7, -8, -11, -14, -17, -18; NO-1, -2; and TR-2 from version F of Handbook. Modified BMPs BI-6 and CU-1 from version F of Handbook.

Table 1 - Comprehensive BMP List

BMP #	BMP Name	
Air Quality		
AQ-1	Use Dust Control Measures	
AQ-2	Avoid Stockpiling Odorous Materials	
Biological Resources		
BI-1	Avoid Relocating Mitten Crabs	
BI-2	Minimize Impacts to Steelhead	
BI-3	Remove Temporary Fills	
BI-4	Minimize Adverse Effects of Pesticides on Non-target Species	
BI-5	Avoid Impacts to Nesting Migratory Birds	
BI-6	Avoid Impacts to Nesting Migratory Birds from Pending Construction	
BI-7	Minimize Impacts to Vegetation from Survey Work	
BI-8	Choose Local Ecotypes Of Native Plants and Appropriate Erosion-Control Seed Mixes	
BI-9	Restore Riffle/Pool Configuration of Channel Bottom	
BI-10	Avoid Animal Entry and Entrapment	
BI-11	Minimize Predator-Attraction	
Cultural Resources		
CU-1	Accidental Discovery of Archaeological Artifacts or Burial Finds	
Hazards & Hazardous Materials		
HM-1	Comply with All Pesticide Application Restrictions and Policies	
HM-2	Minimize Use of Pesticides	
HM-3	Post Areas Where Pesticides Will Be Used	
HM-4	Comply with All Pesticide Usage Requirements	
HM-5	Comply with Restrictions on Herbicide Use in Upland Areas	
HM-6	Comply with Restrictions on Herbicide Use in Aquatic Areas	
HM-7	Restrict Vehicle and Equipment Cleaning to Appropriate Locations	
HM-8	Ensure Proper Vehicle and Equipment Fueling and Maintenance	
HM-9	Ensure Proper Hazardous Materials Management	
HM-10	Utilize Spill Prevention Measures	
HM-11	Ensure Worker Safety in Areas with High Mercury Levels	
HM-12	Incorporate Fire Prevention Measures	
HM-13	Avoid Impacts from Naturally Occurring Asbestos	
Hydrology/Water Quality		
WQ-1	Conduct Work from Top of Bank	
WQ-2	Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms	
WQ-3	Limit Impact of Pump and Generator Operation and Maintenance	
WQ-4	Limit Impacts From Staging and Stockpiling Materials	
WQ-5	Stabilize Construction Entrances and Exits	
WQ-6	Limit Impact of Concrete Near Waterways	
WQ-7	Isolate Work in Tidal Areas With Use of Coffer Dam	
WQ-8	Minimize Hardscape in Bank Protection Design	
WQ-9	Use Seeding for Erosion Control, Weed Suppression, and Site Improvement	
WQ-10	Prevent Scour Downstream of Sediment Removal	
WQ-11	Maintain Clean Conditions at Work Sites	
WQ-12	Manage Well or Exploratory Boring Materials	
WQ-13	Protect Groundwater from Contaminates Via Wells or Exploratory Borings	
WQ-14	Backfill Completed Exploratory Borings	
WQ-15	Prevent Water Pollution	
WQ-16	Prevent Stormwater Pollution	
WQ-17	Manage Sanitary and Septic Waste	

Table 1 - Comprehensive BMP List

BMP #	BMP Name	
Transportation/Traffic		
TR-1	Use Suitable Public Safety Measures	

Table 2
Santa Clara Valley Water District
BMP Suite List

BMP Suite
Bank Protection BMP Suite
Stormwater Management BMP Suite
Discharge Activities BMP Suite
Grading and Excavation BMP Suite
Sediment Removal and Storage BMP Suite
Vegetation Management and Removal BMP Suite
Well and Exploratory Boring Construction, Modification, or Destruction BMP Suite

Air Quality

AQ-1 **Use Dust Control Measures**	The following Bay Area Air Quality Management District (BAAQMD) Dust Control Measures will be implemented: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day; 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered; 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited; 4. Water used to wash the various exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, etc.) will not be allowed to enter waterways; 5. All vehicle speeds on unpaved roads shall be limited to 15 mph; 6. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used; 7. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations), and this requirement shall be clearly communicated to construction workers (such as verbiage in contracts and clear signage at all access points); 8. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications, and all equipment shall be checked by a certified visible emissions evaluator; 9. Correct tire inflation shall be maintained in accordance with manufacturer's specifications on wheeled equipment and vehicles to prevent excessive rolling resistance; and, 10. Post a publicly visible sign with a telephone number and contact person at the lead agency to address dust complaints; any complaints shall be responded to and take corrective action within 48 hours. In addition, a BAAQMD telephone number with any applicable regulations will be included.
AQ-2 **Avoid Stockpiling Odorous Materials**	Materials with decaying organic material, or other potentially odorous materials, will be handled in a manner that avoids impacting residential areas and other sensitive receptors, including: 1. Avoid stockpiling potentially odorous materials within 1,000 feet of residential areas or other odor sensitive land uses; and 2. Odorous stockpiles will be disposed of at an appropriate landfill.

Biological Resources

BMPs for biological resources are designed to minimize impacts to sensitive resources, including special status and listed species, and sensitive natural communities and habitats. Sensitive species and habitats may be directly or indirectly affected by project activities such as excavation, fill, vegetation management including pruning or removal, alteration of hydrological regime, etc. Impacts to species and natural communities are regulated by agencies such as the California Department of Fish and Wildlife (CDFW), the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the Bay Conservation and Development Commission, as well as corresponding laws such as the State and Federal Endangered Species Acts, the Migratory Bird Treaty Act, the Clean Water Act, the Fish and Game Code, the Native Plant Protection Act, and the California Environmental Quality Act. In addition, the California Native Plant Society publishes a rarity listing status for plants that is used by CDFW and is required for review under CEQA.

BI-1 **Avoid Relocating Mitten Crabs**	Sediment potentially containing Chinese Mitten Crabs will not be transported between San Francisco Bay Watersheds and Monterey Bay Watersheds, specifically: 1. Sediment removed from the San Francisco Bay watersheds will not be transported south of Coyote Creek Golf Drive in south San Jose, and the intersection of McKean and Casa Loma Roads; and, 2. Earth moving equipment used in the San Francisco Bay watershed will be cleaned before being moved to, and used in, the Pajaro Watershed.
BI-2 **Minimize Impacts to Steelhead**	Minimize potential impacts to salmonids by avoiding routine use of vehicles and equipment in salmonid streams between January 1 and June 15.
BI-3 **Remove Temporary Fill**	Temporary fill materials, such as for diversion structures or cofferdams, will be removed upon finishing the work or as appropriate. The creek channels and banks will be re-contoured to match pre-construction conditions to the extent possible. Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the preconstruction conditions as closely as possible, within the finished channel topography.
BI-4 **Minimize Adverse Effects of Pesticides on Non-target Species**	"Pesticides" refers to any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest. Pesticides will be handled, stored, transported, and used in compliance with any established directions and in a manner that minimizes negative environmental effects on non-target species and sensitive habitats. The proposed project plan for handling, storing, transporting and using pesticides must be reviewed and approved by <u>both</u> of the following subject matter experts: 1. District's Pest Control Advisor (a State-certified Qualified Applicator) – the plan will be reviewed, and modified as deemed appropriate, for compliance with: District policy, label restrictions and any advisories published by the California Department of Pesticide Regulation, the Santa Clara County Division of Agriculture, and the U.S. EPA bulletin *Protecting Endangered Species, Interim Measures for Use of Pesticides in Santa Clara County* (USEPA 2000). 2. Qualified District Biologist (as defined in EMAP-30264) – the plan will be reviewed,

Biological Resources

	and modified as deemed appropriate, for compliance with: District policy, approved environmental review documents, project permits, and avoidance of all known listed (Threatened or Endangered) and sensitive species. Information sources for determination of all known locations of species that may be harmed by pesticides include the District's GIS system and California Natural Diversity Database (CNDDB). Either the District's Pest Control Advisor or the Qualified District Biologist may modify the proposed pesticide plan, such as establishing buffer areas or prohibiting the use of pesticides outright, based on site-specific data, current regulatory requirements, and District policy. The purchase of all pesticides must be approved by the District's Pest Control Advisor to ensure compliance with the District's *Control and Oversight of Pesticide Use* policy and appropriate regulatory agency reporting requirements.
BI-5 **Avoid Impacts to Nesting Migratory Birds**	Nesting birds are protected by state and federal laws. The District will protect nesting birds and their nests from abandonment, loss, damage, or destruction. Nesting bird surveys will be performed by a qualified biologist prior to any activity that could result in the abandonment, loss, damage, or destruction of birds, bird nests, or nesting migratory birds. Inactive bird nests may be removed with the exception of raptor nests. Birds, nests with eggs, or nests with hatchlings will be left undisturbed.
BI-6 **Avoid Impacts to Nesting Migratory Birds from Pending Construction**	Nesting exclusion devices may be installed to prevent potential establishment or occurrence of nests in areas where construction activities would occur. All nesting exclusion devices will be maintained throughout the nesting season or until completion of work in an area makes the devices unnecessary. All exclusion devices will be removed and disposed of when work in the area is complete.
BI-7 **Minimize Impacts to Vegetation from Survey Work**	Survey cross-sections will be moved, within acceptable tolerances, to avoid cutting dense riparian vegetation and minimize cutting of woody vegetation, taking advantage of natural breaks in foliage. If the cross-section cannot be moved within the established acceptable tolerances to avoid impacts to dense riparian or woody vegetation, the survey section will be abandoned.
BI-8 **Choose Local Ecotypes Of Native Plants and Appropriate Erosion-Control Seed Mixes**	Whenever native species are prescribed for installation the following steps will be taken by a qualified biologist or vegetation specialist: 1. Evaluate whether the plant species currently grows wild in Santa Clara County; and, 2. If so, the qualified biologist or vegetation specialist will determine if any need to be local natives, i.e. grown from propagules collected in the same or adjacent watershed, and as close to the project site as feasible. Also, consult a qualified biologist or vegetation specialist to determine which seeding option is ecologically appropriate and effective, specifically: 1. For areas that are disturbed, an erosion control seed mix may be used consistent with the SCVWD *Guidelines and Standards for Land Use Near Streams, Design Guide 5, 'Temporary Erosion Control Options.'*

Biological Resources

	2. In areas with remnant native plants, the qualified biologist or vegetation specialist may choose an abiotic application instead, such as an erosion control blanket or seedless hydro-mulch and tackifier to facilitate passive revegetation of local native species. 3. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable. 4. If a gravel or wood mulch has been used to prevent soil compaction, this material may be left in place [if ecologically appropriate] instead of seeding. Seed selection shall be ecologically appropriate as determined by a qualified biologist, per *Guidelines and Standards for Land Use Near Streams, Design Guide 2: Use of Local Native Species*.
BI-9 **Restore Riffle/Pool Configuration of Channel Bottom**	The channel bottom shall be re-graded at the end of the work project to as close to original conditions as possible. In salmonid streams, restore pool and riffle configurations to emulate pre-project instream conditions, taking into account channel morphological features (i.e. slope), which affects riffle/pool sequence.
BI-10 **Avoid Animal Entry and Entrapment**	All pipes, hoses, or similar structures less than 12 inches diameter will be closed or covered to prevent animal entry. All construction pipes, culverts, or similar structures, greater than 2-inches diameter, stored at a construction site overnight, will be inspected thoroughly for wildlife by a qualified biologist or properly trained construction personnel before the pipe is buried, capped, used, or moved. If inspection indicates presence of sensitive or state- or federally-listed species inside stored materials or equipment, work on those materials will cease until a qualified biologist determines the appropriate course of action. To prevent entrapment of animals, all excavations, steep-walled holes or trenches more than 6-inches deep will be secured against animal entry at the close of each day. Any of the following measures may be employed, depending on the size of the hole and method feasibility: 1. Hole to be securely covered (no gaps) with plywood, or similar materials, at the close of each working day, or any time the opening will be left unattended for more than one hour; or 2. In the absence of covers, the excavation will be provided with escape ramps constructed of earth or untreated wood, sloped no steeper than 2:1, and located no farther than 15 feet apart; or 3. In situations where escape ramps are infeasible, the hole or trench will be surrounded by filter fabric fencing or a similar barrier with the bottom edge buried to prevent entry.

Biological Resources	
BI-11 **Minimize Predator-Attraction**	Remove trash daily from the worksite to avoid attracting potential predators to the site.

Cultural Resources

CU-1 **Accidental Discovery of Archaeological Artifacts or Burial Remains**	If historical or unique archaeological artifacts are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Work at the location of the find will halt immediately within 30 feet of the find. A “no work” zone shall be established utilizing appropriate flagging to delineate the boundary of this zone. A Consulting Archaeologist will visit the discovery site as soon as practicable for identification and evaluation pursuant to Section 21083.2 of the Public Resources Code and Section 15126.4 of the California Code of Regulations. If the archaeologist determines that the artifact is not significant, construction may resume. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. If the artifact cannot be avoided, the archaeologist will develop within 48 hours an Action Plan which will include provisions to minimize impacts and, if required, a Data Recovery Plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and Section 15126.4 of the CEQA Guidelines. If burial finds are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Upon discovering any burial site as evidenced by human skeletal remains, the County Coroner will be immediately notified and the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent. No further excavation or disturbance within 30 feet of the site or any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the County Coroner, California Native American Heritage Commission, and/or the County Coordinator of Indian Affairs.

Hazards & Hazardous Materials

The District's projects and operations often require exposure to, and the use of, potentially hazardous materials. The BMPs listed in this section reflect the District's standard procedures for their handling and use. Pesticides are one tool for pest control on district properties and facilities. The most common pesticide use is herbicide application to manage vegetation. Insecticides and rodenticides are used infrequently and in small quantities. All BMPs associated with pesticide use comply with, Q751D02, *Control and Oversight of Pesticide Use*. ISO document **Q751D02** defines District policies and procedures for pesticide use and reporting. The policies and procedures specified therein apply to all District-owned or operated facilities, as well as to pesticide use by staff, contractors, permittees, and suppliers. It is the District policy to minimize the environmental risk, and exposure, resulting from its pesticide use, by employing alternatives to the maximum extent practicable. To assure avoidance and minimization of impacts from the use of pesticides, all proposed pesticide applications must be reviewed by the District's Pest Control Adviser, who is responsible for coordinating, reviewing, tracking, documenting and reporting pest control practices at the District.

HM-1 **Comply with All Pesticide Application Restrictions and Policies**	Pesticide products are to be used only after an assessment has been made regarding environmental, economic, and public health aspects of each of the alternatives by the District's Pest Control Advisor (PCA). All pesticide use will be consistent with approved product specifications. Applications will be made by, or under the direct supervision of, State Certified applicators under the direction of, or in a manner approved by the PCA. Refer to Q751D02, *Control and Oversight of Pesticide Use*.
HM-2 **Minimize Use of Pesticides**	In all cases, where some form of pest control is deemed necessary by the PCA; evaluate alternative pest control methods and pesticides. Refer to Q751D02: *Control and Oversight of Pesticide Use*.
HM-3 **Post Areas Where Pesticides Will Be Used**	Posting of areas where pesticides are to be used shall be performed in compliance with Q751D02: *Control and Oversight of Pesticide Use.* Posting shall be performed in compliance with the label requirements of the product being applied. In addition, the District shall provide posting for **any** products applied in areas used by the public for recreational purposes, and areas readily accessible to the public, regardless of whether the label requires such notification (the posting method may be modified to avoid destruction of bait stations or scattering of rodenticide), including: 1. Sign postings shall notify staff and the general public of the date and time of application; the product's active ingredients, and common name; and, the time of allowable re-entry into the treated area. 2. A District staff contact phone number shall be posted on the sign. 3. Signs shall not be removed until after the end of the specified re-entry interval. 4. Right-to-know literature on the product shall be made available upon request to anyone in the area. 5. Notification will take into account neighbors with specific needs prior to treatment of an adjacent area to ensure such needs are met. Such requests are maintained by the District under Q751D02.

Hazards & Hazardous Materials

HM-4 **Comply with All Pesticide Usage Requirements**	All projects that propose ongoing use of pesticides will comply with all provisions of Q751D02: *Control and Oversight of Pesticide Use*, including, but not necessarily limited to the following: 1. All pest control methods will be performed only after a written Pest Control Recommendation for use has been prepared by the District's PCA in accordance with requirements of the California Food and Agricultural Code. 2. F751D01 – *Pest Control Recommendation & Spray Operators Report* will be completed for each pesticide application.
HM-5 **Comply with Restrictions on Herbicide Use in Upland Areas**	Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* application of pre emergence (residual) herbicides to upland areas will not be made within 72 hours of predicted significant rainfall. Predicted significant rainfall for the purposes of this BMP will be described as local rainfall greater than 0.5 inch in a 24-hour period with greater than a 50% probability of precipitation according to the National Weather Service.
HM-6 **Comply with Restrictions on Herbicide Use in Aquatic Areas**	Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* only herbicides and surfactants registered for aquatic use will be applied within the banks of channels within 20 feet of any water present. Furthermore, aquatic herbicide use will be limited to June 15th through October 31st with an extension through December 31 or until the first occurrence of any of the following conditions; whichever happens first: 1. local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events according to the National Weather Service; or 2. when steelhead begin upmigrating and spawning in the 14 steelhead creeks, as determined by a qualified biologist (typically in November/December). If rain is forecast then application of aquatic herbicide will be rescheduled.
HM-7 **Restrict Vehicle and Equipment Cleaning to Appropriate Locations**	Vehicles and equipment may be washed only at approved areas. No washing of vehicles or equipment will occur at job sites.

Hazards & Hazardous Materials

HM-8 **Ensure Proper Vehicle and Equipment Fueling and Maintenance**	No fueling or servicing will be done in a waterway or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators). 1. For stationary equipment that must be fueled or serviced on-site, containment will be provided in such a manner that any accidental spill will not be able to come in direct contact with soil, surface water, or the storm drainage system. 2. All fueling or servicing done at the job site will provide containment to the degree that any spill will be unable to enter any waterway or damage riparian vegetation. 3. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented. 4. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use. 5. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be done in a channel or flood plain.
HM-9 **Ensure Proper Hazardous Materials Management**	Measures will be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means. 1. Prior to entering the work site, all field personnel will know how to respond when toxic materials are discovered. 2. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage. 3. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system. 4. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. 5. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s). 6. The discharge of any hazardous or non-hazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations will be conducted in accordance with applicable State and federal regulations. 7. In the event of any hazardous material emergencies or spills, personnel will call the Chemical Emergencies/Spills Hotline at 1-800-510-5151.

Hazards & Hazardous Materials

HM-10 **Utilize Spill Prevention Measures**	Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water following these measures: 1. Field personnel will be appropriately trained in spill prevention, hazardous material control, and clean up of accidental spills; 2. Equipment and materials for cleanup of spills will be available on site, and spills and leaks will be cleaned up immediately and disposed of according to applicable regulatory requirements; 3. Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means; 4. Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations), and all field personnel will be advised of these locations; and, 5. The work site will be routinely inspected to verify that spill prevention and response measures are properly implemented and maintained.
HM-11 **Ensure Worker Safety in Areas with High Mercury Levels**	To ensure worker safety is protected in areas with elevated mercury concentrations in exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the California Division of Occupational Safety and Health (Cal/OSHA).
HM-12 **Incorporate Fire Prevention Measures**	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will have appropriate fire suppression equipment available at the work site. 3. An extinguisher shall be available at the project site at all times when welding or other repair activities that can generate sparks (such as metal grinding) is occurring. 4. Smoking shall be prohibited except in designated staging areas and at least 20 feet from any combustible chemicals or vegetation.
HM-13 **Avoid Impacts from Naturally Occurring Asbestos**	The District will comply with and implement BAAQMD dust control measures and notification requirements when working in serpentine soils.

Hydrology/Water Quality

The District's projects and operations often pose situations that warrant standard measures to avoid or minimize impacts to water quality. As of this Handbook revision (G), the following best management practices represent measures currently used by the District; however, since many of these measures are based on industry standards for stormwater management maintained by the California Stormwater Quality Association (**CASQA**), the selection of appropriate BMPs from this list **must be verified** by comparison with the most current standards found on the CASQA website.

WQ-1 **Conduct Work from Top of Bank**	For work activities that will occur in the channel, work will be conducted from the top of the bank if access is available and there are flows in the channel.
WQ-2 **Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms**	Field personnel will use the appropriate equipment for the job that minimizes disturbance to the stream bottom. Appropriately tired vehicles, either tracked or wheeled, will be used depending on the situation. Tracked vehicles (bulldozers, loaders) may cause scarification. Wheeled vehicles may cause compaction. Heavy equipment will not operate in the live stream.
WQ-3 **Limit Impact of Pump and Generator Operation and Maintenance**	Pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dry-back or washout conditions. 2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 3. Pump intakes will be screened to prevent uptake of fish and other vertebrates. Pumps in steelhead creeks will be screened according to NMFS criteria. 4. Sufficient back-up pumps and generators will be onsite to replace defective or damaged pumps and generators.
WQ-4 **Limit Impacts From Staging and Stockpiling Materials**	1. To protect on-site vegetation and water quality, staging areas should occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. 2. Building materials and other project-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains. 3. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, swale, hay wattles or bales, silt screens). 4. The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited. 5. During the wet season, no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained silt fencing or other means of erosion control.

Hydrology/Water Quality	
	During the dry season; exposed, dry stockpiles will be watered, enclosed, covered, or sprayed with non-toxic soil stabilizers.
WQ-5 **Stabilize Construction Entrances and Exits**	Measures will be implemented to minimize soil from being tracked onto streets near work sites: 1. Methods used to prevent mud from being tracked out of work sites onto roadways include installing a layer of geotextile mat, followed by a 4-inch thick layer of 1 to 3-inch diameter gravel on unsurfaced access roads. 2. Access will be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the water body bed and banks, and the surrounding land uses.
WQ-6 **Limit Impact of Concrete Near Waterways**	Concrete that has not been cured is alkaline and can increase the pH of the water; fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of four weeks after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of four weeks after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.

Hydrology/Water Quality

WQ-7 **Isolate Work in Tidal Areas With Use of Coffer Dam**	For work in tidal areas, It is preferable to isolate one side of the channel with a cofferdam and allow flows to continue on the other side of the creek. If downstream flows cannot be diverted around the project site, the creek waters will be transmitted around the site through cofferdam bypass pipes. By isolating the work area from tidal flows, water quality impacts are minimized. 1. Installation of coffer dams will begin at low tide. 2. Waters discharged through tidal coffer dam bypass pipes will not exceed 10 percent in areas where natural turbidity is greater than 50 NTU over the background levels of the tidal waters into which they are discharged. 3. Coffer dams in tidal areas may be made from earthen or gravel material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) and anchored to minimize erosion. 4. Cofferdams and bypass pipes will be removed as soon as possible but no more than 72 hours after work is completed. Flows will be restored at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat.
WQ-8 **Minimize Hardscape in Bank Protection Design**	Bank repair techniques appropriate to a given site based on hydraulic and other site conditions will be selected. 1. Biotechnical repair methods include construction with living materials; willow wattling; erosion control blankets; brush matting; and, installation of root wads and boulders in banks. 2. The repair will be designed and installed so that it will be self-sustaining and use vegetation that adds structural integrity to the stream bank.
WQ-9 **Use Seeding for Erosion Control, Weed Suppression, and Site Improvement**	Disturbed areas shall be seeded with native seed as soon as is appropriate after activities are complete. An erosion control seed mix will be applied to exposed soils down to the ordinary high water mark in streams. 1. The seed mix should consist of California native grasses, (for example *Hordeum brachyantherum*; *Elymus glaucus*; and annual *Vulpia microstachyes*) or annual, sterile hybrid seed mix (e.g., *Regreen*™, a wheat x wheatgrass hybrid). 2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place.
WQ-10 **Prevent Scour Downstream of Sediment Removal**	After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the work area is smooth, and continuous between the maintained and non-maintained areas, and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.

Hydrology/Water Quality

WQ-11 **Maintain Clean Conditions at Work Sites**	The work site, areas adjacent to the work site, and access roads will be maintained in an orderly condition, free and clear from debris and discarded materials on a daily basis. Personnel will not sweep, grade, or flush surplus materials, rubbish, debris, or dust into storm drains or waterways. For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality Upon completion of work, all building materials, debris, unused materials, concrete forms, and other construction-related materials will be removed from the work site.

WQ-12

Manage Well or Exploratory Boring Materials	All materials or waters generated during drilling, well or exploratory boring construction, well development, pump testing, or other activities associated with wells or exploratory borings, will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case will these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways. Such materials/waters must not be allowed to move off the property where the work is being completed.
WQ-13 **Protect Groundwater from Contaminates Via Wells or Exploratory Borings**	Any substances or materials that may degrade groundwater quality will not be allowed to enter any well or boring. Lubricants used on drill bits, drill pipe, or tremie pipe will not be comprised of oily or greasy substances or other materials that may degrade groundwater quality. Well openings or entrances will be sealed or secured in such a way as to prevent the introduction of contaminants.
WQ-14 **Backfill Completed Exploratory Borings**	All borings should be backfilled within 24 hours of termination of testing. Borings will not be left in such a condition as to allow for the introduction of surface waters or foreign materials into them. Borings will be secured such that they do not endanger public health. All borings must be properly destroyed by backfilling with acceptable sealing materials. Acceptable sealing materials are: 1. 27 sack neat cement (four 94-pound bags/55-gallon drum), 2. 10 sack cement sand grout, or 3. hydrated high solids 20 percent bentonite slurry. No soil cuttings may be used for backfilling boreholes. No bentonite chips or pellets may be used to backfill borings. Free fall of sealing material will not be allowed if greater than 30 feet or if more than 3 feet of standing water exists in borehole. A tremie pipe must be used to place the cement sealing material if exploratory boring is over 30 feet deep or if more than 3 feet of standing water exists in borehole. Exploratory borings located in Geologic Setting Zone 4 (bedrock) may be backfilled with borehole cuttings from total depth of the boring up to a depth of 50 feet from the surface grade. The top 50 feet of the borehole must

	be backfilled with above described sealing materials.
WQ-15 **Prevent Water Pollution**	Oily, greasy, or sediment laden substances or other material that originate from the project operations and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife will not be allowed to enter, or be placed where they may later enter, any waterway. The project will not increase the turbidity of any watercourse flowing past the construction site by taking all necessary precautions to limit the increase in turbidity as follows: 1. where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases will not exceed 5 percent; 2. where natural turbidity is greater than 50 NTU, increases will not exceed 10 percent; 3. where the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU will not be discharged from the project. Water turbidity changes will be monitored. The discharge water measurements will be made at the point where the discharge water exits the water control system for tidal sites and 100 feet downstream of the discharge point for non-tidal sites. Natural watercourse turbidity measurements will be made in the receiving water 100 feet upstream of the discharge site. Natural watercourse turbidity measurements will be made prior to initiation of project discharges, preferably at least 2 days prior to commencement of operations.
WQ-16 **Prevent Stormwater Pollution**	To prevent stormwater pollution, the applicable measures from the following list will be implemented: 1. Soils exposed due to project activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. In creeks, the channel bed and areas below the Ordinary High Water Mark are exempt from this BMP. 2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application. 3. Erosion control measures will be installed according to manufacturer's specifications. 4. To prevent stormwater pollution, the appropriate measures from, but not limited to, the following list will be implemented: • Silt Fences • Straw Bale Barriers • Brush or Rock Filters • Storm Drain Inlet Protection • Sediment Traps or Sediment Basins • Erosion Control Blankets and/or Mats

	• Soil Stabilization (i.e. tackified straw with seed, jute or geotextile blankets, etc.) • Straw mulch. 5. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g. silt fences). 6. Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet, with at least an equal amount of open area prior to another linear installation.
WQ-17 **Manage Sanitary and Septic Waste**	Temporary sanitary facilities will be located on jobs that last multiple days, in compliance with California Division of Occupational Safety and Health (Cal/OSHA) regulation 8 California Code of Regulations 1526. All temporary sanitary facilities will be located where overflow or spillage will not enter a watercourse directly (overbank) or indirectly (through a storm drain).

Transportation/Traffic	
TR-1 **Incorporate Public Safety Measures**	Fences, barriers, lights, flagging, guards, and signs will be installed as determined appropriate by the public agency having jurisdiction, to give adequate warning to the public of the construction and of any dangerous condition to be encountered as a result thereof.

Bank Protection BMP Suite

AQ-1 Use Dust Control Measures
BI-1 Avoid Relocating Mitten Crabs
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
CU-1 Accidental Discovery of Archaeological Artifacts or Burial Finds
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
HM-12 Incorporate Fire Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-6 Limit Impact of Concrete Near Waterways
WQ-7 Isolate Work in Tidal Areas with Use of Coffer Dam
WQ-8 Minimize Hardscape in Bank Protection Design
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-10 Prevent Scour Downstream of Sediment Removal
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

Stormwater Management BMP Suite

AQ-1 Use Dust Control Measures
BI-3 Remove Temporary Fills
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts From Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-6 Limit Impact of Concrete Near Waterways
WQ-7 Isolate Work in Tidal Areas with Use of Coffer Dam
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-10 Prevent Scour Downstream of Sediment Removal
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste

Discharge Activities BMP Suite

BI-2	Minimize Impacts to Steelhead
BI-5	Avoid Impacts to Nesting Migratory Birds
HM-8	Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9	Ensure Proper Hazardous Materials Management
HM-10	Utilize Spill Prevention Measures
WQ-3	Limit Impact of Pump and Generator Operation and Maintenance
WQ-5	Stabilize Construction Entrances and Exits
WQ-7	Isolate Work in Tidal Areas With Use of Coffer Dam
WQ-11	Maintain Clean Conditions at Work Sites
WQ-15	Prevent Water Pollution
WQ-16	Prevent Stormwater Pollution
WQ-17	Manage Sanitary and Septic Waste
TR-1	Use Suitable Public Safety Measures

Grading and Excavation BMP Suite

AQ-1 Use Dust Control Measures
AQ-2 Avoid Stockpiling Odorous Materials
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
CU-1 Accidental Discovery of Archaeological Artifacts or Burial Finds
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
HM-12 Incorporate Fire Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-4 Limit Impacts From Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-7 Isolate Work in Tidal Areas With Use of Coffer Dam
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

Sediment Removal and Storage BMP Suite

AQ-1 Use Dust Control Measures
AQ-2 Avoid Stockpiling Potentially Odorous Materials
BI-1 Avoid Relocating Mitten Crabs
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-7 Isolate Work in Tidal Areas with Use of Coffer Dam
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-10 Prevent Scour Downstream of Sediment Removal
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

Vegetation Management and Removal BMP Suite

BI-2 Minimize Impacts to Steelhead
BI-4 Minimize Adverse Effects of Pesticides on Non-target Species
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
BI-7 Minimize Impacts to Vegetation from Survey Work
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-5 Stabilize Construction Entrances and Exits
WQ-8 Minimize Hardscape in Bank Protection Design
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement e
WQ-11 Maintain Clean Conditions at Work Sites
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

Well and Exploratory Boring Construction, Modification, or Destruction BMP Suite

AQ-1 Use Dust Control Measures
BI-5 Avoid Impacts to Nesting Migratory Birds
HM-9 Clean Vehicles and Equipment
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-12 Incorporate Fire Prevention Measures
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-11 Maintain Clean Conditions at Work Sites
WQ-12 Manage Well or Exploratory Boring Materials
WQ-13 Protect Groundwater from Contaminates Via Wells or Exploratory Borings
WQ-14 Backfill Completed Exploratory Borings
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
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TR-1 Use Suitable Public Safety Measures

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California Environmental Quality Act (CEQA) (http://ceres.ca.gov/ceqa/)

Q520D01 – Environmental Management System Environmental Planning (Sections 1 – 5)

Q751D02 – Pesticide Use (On District QEMS)

Attachment 2

Stream Maintenance Program Best Management Practices Handbook

Stream Maintenance Program (SMP) Best Management Practices (BMPs)

A. SECTION A –Pre-Project Planning and General BMPs

General BMPs are applicable program-wide, for most routine SMP maintenance activities. These measures include standard construction practices and impact avoidance measures that will minimize potential environmental impacts. These BMPs will be implemented by the stream maintenance crew, as appropriate and as overseen by site managers, for all activities associated with the maintenance program. The majority of these BMPs are implemented prior to and during maintenance operations, though the level of activity varies depending on the work type.

Other General BMPs are conducted prior to implementing maintenance activities on site. This group of measures includes procedures to identify site or maintenance constraints, such as biological or cultural resource surveys which coincide with permit compliance requirements. Site design constraints for sediment and bank stabilization activities in particular are also identified as part of the pre-project planning process.

BMP Number	BMP Title	BMP Description
GEN-1	In-Channel Work Window	All ground-disturbing maintenance activities (i.e., sediment removal, bank stabilization, tree removal, and mechanized vegetation management) occurring in the channel (below bankfull) will take place between June 15 and October 15. Requests for work window extensions must be submitted to the regulatory agencies by October 1st, listing the creek names and reaches where a work extension will occur. Work extensions vary per work activity. The agencies will provide a single response within one week. Significant rainfall applies after October 15. An extension through December 31 may apply if the following requirements are met and regulatory agency approval is received: For ground-disturbing activities: ▪ Work may continue if no significant rainfall, defined as greater than 0.5 inches per 24 hours within a local watershed, is either forecasted[1] or observed. Following October 15th, maintenance work shall cease for the season if such a rain event is forecasted or observed. ▪ In the Pajaro Basin, winterized sites will be visually inspected prior to, and within 48 hours following, each significant rain event (defined as rainfall 0.5 inch or greater within a 24-hour period in the subject watershed) to ensure that winterization measures are properly implemented and maintained. Sediment removal ▪ Extended Work Window: 1. Creeks supporting anadromous fish: An extended work window may occur from October 15 through October 31, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. 2. Creeks not supporting anadromous fish: An extended work window may occur from October 15 through November 30th, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. ▪ Extended Work Window in Lower Quality Areas:

[1] Weather Forecasts. No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Seventy-two-hour weather forecasts from the National Weather Service or other localized and more detailed weather forecast service will be consulted prior to start up of any phase of the project that may result in sediment runoff to a stream.

BMP Number	BMP Title	BMP Description
		1. Sediment removal work may occur until December 31. 2. Work will only occur on Berryessa Creek (0-88+80; 232+70-236+00; 284+30-288+00), Lower Silver Creek (Reach 3 between Stations 37+40 and 381+19), Thompson Creek (0+00-10+00), Canoas Creek (0+00-390+00), Ross Creek (0+00-86+30), Calabazas Creek (35+00-105+00), and San Tomas Aquino Creek (80+00-100+00) with the following conditions: o site conditions are dry and access for all construction equipment and vehicles will not impact waterways; and o all work will stop if any rainfall is forecast for the next 72 hour period. 3. Work may occur after a significant rainfall event but no later than December 31. 4. Sites must be maintained in a rapidly winterizable[2] state (implement control measures BMP GEN-20). Bank stabilization projects may continue until the approved date stated below. Prior to a forecasted significant rainfall event (0.5 in/24 hrs), all incomplete bank stabilization projects must be winterized. 1. In Creeks Supporting Anadromous Fish o An extended work window may occur until October 31st for bank stabilization projects that will be 50% complete by October 15th. 2. In Creeks Not Supporting Anadromous Fish o An extended work window may occur until November 30th for projects that will be 50% complete by October 15th or until significant rainfall. o An extended work window may occur until November 30th for new bank stabilization projects that will be completed in five (5) days or less, or until significant rainfall. ▪ Instream hand pruning and hand removal of vegetation will occur year round, except when: o Wheeled or tracked equipment needs to access the site by crossing a creek, ponded area, or secondary channel; or o Work occurs in streams that support steelhead. In these streams instream vegetation maintenance will cease on December 31 or when local rainfall greater than 0.5 inches is predicted within a 24-hour period of planned activities, whichever happens first. Modification and removal of instream large woody debris will occur at any time of the year, and as further described in the NMFS Biological Opinion.
GEN-2	Instream Herbicide Application Work Window	Instream herbicide applications will take place between June 15 and October 15, or until the first occurrence of any of the following conditions; whichever happens first: ▪ local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events; or ▪ when steelhead begin upmigrating and spawning in the 14 anadromous steelhead creeks, as determined by a qualified biologist (typically in November/December), o A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas and develop site-specific control methods (including the use of approved herbicide and surfactants). Proposed herbicide use would be limited to the aquatic formulation of glyphosate (Rodeo or equal). Surfactant use would be limited to non-ionic products, such as Agri-

[2] Winterization is the process to maintain work sites with the appropriate BMP's to prevent erosion, sediment transport, and protect water quality. Winterization occurs upon completion of bank repairs or on incomplete projects after October 15 and prior to the forecast of significant rainfall, 0.5 inches or greater of local watershed rainfall within 24 hours. Winterization shall be completed prior to the occurrence of such actual significant rainfall.

BMP Number	BMP Title	BMP Description
		dex, Competitor, or another brand name using the same ingredients. Any modifications to these materials would require review and approval by NMFS and CDFW. o A qualified fisheries biologist will review proposed herbicide application methods and stream reaches. The fisheries biologist would conduct a pre-construction survey (and any other appropriate data research) to determine whether the proposed herbicide application is consistent with SMP approvals concerning biological resources and determine which BMPs would be instituted for work to proceed. In addition, herbicide application requirements are as follows: ▪ no direct application into water; ▪ herbicide application shall not occur when wind conditions may result in drift; ▪ herbicide solution shall be applied only until there is a "wet" appearance on the target plants in order to avoid run off; and ▪ where permitted, surfactants shall be added to the spray solution prior to application.
GEN-3	Avoid Exposing Soils with High Mercury Levels	Sediment removal and bank stabilization projects in portions of the Guadalupe River watershed affected by historic mercury mining may expose soils containing mercury. 1. In Basin Plan identified creeks in the Guadalupe River Basin, soils that are likely to be disturbed or excavated shall be tested for mercury (Hg). Soils shall be remediated if disturbed or excavated soils exposed to streamflow have a residual sample test exceeding 0.2 mg mercury per kg erodible sediment (dry wt., median). 2. Remediation may be accomplished either by: a. treating the site so that contaminated soils excavated for the purpose of bank stabilization shall not be susceptible to erosion; or b. further excavating contaminated soils and replacing them with clean fill or other bank stabilization materials that are free from contaminants. c. Soils with residual sample mercury concentrations exceeding 0.2 mg mercury per kg erodible sediment (dry wt., median) shall be removed and disposed of in a Class I landfill following established work practices and hazard control measures. Soils with residual sample mercury concentrations less than 0.2 mg mercury per kg erodible sediment (dry wt., median) will remain at the project site. 3. To ensure worker safety during sediment removal and bank stabilization projects with elevated mercury concentrations in the exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the Occupational Safety and Health Agency (OSHA).

Biological Resources

GEN-4	Minimize the Area of Disturbance	To minimize impacts to natural resources, soil disturbance will be kept to the minimum footprint necessary to complete the maintenance operation.
GEN-5	Mitten Crab Control Measure	Sediment from the San Francisco Bay Watershed, including that for reuse, cannot be moved to areas any farther south than Coyote Creek Golf Drive in south San Jose, and the intersection of McKean and Casa Loma Roads.
GEN-6	Minimize Impacts to Nesting Birds via Site	1. For activities occurring between January 15 and August 31, project areas will be checked by a qualified biologist or Designated Individuals (DI – for limited ground nesting species surveys) for nesting birds within 2

BMP Number	BMP Title	BMP Description
	Assessments and Avoidance Measures	weeks prior to starting work. If a lapse in project-related work of 2 weeks or longer occurs, another focused survey will be conducted before project work can be reinitiated. 2. If nesting birds are found, a buffer will be established around the nest and maintained until the young have fledged. Appropriate buffer widths are 0.5 mile for bald and golden eagles; 250 feet for other raptors and the least Bell's vireo, herons, and egrets; 25 feet for ground-nesting non-raptors; 700 feet for the California clapper rail; 600 feet for the California least tern and western snowy plover; and 50 feet for non-raptors nesting on trees, shrubs and structures. Mowing and weed whacking will have a 25 feet buffer. A qualified biologist may identify an alternative buffer based on a site specific-evaluation. No work within the buffer will occur without written approval from a qualified biologist, for as long as the nest is active. 3. All vegetation management, sediment reuse, road grading, or other SMP activities in or immediately adjacent to suitable California clapper rail or Alameda song sparrow nesting habitat, as determined by a qualified biologist, shall not be conducted prior to September 1 (the non-nesting season). 4. If a pre-activity survey in high-quality San Francisco common yellowthroat breeding habitat (as determined by a qualified biologist) identifies more singing male San Francisco common yellowthroats than active nests, then the inconspicuous nests of this species might have been missed. In that case, maintenance activities in that area shall be delayed until the San Francisco common yellowthroat non-breeding season (i.e., August 16–March 14). 5. The boundary of each buffer zone will be marked with fencing, flagging, or other easily identifiable marking if work will occur immediately outside the buffer zone. 6. All protective buffer zones will be maintained until the nest becomes inactive, as determined by a qualified biologist. 7. If monitoring shows that disturbance to actively nesting birds is occurring, buffer widths will be increased until monitoring shows that disturbance is no longer occurring. If this is not possible, work will cease in the area until young have fledged and the nest is no longer active.
GEN-6.5	Protection of Nesting Least Bell's Vireos	1. To the extent feasible, SMP activities within those areas mapped as vireo habitat in the Santa Clara Valley Habitat Plan shall be scheduled to occur outside of the least Bell's vireo nesting season (March 15 – July 31). If it is not feasible for maintenance activities along these reaches to be scheduled during the non-nesting season, the following measures will be implemented. 2. For activities within woody riparian habitat mapped as vireo habitat in the Santa Clara Valley Habitat Plan that will occur between March 15 and July 31, any work will be preceded by a focused survey for least Bell's vireos. Pre-activity surveys will consist of two site visits, conducted on separate days within 14 days before the initiation of maintenance activities in the given area, with at least one of these surveys occurring within 5 calendar days before the initiation of such activities. Surveys will be conducted between dawn and 11:00 a.m., during mild weather conditions (i.e., not during excessive cold, heat, wind, or rain), within all riparian habitat in and within 250 feet of any proposed maintenance location along these reaches. The surveys will be conducted by a qualified biologist who is familiar with the visual and auditory identification of this species. 3. To minimize impacts to nesting least Bell's vireos and other birds, the biologist will not initially be looking for Bell's vireo nests during these surveys. Rather the biologist will look and listen for individual vireos. If a least Bell's vireo is detected, it will be observed to determine whether it is actively nesting. The biologist will note the nest location, or if finding the actual nest could result in excessive disturbance or risk damaging the nest, the biologist will determine the approximate location, based on observation of birds carrying nesting material,

BMP Number	BMP Title	BMP Description
		carrying food, or repeatedly visiting a certain area. 4. If an active nest is found, a minimum 250-foot no-activity buffer will be established around the nest. If a territorial male is found but no nest can be detected, then the approximate centroid of the bird's area of activity will be the point from which the buffer will be applied. The required buffer may be reduced in areas where dense riparian forest occurs between the construction activities and the active nest or where sufficient barriers or topographic relief exists to protect the nest from excessive noise or other disturbance. The biologist will coordinate with the USFWS and CDFW to evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis. 5. No work will occur within the buffer without verification by a biologist that the nest is inactive and until any fledged young are no longer dependent on adults for food. 6. If a least Bell's vireo and/or its nest is detected during pre-activity surveys, the District will contact the USFWS and CDFG within two working days regarding the presence and location of the bird/nest.
GEN-7	Protection of Burrowing Owls	1. If occupied burrows are identified, a 250 foot radius no work buffer zone will be established around the burrow. The buffer may be modified, with CDFW approval, to take into consideration of paved roads, intervening riparian corridors and levees. 2. No construction work will occur within the 250 foot buffer zone until after the nesting season. 3. After the nesting season work may occur within the 250 foot buffer zone provided: a. A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction) b. The same qualified biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities. c. If there is any change in owl foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer. d. If the owls are gone for at least one week, the project proponent may request approval from the Santa Clara County Habitat Agency that a qualified biologist excavate the usable burrows to prevent owls from re-occupying the site. After the usable burrows are excavated, the buffer zone will be removed and construction may continue. e. Monitoring must continue as described above for the non-breeding season as long as the burrow remains active. 5. Routine use of existing District maintenance roads within the 250 foot buffer will be allowed. However, no construction traffic will be allowed to use the maintenance road during the active nesting period. 6. Exceptions. a. Mowing on levees may occur during the nesting season and within 250 feet of active burrows provided the burrows are marked by a qualified biologist. b. No vehicle mounted mowers will be used within 10 ft of occupied burrows. c. A qualified biologist will monitor the mowing within the buffer zone and stop the mowing if burrowing owls are observed on the surface at the nest or another burrow. d. Areas within 10 feet of the burrows may be mowed using hand equipment when no owls are visible on the surface. e. All mowing activities within the buffer zone will be completed within 30 minutes.
GEN-8	Protection of Sensitive	Approved herbicides and adjuvants may be applied in habitat areas for sensitive wildlife species (including

BMP Number	BMP Title	BMP Description
	Fauna Species from Herbicide Use	steelhead, California red-legged frog, California tiger salamander, salt marsh harvest mouse, and Bay checkerspot butterfly); all applications will occur in accordance with federal and state regulations. For sprayable or dust formulations: when the air is calm or moving away from sensitive wildlife habitat, applications will commence on the side nearest the habitat and proceed away from the habitat. When air currents are moving toward habitat, applications will not be made within 200 yards by air or 40 yards by ground upwind from occupied habitat. However, these distances may be modified for the control of invasive species on salmonid streams if the following measures are implemented: ▪ A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas and develop site-specific control methods (including the use of approved herbicide and surfactants). Proposed herbicide use would be limited to the aquatic formulation of glyphosate (Rodeo or equal). Surfactant use would be limited to non-ionic products, such as Agri-dex, Competitor, or another brand name using the same ingredients. Any modifications to these materials would require review and approval by NMFS and CDFW. ▪ A qualified fisheries biologist will review proposed herbicide application methods and stream reaches. The fisheries biologist would conduct a pre-construction survey (and any other appropriate data research) to determine whether the proposed herbicide application is consistent with SMP approvals concerning biological resources and determine which BMPs would be instituted for work to proceed.
GEN-9	Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities	A qualified botanist will identify special status plant species and sensitive natural vegetation communities and clearly map or delineate them as needed in order to avoid and/or minimize disturbance, using the CDFW protocols and the *CNPS Botanical Survey Guidelines* to formulate the following protocols: 1. A qualified botanist will use the GIS database, CNDDB, and/or other suitable tools to identify special status plants and sensitive natural vegetation communities located within or near work areas. 2. Surveys of areas identified as sensitive natural communities or suitable habitat for special status plant species will be conducted by a qualified botanist prior to commencement of work. 3. Surveys will be conducted during the appropriate time of the year to adequately identify special-status plants that could occur on the site of proposed maintenance activities. 4. The qualified botanist will ensure avoidance and/or minimize impacts by implementing one or more of the following, as appropriate, per the botanist's recommendation: a) Flag or otherwise delineate in the field the special status plant populations and/or sensitive natural community to be protected; b) Allow adequate buffers around plants or habitat; the location of the buffer zone will be shown on the maintenance design drawings and marked in the field with stakes and/or flagging in such a way that exclusion zones are visible to maintenance personnel without excessive disturbance of the sensitive habitat or population itself (e.g., from installation of fencing). c) Time construction or other activities during dormant and/or non-critical life cycle period; d) Store removed sediment off site; and e) Limit the operation of maintenance equipment to established roads whenever possible. 5. No herbicides, terrestrial or aquatic, will be used in areas identified as potential habitat for special status plants species or containing sensitive natural communities, until a qualified botanist has surveyed the area and determined the locations of special status plant species present. 6. If special status plant species or sensitive communities are present, then a qualified botanist will determine if a given type of vegetation management method is ecologically appropriate for a given area. Alternative

BMP Number	BMP Title	BMP Description
		strategies based on the botanist's recommendations will be coordinated with appropriate staff. 7. All impacts to sensitive natural communities and special status plants identified by the qualified botanist will be avoided and/or minimized
GEN-10	Avoid Impacts to Bay Checkerspot Butterfly and Associated Critical Habitat	1. Areas supporting Bay checkerspot larval host plants will be identified by a qualified botanist and protected from disturbance to the extent feasible, by establishing buffer zones around individual plants or populations. The size of the buffer will be determined by a qualified botanist; the actual distance will depend on the plant species potentially affected and the type of disturbance. No herbicide will be applied to the buffer area, and to the extent feasible, maintenance personnel and equipment will not operate within such areas. 2. Herbicides may be used in serpentine areas that do not contain Bay checkerspot butterfly larval host plants or sensitive plant species and habitat when approved by a qualified botanist and for the following maintenance purposes: a) To protect sensitive species and habitat; b) To manage for control of invasive and non-native plants; and/or c) To maintain access to a facility.
GEN-11	Protection of Salt Marsh Harvest Mouse and California Clapper Rail	1. A District qualified biologist will conduct a desk audit to determine whether suitable Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR) habitat is present in or adjacent to a maintenance activity. 2. Within 7 days prior to work within the range of the Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR), as depicted on the District's GIS layers, the proposed project area will be surveyed by a qualified biologist to identify specific habitat areas. Surveyed areas will include work locations and access routes. The range of the salt marsh harvest mouse and California clapper rail is based on the SCVWD's GIS mapping reflecting occurrence information and potential habitat. If this mapping is revised, it will be provided to the Service for review. 3. To minimize or avoid the loss of individuals, activities within or adjacent to California clapper rail and salt marsh harvest mouse habitat will not occur within two hours before or after extreme high tides (6.5 feet or above) when the marsh plain is inundated, because protective cover for those species is limited and activities could prevent them from reaching available cover. 4. Specific habitat areas are vegetated areas of cordgass (*Spartina* spp), marsh gumplant (*Grindelia* spp.), pickleweed (*Sarcocornia pacifica*), alkali heath, (*Frankenia* sp.), and other high marsh vegetation, brackish marsh reaches of creek with heavy accumulations of bulrush thatch (old stands), and high water refugia habitat that may include annual grasses, and shrubs immediately adjacent to channels. 5. Within the identified specific habitat areas, vegetation will be removed by hand from areas to be directly impacted by the work activities if possible (hand removal of vegetation is some channels may not be possible). If within the mapped range of the mouse but outside of areas identified as specific habitat areas, then other methods may be possible. 6. Prior to the initiation of work each day for all vegetation management work, ground or vegetation disturbance, operation of large equipment, grading, sediment removal, and bank stabilization work and prior to expanding the work area, if suitable habitat occurs within the immediate work area, a qualified biologist will conduct a pre-construction survey of all suitable habitat that may be directly or indirectly impacted by the day's activities (work area, access routes, staging areas). a. If during the initial daily survey or during work activities a CCR is observed within or immediately

BMP Number	BMP Title	BMP Description
		adjacent to the work area (50 feet), initiation of work will be delayed until the CCR leaves the work area. b. If during the initial daily survey or during work activities a SMHM or similar rodent is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until a *Site Specific Species Protection Form* can be developed and implemented by a qualified biologist to protect the SMHM or similar rodent is developed and implemented by the qualified biologist. Acceptable plan activities may include one or more of the following activities: 1) establishment of a buffer zone at least 50 feet in radius from the rodent; 2) ongoing active monitoring, 3) construction of silt fence barrier between maintenance work and location of the rodent, 4) delay of work activity until the qualified biologist can provide CDFW and the Service a suggested course of action and seek concurrence. 7. Mowing using heavy equipment (tractors, boom mowers, rider mowers) will not be conducted in habitat areas or within 50 feet of habitat areas. If mowing with hand equipment is necessary within 50 feet of habitat areas, an on-site monitor will observe the area in front of the mower from a safe vantage point while it is in operation. If SMHM are detected within the area to be mown, no mowing will occur in that area. If CCR are detected within the area to be mown, the mowing will stop until the individual(s) have left the work area. 8. See ANI-2 for additional restrictions. 9. If visual observation cannot confirm California clapper rail left the work area then it is assumed that the individual(s) remains in the work area and the work will not resume until the area has been thoroughly surveyed (and absence confirmed) or the Service has been contacted for guidance.
GEN-12	Protection of Special-Status Amphibian and Reptile Species	1. A District qualified biologist will conduct a desk audit to determine whether suitable special-status amphibian or reptile habitat is present in or adjacent to a maintenance activity based on all available information including the habitats modeled in the Valley Habitat Plan. 2. If the District Wildlife or Fisheries Biologist determines that a special-status amphibian or reptile could occur in the activity area, a qualified biologist will conduct one daytime and one nighttime survey within a 7 day period preceding the onset of maintenance activities. a. If a special-status amphibian or reptile, or the eggs or larvae of a special status amphibian or reptile, are found within the activity area during a pre-activity survey or during project activities, the qualified biologist shall notify the project proponent about the special-status species and conduct the following work specific activities: i. For minor maintenance activities and for vegetation removal activities that will take less than 1 day, a qualified biologist shall conduct a special status species survey on the morning of and prior to the scheduled work. A. If no special status species is found, the work may proceed. B. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. C. If an active western pond turtle nest is detected within the activity area, a 50-foot buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. D. If adults or non-larval juveniles of a special status species are found, one of the following two

BMP Number	BMP Title	BMP Description
		procedures will be implemented: i. If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is less likely to result in adverse effects than leaving the individual in place and rescheduling the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFW approval, depending on the listing status of the species in question), and work may proceed. ii. If, in the opinion of the qualified biologist, the individual is likely to leave the work area on its own, and work can be feasibly rescheduled, a buffer will be established around the location of the individual(s) and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled. ii. For minor maintenance and vegetation removal activities that will take more than 1 day, the qualified biologist shall conduct a special-status species survey on each morning of and prior to the scheduled work commencing. E. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. F. If an active western pond turtle nest is detected within the activity area, a 50 ft-buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. G. If adults or non-larval juveniles of a special status species are found, the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFW approval, depending on the listing status of the species in question), and work may proceed. iii. For Sediment Removal and Bank Stabilization Projects the wildlife or fisheries biologist in cooperation with the project proponent shall complete a *Site Specific Species Protection Form for the project*. Elements of the form include: work rescheduling, training work crews, daily surveys, establishment of buffers and buffer fencing, on-site monitoring, habitat modification in advance of work activities, capture and relocation of individual special-status species, methods of documentation, and reporting of results. b. If no special status amphibian or reptile is found within the activity area during a pre-activity survey, the work may proceed. c. During animal conflict management activities, if special status species are found within a burrow proposed for destruction, a qualified biologist will determine an appropriate buffer distance around that burrow to ensure adequate protection of the habitat. The buffer area may include not destroying adjacent burrows as that may damage subterranean networks of the occupied burrow or produce substrate vibrations which could interfere with prey detection mechanisms. If two consecutive follow up surveys are conducted (spaced 30 days apart) in which the burrow is found to be unoccupied, work can proceed as planned. A naturally found back filled burrow known to have been inhabited by a special-status species will be presumed to still be occupied by that species and a clearly delineated buffer demarcation of the burrow area will be in place for the duration of nearby work activities. In rare instances in which destruction of the burrow is not avoidable during animal conflict management, the animal will be relocated to a safe burrow outside the

BMP Number	BMP Title	BMP Description
		impact area, with USFWS and/or CDFW approval, depending on the listing status of the species in question. A biologist will observe the relocated animal until it is certain that the animal is not in immediate danger of desiccation or predation.
GEN-13	Protection of Bat Colonies	1. A District Wildlife Biologist will conduct a desk audit to determine whether suitable habitat (appropriate roost trees or anthropogenic structures) is present for bat colonies within 100 feet of the work site, staging areas, or access routes. 2. If potential bat colony habitat is determined to be present, within two weeks prior to the onset of work activities a qualified biologist will conduct a survey to look for evidence of a bat use. If evidence is observed, or if potential roost sites are present in areas where evidence of bat use might not be detectable (such as a tree cavity), an evening survey and/or nocturnal acoustic survey may be necessary to determine if the bat colony is active and to identify the specific location of the bat colony. 3. If an active bat colony is present then the qualified biologist will make the following determinations: a. The work can proceed without unduly disturbing the bat colony b. There is a need for a buffer zone to prevent disturbance to the bat colony, and implementation of the buffer zone (determined on a case-by-case basis by a qualified biologist) will reduce or eliminate the disturbance to an acceptable level. 4. If a bat colony is found in a tree or structure that must be removed or physically disturbed the qualified biologist will consult with DFW prior to initiating any removal or exclusion activities.
GEN-14	Protection of San Francisco Dusky-footed Woodrat	1. Prior to work within riparian, oak woodland, or coyote brush scrub habitat, or the removal of any oak trees outside these habitats, a District Wildlife Biologist will conduct a desk audit to determine whether woodrats could be present within suitable habitat for San Francisco dusky-footed woodrat or is known to be present in or adjacent to a maintenance activity site. 2. If the District Wildlife Biologist determines that no San Francisco dusky-footed woodrat habitat is present, or there is habitat present but it will not be affected by the maintenance activity, then no further action is required. 3. If the District Wildlife Biologist determines that suitable San Francisco dusky-footed woodrat habitat is present and may be affected by the maintenance activity, a qualified biologist shall conduct a pre-activity survey within 2 weeks prior to the start of work to determine if woodrat nests are present, or within 5 feet of, the immediate activity area. If woodrat nests are determined to be present, the following measures shall be implemented: a. To the extent feasible, impacts to woodrat nests will be avoided by maintaining a minimum 5-ft buffer between maintenance activities and nests. Even if a 5-ft buffer cannot be maintained, the District will minimize impacts to nests by avoiding the direct destruction or modification of the nests to the extent feasible. b. If one or more woodrat nests are determined to be present and physical disturbance or destruction of the nests cannot be avoided, then the woodrats shall be evicted from their nests and the nest material relocated outside of the disturbance area, prior to onset of activities that would disturb the nest, to avoid injury or mortality of the woodrats. First, an alternate location for the nest material shall be chosen by a qualified biologist based on the following criteria: 1) proximity to current nest location; 2) safe buffer distance from planned work; 3) availability of food resources; and 4) availability of cover. An alternate nest structure will then be built at the chosen location. The structure will be made up of small logs (e.g., available materials 2 inches in diameter or greater) stacked to provide a foundation

BMP Number	BMP Title	BMP Description
		on which the woodrats can add nest material. Subsequently, during the evening hours (i.e., within 2 hours prior to sunset), a qualified biologist will slowly dismantle the existing woodrat nest to allow any woodrats to flee and seek cover. All sticks from the nest will be collected and spread over the alternate structure. If young woodrats that are still dependent on their mother are discovered, relocation efforts will cease for the evening and the California Department of Fish and Wildlife will be contacted for guidance on how to proceed.
GEN-15	Salvage Native Aquatic Vertebrates from Dewatered Channels	If fisheries or native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a fish and native aquatic vertebrate relocation plan shall be implemented to ensure that fish and native aquatic vertebrates are not stranded. Relocation efforts will be based on the District's Fish Relocation Guidelines (Attachment B). Streams that support a sensitive species (i.e. steelhead) will require a relocation effort and/ or initial onsite monitoring by a qualified biologist depending on seasonal conditions: 1. In non-tidal channels, where water is to be diverted, prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. 2. Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work.
GEN-15.5	Avoidance of Impacts on the San Joaquin Kit Fox	1. A qualified District biologist will conduct a desk audit to determine whether an SMP activity will occur in an area where the San Joaquin kit fox could potentially occur (i.e., roughly east of Frazier Lake Road and south of Bloomfield Avenue), and in potential habitat for the species. 2. If the District biologist determines that an SMP activity could occur in an area that could potentially support a kit fox, the SCVWD will implement applicable pre-activity surveys and other measures in accordance with the USFWS's *San Joaquin Kit Fox Survey Protocol for the Northern Range*, as follows: a) Conduct a preconstruction/pre-activity survey no less than 14 days and no more than 30 days prior to the beginning of project implementation. Surveys shall identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, and assess the potential impacts to the kit fox by the proposed activity. The status of all dens shall be determined and mapped in accordance with the survey protocol. b) If a natal/pupping den is discovered within the project area or within 200 feet of the project boundary, the USFWS shall be immediately notified. Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Destruction of any known or natal/pupping kit fox den would require take authorization from the USFWS. c) The project proponent will establish exclusion zones around the kit fox dens, if determined to be present. The configuration of the exclusion should have a radius measured outward from the entrance or cluster of entrances. The following radii are minima to be applied: ▪ Potential den: 50 feet ▪ Known den: 100 feet ▪ Natal/pupping den: Service must be contacted (occupied and unoccupied) ▪ Atypical den: 50 feet.

BMP Number	BMP Title	BMP Description
		3. If take of the San Joaquin kit fox will occur, take authorization from the USFWS and CDFW will be necessary.

General Maintenance Practices

GEN-16	In-Channel Minor Activities	For in-channel minor work activities, work will be conducted from the top of the bank if access is available and there are flows in the channel.
GEN-17	Employee/Contractor Training	All appropriate District staff and contractors will receive annual training on Stream Maintenance Program BMPs. The training will also include an overview of special-status species identification and habitat requirements. District staff and contractors will receive fact sheets to assist with in-the-field identification of special-status species and their habitats.
GEN-18	Paperwork Required On-site	1. Copies of regulatory permits related to the Stream Maintenance Program will be kept on-site and available for review, if requested by regulatory personnel. 2. Copies of the Stream Maintenance Program Manual and this BMP Manual will be kept on-site.
GEN-19	Work Site Housekeeping	1. District employees and contractors will maintain the work site in neat and orderly conditions on a daily basis, and will leave the site in a neat, clean, and orderly condition when work is complete. 2. Slash, sawdust, cuttings, etc. will be removed to clear the site of vegetation debris. As needed, paved access roads and trails will be swept and cleared of any residual vegetation or dirt resulting from the maintenance activity. 3. For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality (see BMPs GEN-24). 4. The District's maintenance crews are responsible for properly removing and disposing of all debris incurred as a result of construction within 72 hours of project completion. 5. All trash that is brought to a project site during maintenance activities (e.g., plastic water bottles, plastic lunch bags, cigarettes) will be collected at the site daily.
GEN-20	Erosion and Sediment Control Measures	1. Soils exposed due to maintenance activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. The channel bed and areas below the Ordinary High Water Mark (OHWM) are exempt from this BMP. 2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application. 3. Erosion control measures will be installed according to manufacturer's specifications. 4. Appropriate measures include, but are not limited to, the following: o Silt Fences o Straw Bale Barriers o Brush or Rock Filters o Storm Drain Inlet Protection o Sediment Traps

BMP Number	BMP Title	BMP Description
		o Sediment Basins o Erosion Control Blankets and Mats o Soil Stabilization (i.e. tackified straw with seed, jute or geotextile blankets, etc.) o Wood chips o Straw mulch 5. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g. silt fences). 6. Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet, with at least an equal amount of open area prior to another linear installation; and only on one side of levee slopes. Inboard and outboard areas will only have installations set in an alternating pattern, such that no inboard and outboard levee faces would have erosion control blankets along the same levee stationing. 7. Each maintenance site will be visually inspected at least once daily during extended storm events to confirm that BMPs are effective and maintained as necessary. 8. Each maintenance site will be visually inspected within two business days (48 hours) after each significant rain event to determine whether BMPs were effective and identify the need to modify or maintain existing BMPs or include additional BMPs to be protective.
GEN-21	Staging and Stockpiling of Materials	1. To protect on-site vegetation and water quality, staging areas should occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all maintenance equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. 2. Building materials and other maintenance-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains. Materials will not be stockpiled longer than seven (7) calendar days. 3. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, swale, hay wattles or bales, silt screens). 4. The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited. 5. Wet material removed from an isolated creek reach may be pulled to the side of the channel (within the channel and below top of bank) and allowed to naturally drain prior to removal from the channel. Pulled material will be removed from the channel prior to deactivation of the site or forecast of rain. 6. During the wet season, no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained (i.e., per manufacturer specifications) silt fencing or other means of erosion control. During the dry season; exposed, dry stockpiles will be watered, enclosed, covered, or sprayed with non-toxic soil stabilizers (GEN-24). 7. All pipes, culverts, or similar structures stored at a site within sensitive species areas, for one or more overnight periods shall be securely capped prior to storage or inspected before the pipe is subsequently moved. If any potential special-status species are observed within a pipe, a District biologist shall be consulted on what steps should be taken to protect the species. If a District biologist is on-site, they may remove the special status species from the pipes and relocate to the nearest appropriate and unaffected habitat.

BMP Number	BMP Title	BMP Description
GEN-22	Sediment Transport	To prevent sediment-laden water from being released back into waterways during transport of spoils to disposal locations, truck beds will be lined with an impervious material (e.g., plastic), or the tailgate blocked with wattles, hay bales, or other appropriate filtration material. Trucks may then drain excess water by slightly tilting the loads and allowing the water to drain out through the applied filter, but only within the active project area of the creek where the sediment is being loaded into the trucks or within an identified vegetated area (swale) that is separated from the creek.
GEN-23	Stream Access	District personnel will use existing access ramps and roads to the extent feasible. If necessary to avoid large mature trees, native vegetation, or other significant habitat features, temporary access points will be constructed in a manner that minimizes impacts according to the following guidelines: 1. Temporary access points will be constructed as close to the work area as possible to minimize equipment transport 2. In considering channel access routes, slopes of greater than 20 percent will be avoided, if possible. 3. Any temporary fill used for access will be removed upon completion of the project and pre-project topography will be restored to the extent possible. 4. When temporary access is removed, disturbed areas will be revegetated or filled with compacted soil, seeded, and/or stabilized with erosion control fabric immediately after construction to prevent future erosion. 5. Personnel will use the appropriate equipment for the job that minimizes impacts and disturbance to the stream bottom. Appropriately-tired vehicles, either tracked or wheeled, will be used depending on the site and maintenance activity.
GEN-24	On-Site Hazardous Materials Management	1. An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use will be maintained by the worksite manager. 2. As appropriate, containers will be properly labeled with a "Hazardous Waste" label and hazardous waste will be properly recycled or disposed of off-site. 3. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage. 4. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s). 5. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system. 6. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. 7. Sanitation facilities (e.g., portable toilets) will be placed outside of the creek channel and floodplain. Direct connections with soil, the storm drainage system, and surface waters will be avoided. 8. Sanitation facilities will be regularly cleaned and/or replaced, and inspected daily for leaks and spills.
GEN-25	Existing Hazardous Materials	If hazardous materials, such as oil, batteries or paint cans, are encountered at the maintenance sites, the District will carefully remove and dispose of them according to applicable regulatory requirements. District staff will wear proper protective gear and store the waste in appropriate hazardous waste containers until it can be disposed at a hazardous waste facility.
GEN-26	Spill Prevention and Response	The District will prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels following these measures:

BMP Number	BMP Title	BMP Description
		1. District field personnel will be appropriately trained in spill prevention, hazardous material control, and clean up of accidental spills. 2. Equipment and materials for cleanup of spills will be available on site and spills and leaks will be cleaned up immediately and disposed of according to applicable regulatory requirements. 3. Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means. 4. Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations). All field personnel will be advised of these locations. 5. District staff will routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained. *Spill Response Measures:* For small spills on impervious surfaces, absorbent materials will be used to remove the spill, rather than hosing it down with water. For small spills on pervious surfaces such as soil, the spill will be excavated and properly disposed rather than burying it. Absorbent materials will be collected and disposed of properly and promptly. If a hazardous materials spill occurs that cannot be contained or cleaned up with the onsite materials, the onsite District field personnel will be responsible for immediately initiating an emergency response sequence by notifying the proper authorities (i.e., District Emergency Response (ER) Team and public fire and hazmat agencies) of the release; taking appropriate defensive steps from a safe distance to secure the site to minimize damage to people, environment, and property (PEP); and deferring all other response activities to public emergency response agencies and/or the District Emergency Response (ER) Team or District ER Contractor. Depending on the nature of the release, the District ER Team's actions will include: urgent (responding within 2 hours of notification) field response site reconnaissance, emergency sequence initiation, defensive containment, release control, incident command; or priority (non 2-hour) field response site reconnaissance and clean-up operations. If a "reportable" spill of petroleum products occurs, the District's Stream Maintenance Implementation Program Manager will be notified and action taken to contact the appropriate safety and cleanup crews. A reportable spill is defined as when: ▪ a film or sheen on, or discoloration of, the water surface or adjoining bank/shoreline is observed; or ▪ a sludge or emulsion is deposited beneath the surface of the water or adjoining banks/shorelines (40 Code of Federal Regulations 110); or when ▪ another violation of water quality standards is observed. A written description of the reportable release must be submitted to the appropriate Regional Water Quality Control Board and the California Department of Toxic Substances Control (DTSC). This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. If an appreciable spill has occurred, and results determine that project activities have adversely affected surface water or groundwater quality, a detailed analysis will be performed to the specifications of DTSC to identify the likely cause of contamination. This analysis will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, the District or contractors will select and implement

BMP Number	BMP Title	BMP Description
		measures to control contamination, with a performance standard that surface and groundwater quality will be returned to baseline conditions. These measures will be subject to approval by the District, DTSC, and the Regional Water Quality Control Board.
GEN-27	Existing Hazardous Sites	Upon selection of maintenance project locations, the District will conduct a search for existing known contaminated sites, as part of its annual preparation of the Notice of Proposed Work (NPW), on the State Water Resource Control Board's GeoTracker Web site (http://www.geotracker.waterboards.ca.gov). The Geotracker search will only be performed for the District's ground disturbing activities. For any proposed ground disturbing maintenance sites located within 1,500 feet of any "open" sites where contamination has not been remediated, the District will contact the RWQCB case manager listed in the database. The District will work with the case manager to ensure maintenance activities would not affect cleanup or monitoring activities or threaten the public or environment.
GEN-28	Fire Prevention	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will ~~: a) H~~have appropriate fire suppression equipment available at the work site.
GEN-29	Dust Management	The District will implement the Bay Area Air Quality Management District's (BAAQMD) required Dust Control Measures (http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en). Current measures stipulated by the BAAQMD Guidelines include the following: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. Water used to wash the various exposed surfaces (i.e., parking areas, staging areas, soil piles, graded areas, etc.) will not be allowed to enter the water way. 5. All vehicle speeds on unpaved roads shall be limited to 15 mph. 6. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. 7. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 8. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator. 9. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

BMP Number	BMP Title	BMP Description
GEN-30	Vehicle and Equipment Maintenance	1. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented. 2. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use. 3. Incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) will be checked for leaking oil and fluids. Vehicles or equipment visibly leaking operational fluids will not be allowed on-site. 4. No heavy equipment will operate in a live stream. This will not apply to activities for which no other option exists, such as sediment removal which cannot be conducted from top of bank, etc. In these cases, dewatering will be conducted as necessary, following the protocols in BMPs GEN-33 or GEN-34. 5. No equipment servicing will be done in the creek channel or immediate floodplain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps and generators). 6. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location, and that can be performed without releasing any material into the floodway or water, will be conducted in the channel or floodplain. 7. If necessary, all servicing of equipment done at the job site will be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas will not directly connect to the ground, surface water, or the storm drain system. The service area will be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan, to catch spills or leaks will be used when removing or changing fluids. Fluids will be stored in appropriate containers with covers, and properly recycled or disposed of offsite.
GEN-31	Vehicle Cleaning	1. Equipment will be cleaned of any visible sediment or vegetation clumps before transferring and using in a different watershed to avoid spreading pathogens or exotic/invasive species. 2. Vehicle and equipment washing can occur on-site only as needed to prevent the spread of sediment, pathogens or exotic/invasive species. No runoff from vehicle or equipment washing is allowed to enter water bodies, including creek channels and storm drains, without being subjected to adequate filtration (e.g., vegetated buffers, straw wattles or bales, fiber rolls, and silt screens). The discharge of decant water from any on-site wash area to water bodies or to areas outside of the active project site is prohibited. Additional vehicle/equipment washing will occur at the approved wash area in the District's corporation yard.
GEN-32	Vehicle and Equipment Fueling	1. No fueling will be done in the channel (top-of-bank to top-of-bank) or immediate floodplain unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). 2. All off-site fueling sites (i.e., on access roads above the top-of-bank) will be equipped with secondary containment and avoid a direct connection to soil, surface water, or the storm drainage system. 3. For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, will be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.

BMP Number	BMP Title	BMP Description
Dewatering		
GEN-33	Dewatering for Non-Tidal Sites	When sediment removal and bank stabilization work area includes a flowing stream, the entire streamflow will be diverted around the work area by construction of a temporary dam and/or bypass. Where appropriate, stream flow diversions will occur via gravity driven systems. *A. Planning to avoid and minimize impacts to water quality and aquatic wildlife:* 1. For construction and monitoring of a stream flow bypass, the *Sediment Removal and Bank Stabilization Projects* checklist will be completed. 2. Recommendations by a qualified Fisheries Biologist to protect native fisheries and aquatic vertebrates will be incorporated into the bypass design. The recommendations may include but are not limited to: i. Screening the stream flow diversion source or pump to prevent entrainment of native fish or amphibian species. The screening dimensions will be appropriate to the species present. ii. Relocation of native aquatic vertebrates. This will include the methods to be used to capture and hold and move the aquatic vertebrates and a description of where the aquatic vertebrates will be relocated. 3. Depending on the channel configurations, sediment removal activities may occur where the flows are not bypassed around the work site as long as a berm is left between the work area and stream flows to minimize water quality impacts during excavation activities. The berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel. *B. Construction*: 1. The construction of facilities will be based on the water bypass plan. 2. Coffer dams will be installed both upstream and downstream of the work area to minimize impacts or the distance necessary to accomplish effective passive systems. 3. In streams where water may enter the construction site from downstream (reverse flow) additional coffer dams (downstream) may be necessary. When multiple coffer dams are constructed, the upstream dam will be constructed first. 4. Instream cofferdams will only be built from materials such as sandbags, earth fill, clean gravel, or rubber bladders which will cause little or no siltation or turbidity. 5. Plastic sheeting will be placed over k-rails, timbers, and earth fill to minimize water seepage into and out of the maintenance areas. The plastic sheets will be firmly anchored, using sandbags, to the streambed to minimize water seepage. 6. When pumping is necessary to dewater a work site, a temporary siltation basin and/or use of silt bags may be required to prevent sediment from re-entering the wetted channel. Pump intakes will be screened to prevent harm to aquatic wildlife. 7. If necessary to prevent erosion an energy dissipater will be constructed at the discharge point. 8. Timing of flow diversions will be coordinated with the completion of the dam structure to facilitate not drying up the downstream creek area and to minimize dry back conditions. *C. Implementation*: 1. Water flows downstream of the project site will be maintained to prevent stranding aquatic vertebrates.

BMP Number	BMP Title	BMP Description
		2. Water diverted around work sites and water detained by coffer dams will be protected from maintenance activity-related pollutants, such as soils, equipment lubricants or fuels. 3. The *Fish Relocation Guidelines* (Attachment B) will be implemented to ensure that fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering. a) Native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. b) Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work. 4. Filtration devices (silt bags attached to the end of discharge hoses and pipes to remove sediment from discharged water) or settling basins will be provided as necessary at discharge sites to ensure that the turbidity of discharged water is not visibly more turbid than the water in the channel upstream of the maintenance site. If increases in turbidity are observed, additional measures will be implemented such as a larger settling basin or additional filtration. If increases in turbidity persist, the District's Stream Maintenance Program Implementation Project Manager will be alerted since turbidity measurements may be required. 5. Water remaining in the work area will be removed by evaporation, seepage, or pumping. When pumping is required to dewater a site, the decanted water will be discharged with water bypassed around the site or in a separate erosion control – energy dissipation area/vegetated swale. The turbidity of discharged water will not be visibly more turbid than the receiving water. *Deconstruction*: 1. When maintenance is completed, the flow diversion structure will be removed as soon as possible. Impounded water will be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. 2. Removal will normally proceed from downstream in an upstream direction. 3. When diversion structures are removed, the ponded water will be directed back into the low-flow channel in a phased manner to minimize erosion and downstream water quality impacts. Normal flows will be restored. 4. The area disturbed by flow bypass mechanisms will be restored to the pre-project condition at the completion of the project (to the extent practical). This may include, but is not limited to, recontouring the area and planting of riparian vegetation.

BMP Number	BMP Title	BMP Description
GEN-34	Dewatering in Tidal Work Areas	For tidal areas, a downstream cofferdam will be constructed to prevent the work area from being inundated by tidal flows. 1. Installation of cofferdams and fish exclusion measures will be installed at low tide when the channel and project site are at their driest. 2. It is preferable to not use any bypass pipes when work is being conducted on one side of the channel, if~~s~~ isolated by the cofferdam, and flows can continue on the other side of the creek channel without entering the project area. 3. If downstream flows cannot be diverted around the project site, the creek waters will be transmitted around the site through cofferdam bypass pipes. Waters discharged through tidal cofferdam bypass pipes will not exceed 50 NTUs over the background levels of the tidal waters into which they are discharged. 4. Cofferdams in tidal areas may be made from earthen or gravel material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) if needed to minimize erosion. A protected covering or sheeting will be placed on the water side of an earthen coffer dam to protect water quality. 5. When maintenance is completed, the cofferdams and bypass pipes will be removed as soon as possible but no more than 72 hours after work is completed. Flows will be restored at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat.
GEN-35	Pump/Generator Operations and Maintenance	When needed to assist in channel dewatering, pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dryback or washout conditions. 2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 3. All pump intakes will be screened. Pumps in steelhead creeks will be screened according to NMFS criteria (http://www.swr.noaa.gov/sr/fishscrn.pdf) to prevent entrainment of steelhead.
Public Safety		
GEN-36	Public Outreach	The public will be informed of stream maintenance work prior to the start of work as part of the preparation of the NPW for all projects in the NPW: 1. Each spring, a newspaper notice will be published with information on the NPW work sites, approximate work dates, and contact information. 2. Neighborhood Work Notices will be distributed as part of the NPW preparation prior to the start of work. 3. Local governments (cities and County) will be notified of scheduled maintenance work. The NPW will be submitted to the public works departments, local fire districts, and the District's Flood Protection and Watershed Advisory Committees. 4. The District will post specific information on individual maintenance projects on the Stream Maintenance Web site: (http://valleywater.org/EkContent.aspx?id=379&terms=stream+maintenance) 5. For high profile projects, at the District's discretion, signs will be posted in the neighborhood to notify the public at least one week in advance of maintenance schedules, trail closures, and road/lane closures as necessary and as possible. Signage used at work sites will include contact information for lodging comments and/or complaints regarding the maintenance activities.
GEN-37	Implement Public Safety Measures	The District will implement public safety measures during maintenance as follows: 1. Construction signs will be posted at job sites warning the public of construction work and to exercise caution,

BMP Number	BMP Title	BMP Description
		as appropriate to public accessed areas. 2. Where work is proposed adjacent to a recreational trail, warning signs will be posted several feet beyond the limits of work. Signs will also be posted if trails will be temporarily closed. 3. If needed, a lane will be temporarily closed to allow for trucks to pull into and out of access points to the work site. 4. Temporary fencing, either the orange safety type or chain link, will be installed above repair sites on bank stabilization projects. 5. When necessary, District or contracted staff will provide traffic control and site security.
GEN-38	Minimize Noise Disturbances to Residential Areas	The District will implement maintenance practices that minimize disturbances to residential areas surrounding work sites. 1. With the exception of emergencies, work will be conducted during normal working hours. Maintenance activities in residential areas will not occur on Saturdays, Sundays, or District observed holidays except during emergencies, or with approval by the local jurisdiction and advance notification of surrounding residents. 2. Vehicles, generators and heavy equipment will be equipped with adequate mufflers. 3. Idling of vehicles will be prohibited beyond 5 minutes unless operation of the engine is required to operate a necessary system such as a power take-off (PTO).
GEN-39	Planning for Pedestrians, Traffic Flow, and Safety Measures	1. Work will be staged and conducted in a manner that maintains two-way traffic flow on public roadways in the vicinity of the work site. If temporary lane closures are necessary, they will be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any lane closures will include advance warning signage, a detour route and flaggers in both directions. When work is conducted on public roads and may have the potential to affect traffic flow, work will be coordinated with local emergency service providers as necessary to ensure that emergency vehicle access and response is not impeded. 2. Bicycle and pedestrian facility closures will be scheduled outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. 3. Public transit access and routes will be maintained in the vicinity of the work site. If public transit will be affected by temporary road closures and require detours, affected transit authorities will be consulted and kept informed of project activities. 4. Adequate parking will be provided or designated public parking areas will be used for maintenance-related vehicles not in use through the maintenance period. 5. Access to driveways and private roads will be maintained. If brief periods of maintenance would temporarily block access, property owners will be notified prior to maintenance activities.

BMP Number	BMP Title	BMP Description
Cultural Resources		
GEN-40	Discovery of Cultural Remains or Historic or Paleontological Artifacts	Work in areas where remains or artifacts are found will be restricted or stopped until proper protocols are met. 1. Work at the location of the find will halt immediately within 50 feet of the find. A “no work” zone shall be established utilizing appropriate flagging to delineate the boundary of this zone, which shall measure at least 50 feet in all directions from the find. 2. The District shall retain the services of a Consulting Archaeologist or Paleontologist, who shall visit the discovery site as soon as practicable, and perform minor hand-excavation to describe the archaeological or paleontological resources present and assess the amount of disturbance. 3. The Consulting Archaeologist shall provide to the District and the Corps, at a minimum, written and digital-photographic documentation of all observed materials, utilizing the guidelines for evaluating archaeological resources for the California Register of Historic Places (CRHP) and National Register of Historic Places (NRHP). Based on the assessment, the District and Corps shall identify the CEQA and Section 106 cultural-resources compliance procedure to be implemented. 4. If the find appears to not meet the CRHP or NRHP criteria of significance, and the Corps archaeologist concurs with the Consulting Archaeologist’s conclusions, construction shall continue while monitored by the Consulting Archaeologist. The authorized maintenance work shall resume at the discovery site only after the District has retained a Consulting Archaeologist to monitor and the Watershed Manager has received notification from the Corps to continue work. 5. If the find appears significant, avoidance of additional impacts is the preferred alternative. The Consulting Archaeologist shall determine if adverse impacts to the resources can be avoided. 6. When avoidance is not practical (e.g., maintenance activities cannot be deferred or they must be completed to satisfy the SMP objective), the District shall develop an Action Plan and submit it to the Corps within 48 hours of Consulting Archaeologist’s evaluation of the discovery. The action Plan may be submitted via e-mail to ~~(~~rstradford@spd.usace.army.mil~~)~~. The Action Plan is synonymous with a data-recovery plan. It shall be prepared in accordance with the current professional standards and State guidelines for reporting the results of the work, and shall describe the services of a Native American Consultant and a proposal for curation of cultural materials recovered from a non-grave context. 7. The recovery effort will be detailed in a report prepared by the archaeologist in accordance with current archaeological standards. Any non-grave artifacts will be placed with an appropriate repository. 8. The Consulting Paleontologist will meet the Society for Vertebrate Paleontology’s criteria for a “qualified professional paleontologist” (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). 9. The paleontologist will follow the Society for Vertebrate Paleontology’s guidelines for treatment of the artifact. Treatment may include preparation and recovery of fossil materials for an appropriate museum or university collection, and may include preparation of a report describing the finds. The District will be responsible for ensuring that paleontologist’s recommendations are implemented. 10. In the event of discovery of human remains (or the find consists of bones suspected to be human), the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent.) 11. Immediately notify the Santa Clara County Coroner and provide any information that identify the remains as Native American. If the remains are determined to be from a prehistoric Native American, or determined to be a Native American from the ethnographic period, the Coroner shall contact the Native American Heritage

BMP Number	BMP Title	BMP Description
		Commission (NAHC) within 24 hours of being notified of the remains. The NAHC then designates and notifies within 24 hours a Most Likely Descendant (MLD). The MLD has 24 hours to consult and provide recommendations for the treatment or disposition, with proper dignity, of the human remains and grave goods. 12. Preservation in situ is the preferred option. Human remains shall be preserved in situ if continuation of the maintenance work, as determined by the Consulting Archaeologist and MLD, will not cause further damage to the remains. The remains and artifacts shall be documented and the find location carefully backfilled (with protective geo-fabric if desirable) and recorded in District project files. 13. Human remains or cultural items exposed during maintenance that cannot be protected from further damage shall be exhumed by the Consulting Archaeologist at the discretion of the MLD and reburied with the concurrence of the MLD in a place mutually agreed upon by all parties.
GEN-41	Review of Projects with Native Soil	A cultural resources specialist will conduct a review and evaluation of those sites that would involve disturbance / excavation of native soil previously undisturbed by contemporary human activities to determine their potential for affecting significant cultural resources. The evaluation of the potential to disturb cultural resources will be based on an initial review of archival information provided by the California Historical Resources System/Northwest Information Center (CHRIS/NWIC) in regard to the project area based on a 0.25 mile search radius. It is recommended that this initial archival review be completed by a professional archaeologist who will be able to view confidential site location data and literature to arrive at a preliminary sensitivity determination. If necessary, a further archival record search and literature review (including a review of the Sacred Lands Inventory of the Native American Heritage Commission); and a field inventory of the project area will be conducted to determine the presence/absence of surface cultural materials associated with either prehistoric or historic occupation. The results along with any mitigation and/or management recommendations would be presented in an appropriate report format and include any necessary maps, figures, and correspondence with interested parties. A summary table indicating appropriate management actions (e.g., monitoring during construction, presence/absence testing for subsurface resources; data recovery, etc.) will be developed for each project site reviewed. The management actions will be implemented on site to avoid significant effects to cultural resources.
Utilities		
GEN-42	Investigation of Utility Line Locations	An evaluation of the locations of utility lines that could be affected by maintenance activities will be conducted annually as part of the preparation of the Notice of Proposed Work (NPW). Utilities will be avoided as much as possible. For maintenance areas with the potential for adverse effects on utility services, the following measures shall be implemented: 1. Utility excavation or encroachment permits shall be required from the appropriate agencies. These permits include measures to minimize utility disruption. The District and its contractors shall comply with permit conditions. Such conditions shall be included in construction contract specifications. 2. Utility locations shall be verified through a field survey (potholing) and use of the Underground Service Alert services. 3. Detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and/or fill of areas around utility cables and pipelines. All affected utility services shall be notified of the District's maintenance plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services. 4. Residents and businesses in the project area shall be notified of planned utility service disruption 2 to 4 days in advance, in conformance with state standards. 5. Disconnected cables and lines shall be reconnected promptly.

B. SECTION B – Sediment Removal BMPs

This group of BMPs is intended to be implemented specifically during sediment removal activities to avoid potential impacts on biological resources.

BMP Number	BMP Title	BMP Description
SED-1	Groundwater Management	If high levels of groundwater (i.e., visible water) are encountered during excavations in a work area, the water will be pumped out of the work site or left within the work area if the work activity is not causing water quality degradation in a live stream. Water Quality monitoring would need to occur. If necessary to protect water quality, the extracted water will be discharged into specifically constructed infiltration basins, holding ponds, or areas with vegetation to remove sediment prior to the water re-entering a creek. Water discharged into vegetated areas or swales will be pumped in a manner that will not create erosion around vegetation.
SED-2	Prevent Scour Downstream of Sediment Removal	Sediment removal sites in the transport zone on alluvial fans may cause increased scour downstream if they experience scouring flows or rapid sediment accumulation after maintenance. After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the maintenance area is smooth and continuous between the maintained and non-maintained areas and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.
SED-3	Restore Channel Features	Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the pre-construction conditions as closely as possible, within the finished channel topography.
SED-4	Berm Bypass	Where sediment removal is accomplished without a bypass by removing alternating cells, the berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel.
SED-5	Sediment Characterization	Projects involving sediment removal at stream gauges, outfalls, culverts, flap gates, tide gates, grade control structures, bridges, fish ladders, and fish screens in excess of 25 cubic yards shall be characterized in accordance with the SCVWD's Sediment Characterization Plans for SMP-2. These projects shall be reported in the annual summary report. Sediment removed will not be reused without pre-approval from appropriate regulatory agencies. See section 5.4 for information on the waiver process.

C. SECTION C – Vegetation Management BMPs

These BMPs provide specific and detailed guidance on the variety of vegetation management procedures implemented by the District. BMPs for the following maintenance techniques are included: tree pruning, tree removal, plant removal, woody debris management, herbicide application, mowing, discing, flaming, and grazing. Practices will be implemented by fully trained and qualified field crews.

BMP Number	BMP Title	BMP Description
VEG-1	Minimize Local Erosion Increase from In-channel Vegetation Removal	To minimize the potential effect of localized erosion, the toe of the bank will be protected by leaving vegetation to the maximum extent possible and consistent with the maintenance guidelines or original design requirements.
VEG-2	Non-native Invasive Plant Removal	Invasive species (e.g. cape ivy [*Delairea odorata/Senecio mikanoides]*, arundo [*Arundo donax*]) will be disposed of in a manner that will not contribute to the further spread of the species. Cape ivy removed during a project shall be bagged and disposed of in a landfill. Arundo canes will be prevented from floating downstream or otherwise entering the creek or waterway.
VEG-3	Use Appropriate Equipment for Instream Removal	When using heavy equipment to cut or remove instream vegetation, low ground pressure equipment, such as tracked wheels will be utilized to reduce impacts to the streambed.
VEG-4	Use Flamers with Caution	1. A fire extinguisher, water supply and other appropriate fire suppression equipment will always be kept close to the work site in case of an emergency. 2. Propane tanks will be checked for leaks and proper functioning prior to and proceeding use of flaming equipment. The propane tank will be treated as a hazardous material.
VEG-5	Conduct Flaming During Appropriate Weather and Seasonal Conditions	Flamers will not be used during periods of high fire danger or in areas where fuel or climate conditions could accidentally ignite a fire.
VEG-6	Standard Grazing Procedures	1. Vegetation and areas to be preserved will be fenced off to exclude grazing animals. 2. Grazing animals will be excluded from stream channels, using fencing or other barriers.

D. SECTION D – Bank Stabilization BMPs

These BMPs provide additional guidance during implementation of bank stabilization projects to avoid impacts on biological and cultural resources. Review of the Post-Project Restoration BMPs in Section F is recommended because those measures will be implemented after bank stabilization projects are complete. The BMPs included in this section are implemented by the field crew and site manager.

BMP Number	BMP Title	BMP Description
BANK-1	Bank Stabilization Design to Prevent Erosion Downstream	To further prevent potential downstream erosion impacts due to bank stabilization, the site design will be adjusted to provide proactive protection of vulnerable areas within the reach of the worksite. Such measures include, but are not limited to, appropriately keyed-in coir logs, riparian planting, strategic placement of rock, and flow deflectors. Bank stabilization will include appropriate transition designs upstream and downstream of the work site to prevent potential erosion impacts.
BANK-2	Concrete Use Near Waterways	Concrete that has not been cured is alkaline and can increase the pH of the water. Fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of 30 days after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet

BMP Number	BMP Title	BMP Description
		sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.
BANK-3	Bank Stabilization Post-Construction Maintenance	The District may maintain or repair bank stabilization projects that are less than 2 years old that are damaged by winter flows. The District will notify the regulatory agencies 24 hours prior to beginning the work and the work will be reported as part of the Post-Construction Report submitted by January 15 of each year or if necessary, the subsequent year. Appropriate BMPs will be applied during maintenance repairs.

E. SECTION E – Post-Project Restoration BMPs

These BMPs will be implemented, as appropriate, on all sites that involve ground disturbance.

BMP Number	BMP Title	BMP Description
REVEG-1	Seeding	Sites where maintenance activities result in exposed soil will be stabilized to prevent erosion. Disturbed areas shall be seeded with native seed as soon as is appropriate after maintenance activities are complete. An erosion control seed mix may be applied to exposed soils, and down to the ordinary high water mark (OHWM). 1. The seed mix should consist of California native grasses (e.g., *Hordeum brachyantherum*, *Elymus glaucus*, and *Vulpia microstachyes*) or annual, sterile seed mix. 2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place (GEN-20).
REVEG-2	Planting Material	Revegetation and replacement plantings will consist of locally collected native species. Species selection will be based on surveys of natural areas on the same creek that have a similar ecological setting and/or as appropriate for the site location.

F. SECTION F – Management of Animal Conflict BMPs

Methods of animal management included in the SMP are avoidance, biological controls, physical alterations, habitat alterations, and lethal controls. Of all these methods, implementation of lethal controls has the highest potential for environmental and biological impacts. Therefore, the animal management BMPs provided in this section focus on lethal controls. The application area for lethal controls will be identified during the annual planning process (see the Biological Resource Planning BMPs) and guided as directed by wildlife biologists. Species habitat areas are defined by the District's GIS species mapping, updated CNDDB and known local biological information and are included in the SMP Update Subsequent EIR.

BMP Number	BMP Title	BMP Description
ANI-1	Avoid Redistribution of Rodenticides	Carcass surveys will be conducted periodically when acute poisons and first generation anticoagulants are used. The frequency of the carcass surveys will be specific to the type of rodenticide used, to minimize secondary poisoning impacts: • Acute toxins – Daily carcass surveys, beginning the first day after application until the end of the baiting period for acute toxins used above-ground. • Anticoagulants - Within 7 days of installation of first generation anticoagulant bait, and weekly thereafter. Anytime a carcass is found, daily carcass surveys will begin for as long as carcasses are found until no carcasses are found during a daily survey. Once no carcasses are found, carcass surveys will return to the weekly carcass survey timeline maximum from the date of initial installation of an anticoagulant bait station. To verify that the frequency of carcass surveys is adequate, a biologist will conduct daily carcass surveys 2 times per year over one baiting cycle. Based on the results of these surveys, the timing of carcass surveys will be adjusted if necessary. Any spilled bait will be cleaned up immediately.
ANI-2	Prevent Harm to the Salt Marsh Harvest Mouse and California Clapper Rail	1. No rodenticides or fumigants will be used within the range of the SMHM or CCR as identified on District range maps. 2. Methods of rodent control within SMHM or CCR habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any SMHM that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.
ANI-3	Burrowing Owl, Bald Eagle and Golden Eagle Buffer Zone	Per the California Department of Fish and Wildlife's 2008 *Guidance for Burrowing Owl Conservation*, a 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.
ANI-4	Animal Control in Sensitive Amphibian Habitat	1. Fumigants will not be used within the habitat areas of special status amphibians. 2. The use of bait stations within the potential habitat areas of California red-legged frog, California tiger salamander, or foothill yellow-legged frog will be limited to bait stations specifically designed to prevent entry by these species. 3. Any live traps will allow California red-legged frogs, California tiger salamanders, or foothill yellow-legged frogs to safely exit (e.g., by having openings measuring no smaller than 2 inches by 1 inch).
ANI-5	Slurry Mixture near Waterways	All slurry type mixes used to fill rodent burrows will be prevented from entering any waterway by using appropriate erosion control methods and according to the manufacturer's specifications. If the creek bed is dry or has been dewatered, any material that has entered the channel will be removed.
ANI-6	Species requiring depredation permit	Animal Conflict Management will not include lethal control of species listed in California F&G Code Section 4181 inlcuding beaver and gray squirrel without first obtaining a depredation permit.

G. SECTION G – Use of Pesticides

Pesticides may be used for vegetation management or control of animal damage.

BMP Number	BMP Title	BMP Description
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with District Policy Ad-8.2 Pesticide Use as follows: 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. In addition, posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the label requires such notification. In doing this, the District ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The posting method may be modified to avoid destruction of bait stations or scattering of rodenticide.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients, and common name, and the time of allowable re-entry into the treated area. 4. Signs will not be removed until after the end of the specified re-entry interval. 5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A District staff contact phone number will be posted on the sign, including a cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, the District will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

Source: Data compiled by Horizon Water and Environment in 2011

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix B

Notice of Preparation/Initial Study and Scoping Report

Appendix B

NOP-IS

NOTICE OF PREPARATION

From: Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Project Title: Anderson Dam Seismic Retrofit Project

Project Location: Santa Clara County, California

The Santa Clara Valley Water District will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the above project. The District would like to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached Initial Study.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than 30 days after receipt of this notice**. The District will also hold a scoping meeting to provide an additional opportunity for input on the scope and content of the information to be addressed in the draft EIR. The scoping meeting will be held at **6:30 pm on Monday, August 26, 2013,** in the Hiram Morgan Hill Room of the Morgan Hill Community & Cultural Center located at 17000 Monterey Road, Morgan Hill.

Please send your response to:

Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 630-3055
klueneburger@valleywater.org

Please provide the name for a contact person in your agency.

Beau Goldie
Chief Executive Officer

8-13-13
Date

Anderson Dam Seismic Retrofit Project

FERC Project 5737

Initial Study

August 2013

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Project No. 91864005

Table of Contents

List of Figures

List of Tables

A. PROJECT DESCRIPTION

1.0 Introduction

Anderson Dam and Reservoir is a major water supply facility located adjacent to the City of Morgan Hill, California, about 18 miles southeast of San Jose (See **Figure 1**). Anderson Reservoir is the largest of the ten reservoirs owned and operated by the Santa Clara Valley Water District (District) and provides a greater water storage capacity than the rest of the nine reservoirs combined. It is thus a critical facility to the District and to the communities it serves. The dam was completed in 1950 as a zoned, rockfill embankment, has a maximum height of approximately 240 feet, and impounds approximately 90,373 acre-feet of water at its maximum reservoir operating elevation.

Anderson Dam and Reservoir is subject to dam safety regulation by both the California Division of Safety of Dams (DSOD) and the Federal Energy Regulatory Commission (FERC) as FERC Project 5737. Anderson Dam is classified under FERC guidelines as a “High Hazard Potential” dam due to the potential incremental loss of life should failure occur.

As a result of a 2011 Seismic Stability Evaluation (AMEC 2011) that identified potential embankment instability as a result of seismic shaking and liquefaction, the proposed Anderson Dam Seismic Retrofit Project (ADSRP or Project) was initiated. A reservoir restriction to 45 feet below the crest of the dam (equivalent to approximately 61,000 acre-feet of reservoir storage) was voluntarily established by the District in 2009. The reservoir restriction has subsequently been reviewed and accepted by dam safety regulators. Between 2008 and 2012, several dam safety deficiencies associated with seismic shaking, fault offset, flood capacity, and emergency drawdown capabilities were identified. These deficiencies include:

- The presence of liquefiable materials in the embankment and foundation of the dam that could result in major slumping and failure of the embankment following a future large earthquake,
- The presence of *conditionally active* faults in the foundation that could rupture the existing low level outlet,
- A spillway that is inadequate to safely pass large floods, and
- Limitations in being able to quickly draw down the reservoir during floods or other emergency events.

The ADSRP consists of construction activities associated with remedying these seismic, flood capacity, and reservoir drawdown deficiencies at Anderson Dam. The ADSRP is being conducted by the District in coordination with resource agencies, stakeholders, and the public. The District has established a target date of December 31, 2018 for the completion of all necessary remedial work to correct the identified deficiencies.

1.1 CEQA Review

As the lead agency responsible for compliance with the California Environmental Quality Act (CEQA), the Santa Clara Valley Water District (District) has determined that ADSRP is a “project” for the purposes of CEQA (pursuant to CEQA Guidelines §15378), and would have the potential to result in significant environmental effects. Accordingly, the District will be preparing an EIR for the project (CEQA Guidelines §15064).

Anderson Dam Seismic Retrofit Project

Santa Clara Valley Water District

Figure 1
Project Location

This Initial Study, which is presented together with the Notice of Preparation (NOP) required by CEQA and the state's CEQA Guidelines (CCR §15082), contains a brief description of the project, including its goals and objectives and potential environmental impacts. It also discusses the process that will be used to determine the scope of analysis in the EIR, and provides an overview of the opportunities for participation in review of the EIR, along with contact information.

1.2 DSOD Requirements

DSOD requires that outlets at major dams have the capacity to draw down the reservoir during an emergency. The DSOD requirements include the capability of drawing down 10 percent of the reservoir elevation in 7 to 10 days, and drawn down to a minimum pool within 120 days. The Anderson Dam outlet does not currently meet these requirements. DSOD drawdown standards apply to new projects and existing dams when the outlet is modified. Because the outlet needs to be modified to meet fault rupture concerns, outlet design must also employ current drawdown criteria. As a result, the replacement outlet at Anderson Dam would be designed to have sufficient capacity to meet these emergency drawdown requirements.

1.3 FERC Requirements

In addition to the seismic deficiencies present at the dam, the spillway at Anderson Dam lacks the capacity to safely pass the flood flows associated with the updated Probable Maximum Flood (PMF). An updated PMF evaluation was recently completed (HDR 2013) and predicts a peak spillway discharge of 95,700 cubic feet per second (cfs) at a reservoir stage of elevation 652.5 feet during the PMF. The peak PMF flow exceeds the current spillway capacity by 50 percent and would cause overtopping of the existing dam embankment by several feet. Overtopping of the dam could lead to failure of the dam. District, DSOD, and FERC dam safety criteria require spillways to be sized to safely pass PMF flows without significant impact to the dam (e.g., overtopping). Consequently, an enlarged spillway, in conjunction with raising the dam crest, is planned to address this deficiency.

2.0 Goals and Objectives

It is the mission of the District to provide Silicon Valley safe, clean water for a healthy life, environment, and economy. The District's primary goals for the proposed Project are to make improvements necessary to:

- Stabilize the dam embankment for the maximum credible earthquakes on the Calaveras and Coyote Creek Faults.
- Modify or replace the outlet works to protect against potential fault rupture risk from the maximum credible earthquake on the Coyote Creek-Range Front fault zone.
- Incorporate other measures to comply with FERC, DSOD and District dam safety requirements, including potential spillway modifications.

In addition to the above project goals, project objectives include:

- Minimize short-term and long-term impacts to the environment, reservoir and water operations, and recreational use of the reservoir.
- Improve operational flexibility.
- Provide access to inspect and maintain the embankment, outlet works, and spillway, without substantially affecting dam and reservoir operations.

3.0 Project Setting

Anderson Dam is located in Santa Clara County, California, 0.8 miles east of U.S. Highway 101 (Cochrane Road exit), about 18 miles southeast of downtown San Jose, and 2.5 miles northeast of downtown Morgan Hill (See **Figure 1**). The dam is situated on Coyote Creek, a tributary to the San Francisco Bay, which creates Anderson Reservoir. Existing project site features are shown in **Figure 2**. The proposed Project site is on land owned either by the District, County of Santa Clara, or private parties.

4.0 Project Description

The proposed Project includes the following elements to retrofit Anderson Dam:

- **Dam Embankment Remediation**
- **Dam Crest Raise and Spillway Capacity Increase**
- **Intake and Outlet Works Construction**
- **Borrow Areas Mining**
- **Spoils Disposal**

The general layout for these elements is shown in **Figures 3** and **5**. Key components of the project are described further below.

4.1 Dam Embankment Remediation

Embankment seismic remediation would consist of excavating a substantial portion of both the upstream and downstream slopes of the dam, removing potentially liquefiable fill and alluvium exposed in the excavations, replacing the excavated material with compacted rockfill, and constructing buttresses on both sides of the dam. In addition, Cochrane Road would be realigned around the expanded downstream embankment.

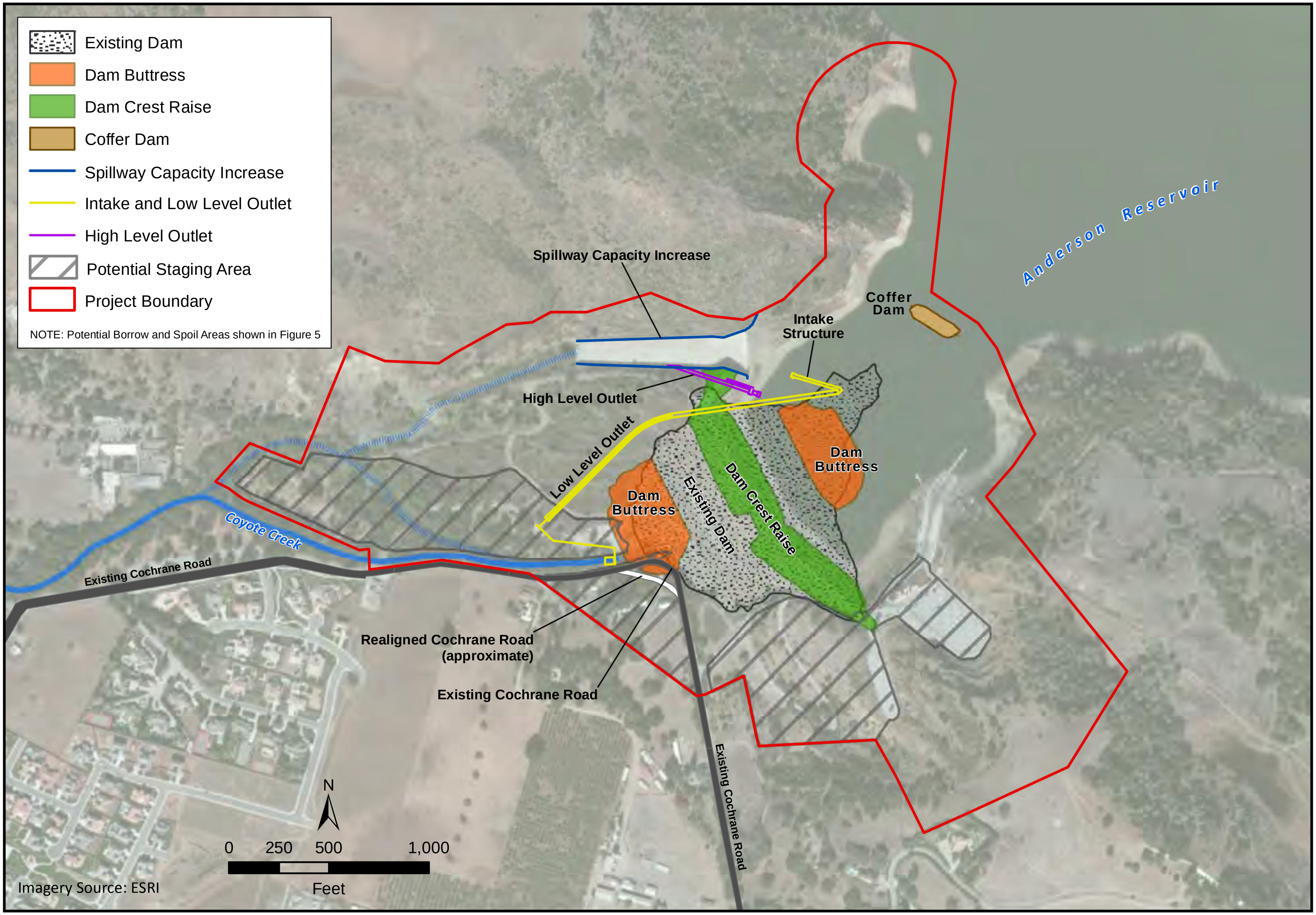
Figure 4 presents a generalized cross section illustrating the embankment measures for the proposed Project. After the reservoir elevation is lowered, the cofferdam is built, and the work area has been prepared, excavation of the downstream and upstream slopes of the dam embankments can proceed.

> *Downstream Slope Stabilization.* Excavation would begin at about elevation 615 feet of the downstream dam slope and proceed to bedrock anticipated to be about 225 feet deep (to elevation 390 feet). The excavation would extend about 100 feet downstream of the existing dam. The downstream embankment would then be reconstructed to match the current dam slope using well compacted rockfill. A new buttress composed of rockfill would also be added to the base of the dam extending the dam footprint about 100 feet downstream.
>
> *Upstream Slope Stabilization.* Excavation would begin at about elevation 610 feet of the upstream dam slope and proceed to bedrock anticipated to be about 220 feet deep (to elevation 390 feet) within the historical stream channel. The excavation would extend about 100 feet upstream of the existing dam. Similar to the downstream face of the dam, the upstream embankment would be reconstructed to match the current dam slope using well compacted rockfill and a new buttress composed of rockfill would be added to the base of the dam. The new upstream buttress would extend the dam footprint about 140 feet into the reservoir.

Anderson Dam Seismic Retrofit Project

Santa Clara Valley Water District

Figure 2
Project Site

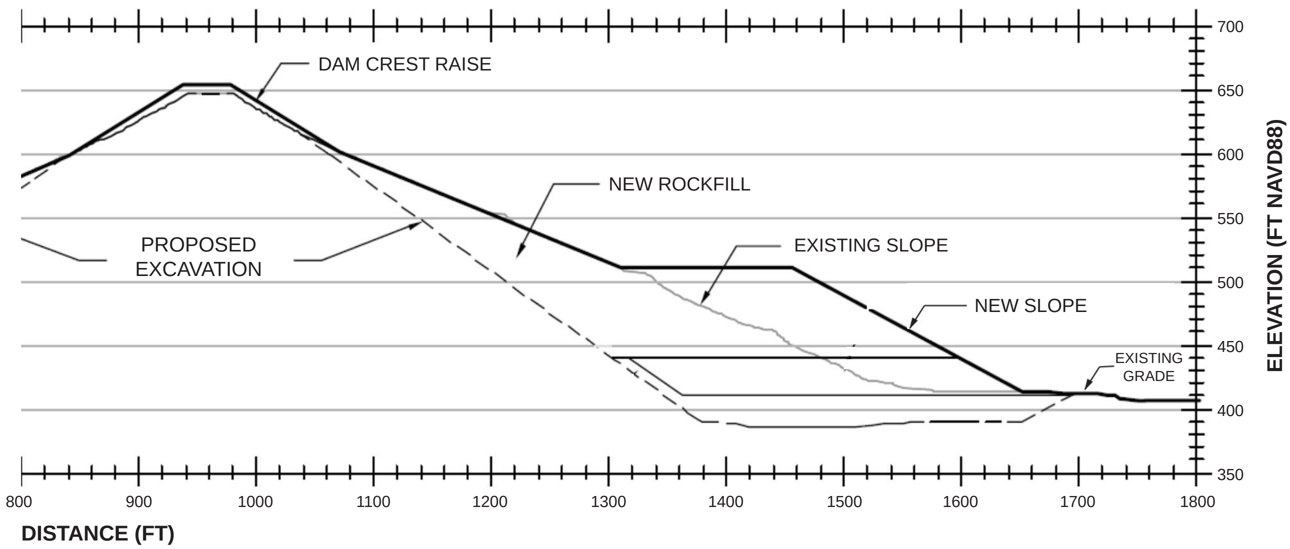


Anderson Dam Seismic Retrofit Project

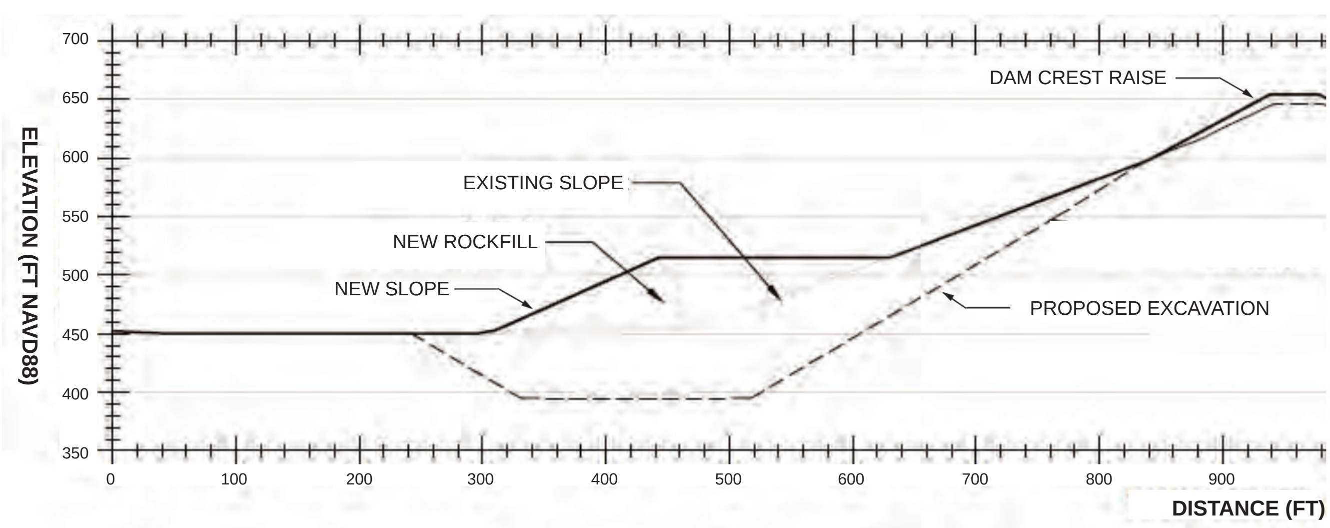
Santa Clara Valley Water District

Figure 3
Proposed Project

Typical Cross Section of Proposed Downstream Slope and Buttress



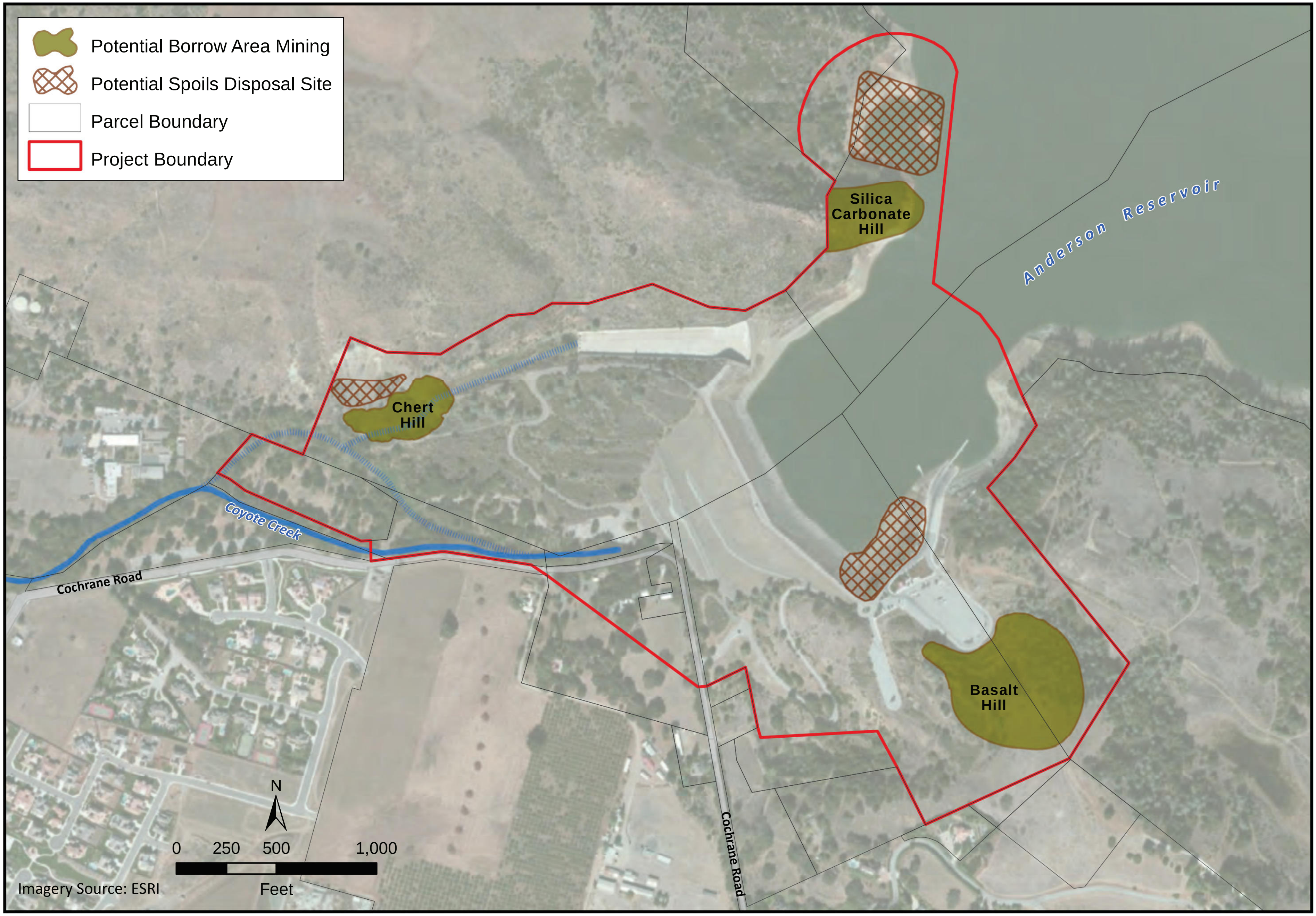
Typical Cross Section of Proposed Upstream Slope and Buttress



Anderson Dam Seismic Retrofit Project

Santa Clara Valley Water District

Figure 4
Cross Section of Proposed Dam Embankments



Anderson Dam Seismic Retrofit Project

Santa Clara Valley Water District

Figure 5
Potential Borrow Area Mining and Spoils Disposal Sites

4.2 Dam Crest Raise and Spillway Capacity Increase

To accommodate the PMF event, the dam crest and spillway walls would be raised by approximately 7 feet. The crest would be raised by adding compacted soil that would be tapered into the existing dam slopes, while retaining a crest width of approximately 40 feet. The dam crest would be paved for vehicular access.

4.3 Intake and Outlet Works

The Project would construct a new 270-foot long sloping intake pipeline with three intake ports on the northern abutment of the dam. A new intake control building would be constructed at the crest of the dam, and a 350-foot long watertight concrete access way would be constructed along the inclined steel pipeline. The intake structure would be connected to two new outlet pipelines: a high level outlet for emergency drawdown and flood management flows, and a low level outlet for normal operational flows and low level drawdown.

The high level outlet would consist of approximately 350 feet of large diameter steel or reinforced concrete cylinder pipe installed below the southern side of the spillway. The high level outlet would discharge reservoir water directly to the spillway, when needed.

The low level outlet would consist of an approximately 1,630-foot cast-in-place, concrete-lined, maintenance tunnel through the northern abutment of the dam containing the steel outlet pipe, an independent low-flow pipe, ventilation, lighting, and required utilities. At the end of the maintenance tunnel, the low level outlet would connect to the existing Anderson Force Main (AFM)[1] with a secondary discharge point to Coyote Creek through an outlet structure and energy dissipation chambers located about 535 feet away, near the toe of the dam. The existing outlet pipe would be abandoned in place by filling it with concrete or cement grout after the new outlet facilities are in service.

4.4 Borrow Area Mining

Three on-site borrow areas have been identified as potential sources for the materials necessary to construct the embankment and buttresses: Basalt Hill, Chert Hill, and Silica Carbonate Hill (See **Figure 5**). Excavation of these materials would likely require blasting and processing to obtain the desired sized material for use in the project. Depending on final Project design, it is possible that all three borrow sites may not be needed, but all three potential borrow sites are described for environmental evaluation purposes.

> *Basalt Hill.* The Basalt Hill quarry was one of the main sources of borrow material used in the original construction of the dam. The floor of the quarry is currently occupied by a parking lot. This site is estimated to contain approximately 885,000 cubic yards (cy) of usable material.

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[1] The Anderson Force Main (AFM) is a bidirectional 54-inch pipeline allowing imported San Luis Reservoir water to be gravity fed or pumped into Anderson Reservoir. The AFM also allows for the discharge of Anderson Reservoir or San Luis Reservoir water to Coyote Creek. Additionally the AFM may be utilized to deliver water from Anderson Reservoir to either the Anderson Hydroelectric facility (which then discharges to Coyote Creek) or to District water treatment plants (via the Cross Valley Pipeline).

Chert Hill. This quarry was also was one of the main borrow sources used for the original construction of the dam. This site is estimated to contain approximately 85,000 cy of usable material.

Silica Carbonate Hill. This site is estimated to contain approximately 576,000 cy of usable material. If materials in the Chert Hill and Basalt Hill quarries are of sufficient quantity and quality, it is unlikely that the Silica Carbonate Hill quarry would be developed because access is more limited, and because of the cemented nature of the materials. In addition, it appears that portions of the potential quarry may be on private land, and if the quarry were to be developed, additional property rights would need to be acquired for those portions of the potential quarry.

4.5 Spoils Disposal

Excavation activities are expected to result in waste rockfill that would require permanent disposal. Three disposal sites have been identified to receive excess spoils: Boat ramp, Chert Hill, and Silica Carbonate Hill (See **Figure 5**). Overburden material may also be used for haul road development and for the dam crest raise. Spoils disposed in these locations would remain permanently. As necessary, sites would be treated with erosion controls and vegetated upon project completion.

5.0 Project Construction

5.1 Preliminary Schedule

Project construction would begin in 2016 and be completed at the end of 2018. The bulk of the work would be completed during Year 2 (2017). Construction activities would occur in double shifts (two 10-hour shifts per day), 6 days per week (Monday through Saturday). **Table 1** provides a preliminary construction schedule including basic District assumptions. It is assumed that reservoir drawdown would be initiated prior to the start of construction year 1. A reservoir dewatering plan would be prepared, and is subject to approval by the regulatory agencies.

Table 1. Preliminary Schedule

Construction Year 1 (2016)	▪ Contractor mobilizes in April; ▪ Site, staging areas, and access / haul roads are identified, procured, and upgraded, as necessary (May – June) ▪ Borrow areas are developed and initial stockpiles are created (May – June); ▪ Tunneling for the low level outlet works is initiated from downstream (June);
Construction Year 2 (2017)	▪ Reservoir draw down to prescribed level is concluded by April 15th; ▪ Construct upstream coffer dam (April) ▪ Upstream and downstream embankment work (April - November);

	▪ New intake for low level outlet is constructed and connected with completed tunnel (April – November); ▪ High level outlet tunnel leading to spillway is completed (May). ▪ Reservoir allowed to begin refilling naturally (November)
Construction Year 3 (2018)	▪ Spillway enlargement (April – October); ▪ Dam crest is raised (April – May); ▪ Site restoration is completed (November).

5.2 Personnel and Equipment

The construction process would involve up to approximately 105 workers on site during any day or night shift during peak construction. Contractor equipment could include a construction office and equipment trailers; warehousing and equipment maintenance facilities; and fuel pumps and fuel storage tanks. Mobile construction equipment utilized for the Proposed Project would depend on the selected contractor's planned operations, but may include the following typical equipment:

- tunneling equipment
- excavators
- scrapers
- bulldozers
- graders
- rollers
- compactors
- conveyors
- water trucks
- highway trucks
- off-road hauling trucks
- concrete delivery trucks
- vehicle maintenance truck
- front-end loaders
- pickup trucks
- air compressors
- generators
- hydraulic and pneumatic drills
- welding equipment
- pumps and piping
- back-up lighting systems
- communications and safety equipment
- miscellaneous equipment customary to the mechanical and electrical crafts, and vehicles used to deliver equipment and materials

5.3 Reservoir Dewatering

Construction of the Proposed Project would require the reservoir to be fully dewatered. This would be accomplished by managing reservoir storage and outflows in the year and months leading up to the 2017 construction season. As the construction season approaches, the District would operate the reservoir to safely draw down the reservoir, with a target of reaching minimum pool (elevation 488 feet) by early 2017. After the reservoir is at minimum pool, water remaining in the reservoir would be pumped into the existing intake structure and discharged to Coyote Creek through the existing outlet. As the reservoir is being drawn down, it may be possible to begin early excavation of the upper embankment slopes.

Coffer Dam. A coffer dam would be constructed upstream of the embankment to maintain a dry work area while construction of the embankments and intake and outlet works is occurring. As soon as the area upstream of the embankment is free of standing water, construction of the cofferdam would begin. The cofferdam would be approximately 10 feet high (crest elevation at about 460 feet) and 240 feet long, with a crest width of approximately 30 feet. No foundation excavation, beyond cleaning up the reservoir sediments, is anticipated to be required. The cofferdam would be primarily constructed from materials obtained from the excavation of the embankment or borrow areas. The coffer dam may be fortified with cement to reduce seepage. Upon project completion, the coffer dam would be left in place and would become submerged as the reservoir refills.

Water Management During Construction. Inflows to the reservoir (due to releases from Coyote Reservoir or natural inflow) would be treated consistent with basin plan (RWQCB 2011) requirements and released to Coyote Creek downstream of the reservoir. An existing backwater pool (see **Figure 2**) would be used as a settling pond to manage water prior to discharge to the creek.

5.4 Access and Staging Areas

Access to the Project site would be accomplished using established roads including U.S. Highway 101, Cochrane Road, and Coyote Road. It is currently anticipated that Cochrane Road would be realigned to allow for construction of the downstream buttress.

Temporary staging areas are shown in **Figure 3**. Portions of the County Park, including the Toyon Group Area and parking lot, boat ramp parking lots, and the park area surrounding the dam, would be utilized for temporary construction staging. However, the Live Oak Picnic Area and parking lot south of Coyote Creek would be available for public use throughout project construction (Live Oak facilities north of the creek, across the pedestrian bridge, would not be accessible during construction). Proposed park and road closures are show in **Figure 6**. An additional two parcels on Cochrane Road may also be acquired for staging purposes.

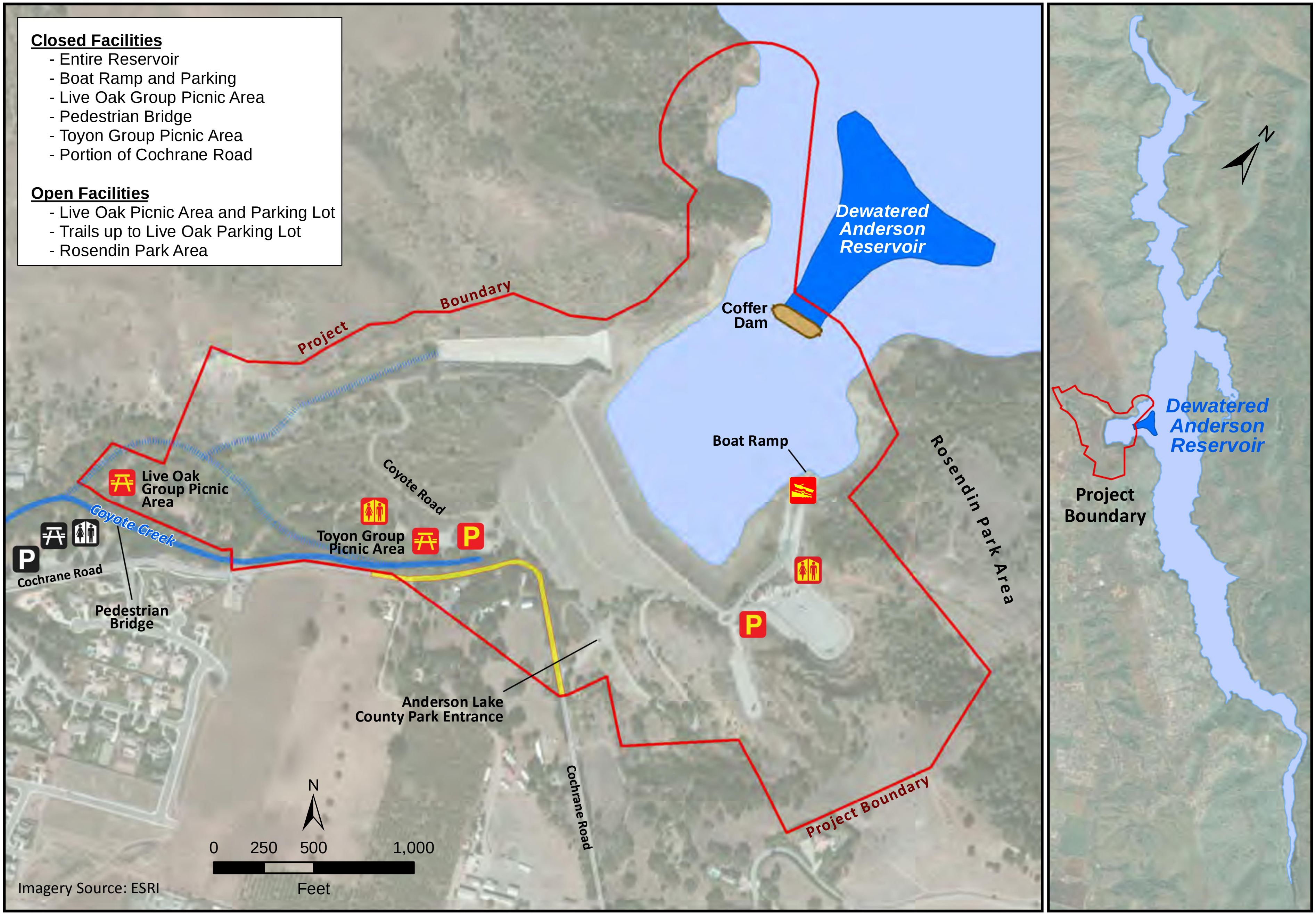
Staging areas would also be utilized to sort and process mined materials from the borrow sites. This includes the area that would be dewatered between the coffer dam and dam embankment, and an area to the south of the County Park entrance kiosk. Access roads, staging areas, and other impacted areas of the park would be restored upon project completion.

5.5 Potentially Affected Properties

The dam embankment remediation, dam crest raise and spillway capacity increase, intake and outlet works, borrow mining, temporary staging, and permanent spoil disposal areas identified for construction of the proposed Project would primarily occur on District and adjoining County of Santa Clara properties. However, additional temporary and permanent rights-of-way and real estate property would be needed for development of the Silica-Carbonate Hill borrow area, for temporary construction staging, and for downstream embankment construction and Cochrane Road realignment, as described below. **Table 2** provides a description of properties included in the proposed Project boundary. Properties within the boundary are identified by Assessor's Parcel Number (APN) and shown on **Figure 7**. Proposed project boundaries should be considered approximate at this stage of project development and may be adjusted as project design is developed further.

Table 2. Property Details

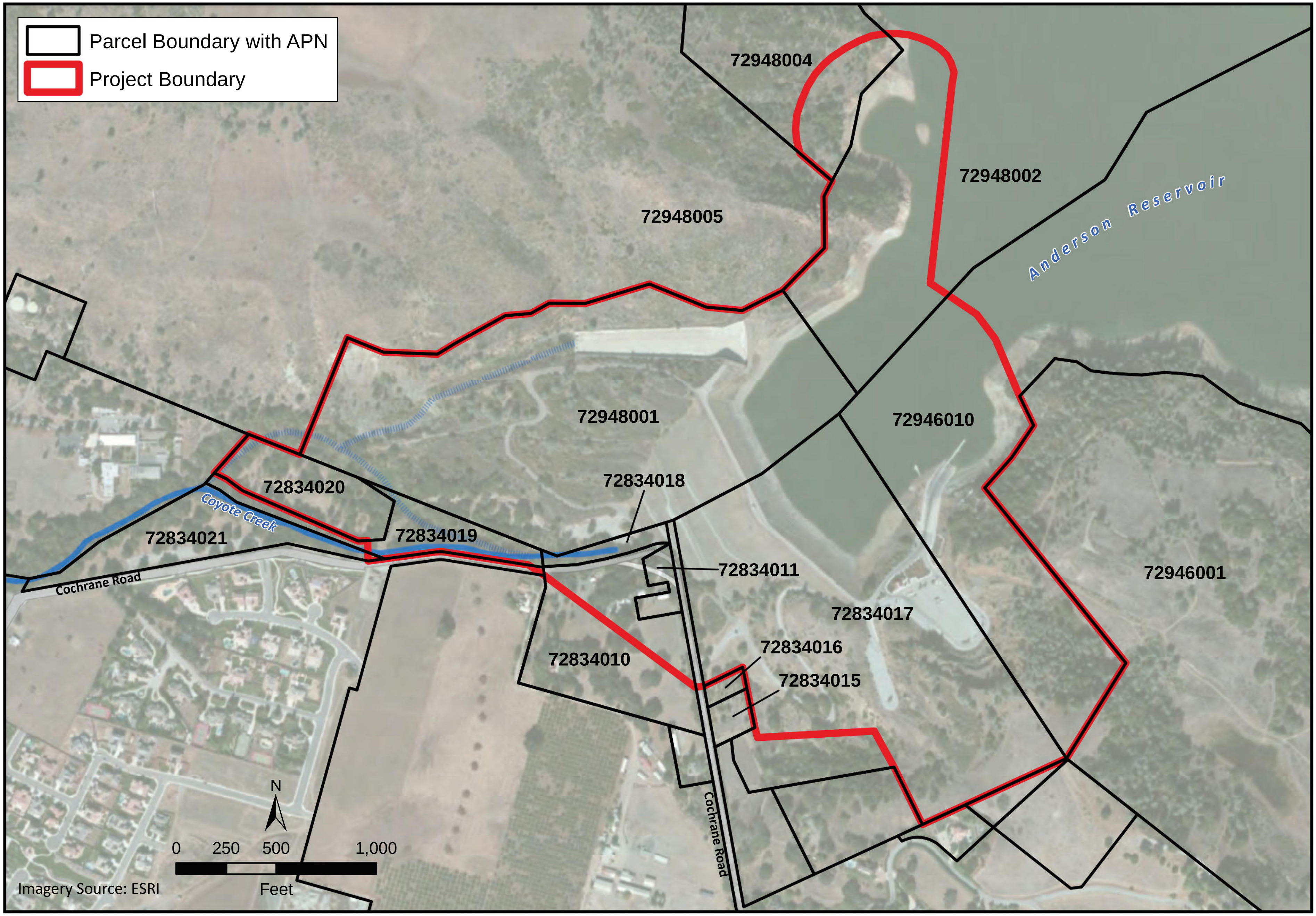
APN & Address (if available)	Ownership	Land Use Authority	Zoning	Existing Land Use	Project Use
728-34-010 / 2290 Cochrane Road	Private	City of Morgan Hill	Rural county	Residential, small-scale agricultural	Temporary Right of Entry for staging, portion potentially acquired for realignment of Cochrane Road
728-34-011 / 2390 Cochrane Road	Private	City of Morgan Hill	Rural county	Single-family residential	Potential acquisition for dam embankment remediation and realignment of Cochrane Road
728-34-017	Santa Clara Valley Water District	City of Morgan Hill	Open space	Open Space / Utility / Water	Temporary staging, Disposal, Dam Embankments Remediation, Dam Crest Raise, Basalt Hill borrow area
728-34-018	Santa Clara Valley Water District	City of Morgan Hill	Open space	Open Space / Utility	Temporary staging, Disposal, Dam Embankment Remediation, Outlet Works
728-34-019	Santa Clara Valley Water District	City of Morgan Hill	Open space	Open Space / Utility	Temporary staging and Outlet Works
728-34-020	County of Santa Clara	City of Morgan Hill	Open space	Open space/Anderson Lake County Park	Temporary Right of Entry for staging
729-46-010	Santa Clara Valley Water District	City of Morgan Hill	Open space	Open Space / Utility / Water	Temporary staging, Disposal, Basalt Hill borrow area
729-48-001	Santa Clara Valley Water District	City of Morgan Hill	Open space	Open Space / Utility / Water	Temporary staging, Disposal, Dam Embankment Remediation, Dam Crest Raise and Spillway Capacity Increase, Intake and Outlet Works, Chert Hill borrow area
729-48-002	Santa Clara Valley Water District	City of San Jose	Open Space	Open Space / Utility / Water	Temporary staging, Disposal, Silica Carbonate Hill borrow area
729-48-004	County of Santa Clara	City of San Jose	Single-family residential	Open space	Temporary Right of Entry for Silica-Carbonate Hill borrow area



Anderson Dam Seismic Retrofit Project

Santa Clara Valley Water District

Figure 6
Park Closures



Anderson Dam Seismic Retrofit Project

Santa Clara Valley Water District

Figure 7
Potentially Affected Properties

6.0 Project Operation

Water stored in Anderson Reservoir results from rainfall in the watershed, inflows from the Coyote Reservoir upstream, and from the United States Bureau of Reclamation (USBR) San Felipe Division of the Central Valley Project (CVP) – specifically, the San Luis Reservoir. Water released from the reservoir is conveyed to Coyote Creek via a sloping intake structure below the boat ramp and an outlet pipe through the center of the dam. The existing outlet can also be used to convey water as needed to the Anderson Force Main Pipeline or the Anderson Hydroelectric facility located about 1,300 feet downstream of the dam.

Current reservoir operations involve water releases from the reservoir for multiple purposes including groundwater recharge, flood control, water supply to the Santa Teresa Water Treatment Plant, power generation, downstream aquatic habitat, maintenance, and emergencies. Existing operations also include delivery of imported water to the reservoir via the Anderson Force Main. The project would add operational flexibility to conduct these existing activities (e.g., the ability to discharge to Coyote Creek and the water treatment system simultaneously, an operation not currently possible). The Project does not include any changes to the existing capacity of Anderson Reservoir, to the capacity or operations of the downstream hydroelectric facility, to the normal operational range of water levels in the reservoir, nor to any existing District rule curves and requirements. While specific maintenance and inspection activities will be affected by the project simply as a result of differing post project apparatus at the dam, the nature and occurrence of post project maintenance activities will not be significantly different from existing conditions.

7.0 Environmental Review and Permitting Requirements

In addition to the District, the CEQA documentation for the proposed Project will be used by agencies issuing permits, as well as other approvals and consultations for the proposed Project. Specifically, information about the proposed Project, and the environmental analysis will be used by several agencies as part of their decision-making process regarding regulations applicable to the proposed Project. **Table 3** provides a list of agencies and applicable permits, approvals and consultations that are expected to be required for the proposed Project.

Table 3. Proposed Project Regulatory Permits, Approvals and Consultations

Agency	Permit / Approval / Consultation
Federal Agencies	
Federal Energy Regulatory Commission (National Environmental Policy Act Lead Agency)	18 CFR Part 2.80, 380 (FERC NEPA Regulations)
NOAA-Fisheries – National Marine Fisheries Service	Federal Endangered Species Act – Section 7 Consultation
	Magnuson-Stevens Act – Essential Fish Habitat Assessment
U.S. Army Corps of Engineers	Section 404 Clean Water Act – Permit
U.S. Fish and Wildlife Service	Federal Endangered Species Act – Authorization under incidental take provisions of the Valley Habitat Plan

Agency	Permit / Approval / Consultation
State Agencies	
California Department of Fish and Wildlife	Section 1600 et seq. California Fish and Game Code – Lake or Streambed Alteration Agreement
	California Endangered Species Act – Authorization under incidental take provisions of the Valley Habitat Plan
California Division of Safety of Dams	California Water Code, Division 3 – Approval California Code of Regulations, Title 23 – Approval
California State Water Resources Control Board	Section 402 Clean Water Act – Notification under Stormwater Construction General Permit Order No. 2009-0009-DWQ
San Francisco Bay Regional Water Quality Control Board (Region 2)	Section 401 of the Clean Water Act – Water Quality Certification Porter-Cologne Water Quality Control Act – Waste Discharge Requirements
State Office of Historic Preservation	Section 106 National Historic Preservation Act
Local Agencies	
City of San Jose	Municipal Approvals
City of Morgan Hill	Encroachment Permit, Temporary Right of Entry
	Municipal Approvals
County of Santa Clara	Roads & Airports – Cochrane Road Realignment
	Parks & Recreation – Land Use approvals and Park closure coordination, Temporary Right of Entry
	Planning - SMARA Exemption / Coordination
	Fire Department – Blasting Permit

7.1 Topics to be Analyzed in the EIR

Based on the potential for the proposed project to result in significant impacts on the environment, the District has determined that an EIR is the appropriate level of environmental review. The EIR will assess the proposed project's effects on the environment, to identify significant impacts, and to identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts. An analysis of alternatives to the proposed project will also be included in the EIR. Topics to be analyzed in the EIR, include but are necessarily limited to the following: aesthetics, agricultural resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, recreation, transportation and traffic, and utilities. Responses received to the NOP may modify or add to the preliminary assessment of potential issues addressed in the EIR.

7.2 Environmental Procedures

The NOP initiates the CEQA process through which the District will refine the range of issues and project alternatives to be addressed in the draft EIR. Comment is invited on the proposal to prepare the EIR and on the scope of issues to be included in the EIR.

Please submit any comments within 30 days of receipt of this notice to Kurt Lueneburger, the District's environmental planner for the Anderson Dam Seismic Retrofit project, at the Santa Clara Valley Water District (see *Contact Information* below). In conjunction with the 30-day review period for the NOP, the District will hold a scoping meeting to provide an additional opportunity to learn about the project, ask questions, and provide comments about the scope and content of the information to be addressed in the draft EIR. The scoping meeting will be held at 6:30 pm on Monday, August 26, 2013, in the Hiram Morgan Hill Room of the Morgan Hill Community & Cultural Center located at 17000 Monterey Road, Morgan Hill.

After the 30-day review period for the NOP is complete and all comments are received, a draft EIR will be prepared in accordance with CEQA, as amended (Public Resources Code §21000 et seq.), and the State Guidelines for Implementation of CEQA (CCR §15000 et seq.).

Once the draft EIR is completed, it will be made available for a 45-day public review and comment period. Copies of the draft EIR will be sent directly to those agencies commenting on the NOP, and will also be made available to the public at a number of locations, including the District headquarters and several public libraries in the area. Information about availability of the draft EIR will also be posted on the District's website (http://www.valleywater.org).

8.0 Contact Information

For further information, contact the following:

Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 630-3055
klueneburger@valleywater.org

Additional information relevant to the project and the draft EIR can also be found at http://www.valleywater.org.

B. ENVIRONMENTAL CHECKLIST

1.0 Overview

Project title:	Anderson Dam Seismic Retrofit Project
Lead Agency name and address:	Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118
Contact person and phone number:	Kurt Lueneburger, Environmental Planner (408) 630-3055
Project location:	The project would be located in the Morgan Hill and Mount Sizer Quadrangles. Construction activities would take place primarily in Township 9S, Section 10, Range 3E. 37° 10’ 14.24” N / 121° 37’ 20.97” W (WGS84)
Project sponsor’s name and address:	Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118
Land designation:	Land zoning designations for the parcels are open space or rural country. Surrounding land use includes low-density residential, rural country and some small-scale agriculture.

2.0 Environmental Factors Potentially Affected

The environmental factors checked below would potentially be affected by this Project (i.e., the Project would involve at least one impact that is a “Potentially Significant”), as indicated by the checklist on the following pages.

X	Aesthetics	X	Agricultural and Forestry Resources	X	Air Quality
X	Biological Resources	X	Cultural Resources	X	Geology / Soils
X	Greenhouse Gas Emissions	X	Hazards and Hazardous Materials	X	Hydrology / Water Quality
X	Land Use / Planning		Mineral Resources	X	Noise
	Population / Housing		Public Services	X	Recreation
X	Transportation/Traffic	X	Utilities / Service Systems	X	Mandatory Findings of Significance

3.0 Evaluation of Environmental Impacts

The degree of change from existing conditions caused by the Project is compared to the impact evaluation criteria to determine if the change is significant. Where it is determined that one or more significant impacts could result from implementation of the Project, mitigation measures would be developed to reduce or eliminate the significant impacts. Existing conditions serve as a baseline for evaluating the impacts of the Project.

The following terminology is used in this document to describe the various levels of environmental impacts associated with the Project:

- A finding of *no impact* is identified if the analysis concludes that the proposed Project would not affect a particular environmental topical area in any way.
- An impact is considered *less than significant* if the analysis concludes that the proposed Project would not cause a substantial adverse change in the environment.
- An impact would be considered to have *potentially significant issues* if the analysis concludes that the proposed Project could cause a significant environmental impact. Proposed Projects that potentially produce a significant impact(s) warrant the greater level of analysis and consideration provided by an Environmental Impact Report (EIR).

4.0 CEQA Environmental Checklist

I. AESTHETICS: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?		X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a designated scenic highway?			X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	X		
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X	

Environmental Setting

Anderson Dam is located in Santa Clara County 0.8 miles east of U.S. Highway 101 (US-101), approximately 18 miles southeast from downtown San Jose. The Dam is visible from US-101. The Project area is not located within the viewshed of any designated scenic highways.

Anderson Dam is constructed of natural materials and is similar in color tones to the earthen shoreline. Three on-site borrow areas have been identified as sources for the materials necessary to construct the embankment and buttresses for the Project: Basalt Hill, Chert Hill, and Silica-Carbonate Hill (See **Figure 5**). The three borrow sites support typical vegetation covering similar to the surrounding landscape. Serpentine grassland and chaparral communities occur on the slopes above the reservoir but the immediate shoreline includes a mix of native and non-native annual and perennial species typical of disturbed areas such as wild oats, bromes and mustards.

Explanations

a) Less than Significant. A scenic vista is defined as a viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public. Anderson Dam and Reservoir may provide scenic views to people in the project vicinity, but themselves do not include remarkable landscape elements that create scenic vistas. In addition, the Project site is not designated as a scenic vista by the Caltrans Scenic Route Program or in the Santa Clara County General Plan (County of Santa Clara 1994).

b) No Impact. No designated or eligible state scenic highways are located in the Project vicinity (Caltrans 2011) with views of the Project site. Therefore, the Proposed Project would not impact scenic resources, trees, outcroppings, and historic buildings within a state scenic highway viewshed.

c) Potentially Significant Issue. Many of the Project activities would occur within previously impacted areas. However, the Proposed Project includes raising the dam crest by approximately seven feet. The crest would be raised by adding compacted fill materials tapered into the existing dam slopes, while retaining a crest width of approximately 40 feet. The existing pavement on the dam crest would be removed and restored upon project completion.

Three borrow areas could be used to provide the District with materials for the Dam retrofit. The development of the borrow areas would include removal of vegetation and grading activities. A number of trees within the borrow areas and staging areas, including roadways used to access these areas, may be removed. Once the Project is completed, the District would revegetate the borrow areas in accordance with a site specific revegetation plan.

The Silica-Carbonate Hill borrow area is a prominent outcrop that is visible from the Dam and Park area around the Dam. If the Project requires mining the entire Silica-Carbonate Hill borrow area for the dam reconstruction, this outcrop would be removed. This would substantially change the scenic quality and character of the shoreline of the Reservoir and is considered a potentially significant issue. The District would prepare an analysis of the potential impacts to visual resources associated with construction of the proposed Project features and future operations.

Implementation of the proposed Project would also require complete dewatering of the Reservoir, which would impact the surrounding viewshed. Views of the Reservoir when it is dewatered would be limited to the single-family residences and the Holiday Lake Estates neighborhood on the southside of the Reservoir since recreational sites would be closed temporarily. Upon completion of construction activities the Reservoir would be returned to normal operations, and views of the Reservoir would be restored. Although the Project construction activities would temporarily degrade the existing visual character or quality of the site, they are considered potentially significant. The District would prepare an analysis of the potential impacts to visual resources associated with construction of the proposed Project features and future operations.

d) Less than Significant Impact. Construction activities would occur in double shifts (two 10-hour shifts per day) 6 days per week to meet the construction schedule. Therefore, nighttime lighting would be required during the temporary construction period. Night time construction lighting would be directed away from any existing residences along Cochrane Road as much as possible. As a result, the exposure of residents or other viewer groups to construction lighting is anticipated to be minimal, and this impact is accordingly considered less than significant.

Following construction, existing lighting would be replaced with new permanent lighting that would not differ substantially from the current lighting located at the Project site. Project activities would include installation of new or replacement appurtenances at the Dam, which would be constructed with galvanized metal or painted with a non-reflective paint to reduce the potential for glare. Therefore, upon completion of construction there would be less than significant impacts to lighting or glare that would adversely affect day or nighttime views of the area.

II. AGRICULTURAL AND FORESTRY RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:	Potentially Significant Issue	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	X		
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	X		
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Protection (as defined by Government Code section 51104(g)?			X
d) Result in the loss of forest land or conversion of forest land to non-forest use?			X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?			X

Environmental Setting

Surrounding land uses include grazing lands, single-family rural residences, and parklands on District- and County-owned property.

Two parcels located below the dam at the corner of Cochrane Road and Coyote Road are zoned A-20Ac-d1 and designated as "Exclusively Agriculture with Combining District" by County of Santa Clara (County of Santa Clara 2012). A portion of the parcel located at 2290 Cochrane Road, Morgan Hill (APN 728-34-010) is proposed to be used for temporary project construction staging and a parcel at 2390 Cochrane Road, Morgan Hill (APN 728-34-011) may be permanently acquired to realign Cochrane Road.

Explanations

a) Potentially Significant Issue. The Project would affect Prime Farmland as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Department of Conservation (CDC 2013). The privately –owned parcels to be affected by the project contain Keefers Clay loam and are considered Prime Farmland by the U.S. Department of Agriculture, Natural Resource Conservation Service, if irrigated (USDA 2013). During construction, both parcels would be used for temporary staging of equipment and materials. Upon completion of construction activities, the staging area would be returned to pre-project conditions and could be used for agricultural production. However, a small corner of the 2290 Cochrane Road parcel and most of the 2390 Cochrane Road parcel would be permanently converted to non-agricultural use by dam embankment construction and realignment of Cochrane Road. Therefore, the proposed Project may both temporarily and permanently convert Prime Farmland, a potentially significant issue that will be evaluated further in the EIR.

b) Potentially Significant Issue. The Project would not conflict with an existing Williamson Act contract. However, the Project would potentially conflict with existing zoning for agricultural use. The privately-owned parcels below the dam are zoned A-20Ac-d1 and designated as "Exclusively Agriculture with Combining District." Upon completion of construction activities, the staging area would be returned to pre-project conditions and could be used for agricultural production. However, the portions of the parcels would be permanently converted to non-agricultural use by dam embankment construction and the realigned Cochrane Road. Therefore, the proposed Project may both temporarily and permanently conflict with existing zoning for agricultural use. A permanent conflict with existing zoning for agricultural use would be a potentially significant issue that will be evaluated further in the EIR.

c) No Impact. The Project would not conflict with existing zoning for, or cause rezoning of, forest land as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production as defined by Government Code section 51104(g).

d) No Impact. There are no designated forest lands in the Project area; therefore, the Project would not convert forest lands to non-forest uses.

e) No Impact. The Project would not involve other changes in the existing environment, which could result in the conversion of Farmland to non-agricultural use. The Project proposes a seismic retrofit of an existing dam; therefore, the activities associated with this action would not encourage the conversion of agricultural land to other uses.

III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of applicable air quality plans?	X		
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	X		
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	X		
d) Expose sensitive receptors to substantial pollutant concentrations?	X		
e) Create objectionable odors affecting a substantial number of people?	X		

Environmental Setting

The proposed Project is located within the Santa Clara Valley subregion of the Bay Area Air Quality Management District (BAAQMD). According to the BAAQMD, the Santa Clara Valley subregion has a high potential for air pollution, specifically for carbon monoxide, particulates, and photochemical precursors for ozone pollution. The BAAQMD region is designated nonattainment of the National Ambient Air Quality Standards (NAAQS) for ozone and fine particulate matter ($PM_{2.5}$), and the State Ambient Air Quality Standards (SAAQS) for ozone, particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$). The region is designated either attainment or unclassifiable for the remaining NAAQS and SAAQS (BAAQMD 2012).

In addition to the air pollutants regulated by the BAAQMD, naturally occurring asbestos may be found in rock and soils in the Project area. Exposure to asbestos containing minerals from inhalation or ingestion can result in severe health problems. Lung diseases from asbestos exposure include asbestosis and mesothelioma, among others (CARB 2008).

The BAAQMD established thresholds of significance for both construction and operation of projects within their boundaries. These thresholds are contained in the BAAQMD California Environmental Quality Act (CEQA) Guidelines, issued in 1999. Although the BAAQMD issued revised thresholds and guidance in June 2010, they were subsequently challenged and set aside by the Alameda County Superior Court because they were not subjected to a CEQA evaluation prior to adoption. Regardless of this fact, the District has adopted the 2010 BAAQMD thresholds for the purposes of this analysis because they were established based on the substantial evidence and represent the most current and appropriate thresholds for use at this time.

For short-term construction-related emissions, quantification is not necessary and projects are assumed to be below the significance thresholds if they implement a set of basic mitigation measures and, for larger projects such as the proposed Project, a set of enhanced mitigation measures. For long-term maintenance and operational emissions, the threshold of significance for carbon monoxide would be a contribution causing an exceedance of the SAAQS of 9 parts per million (ppm) averaged over 8 hours or 20 ppm averaged over 1 hour. The long-term operational threshold of significance for reactive organic gases (ROG), oxides of nitrogen (NO_x), and $PM_{2.5}$ (exhaust) is 54 pounds per day, 82 pounds per day of PM_{10} (exhaust), and zero pounds per day of local CO, accidental release of acutely hazardous air pollutants, or odors. The BAAQMD CEQA Guidelines provide that PM_{10} and $PM_{2.5}$ (fugitive dust) should be managed by best management practices (BMPs).

Explanations

a) Potentially Significant Issue. Project construction activities have the potential to generate emissions from heavy equipment used during construction, as well as generation of dust. Likely air pollutants from construction including the following: PM dust, criteria pollutants from fuel combustion, and diesel PM. Emissions generated during implementation of the proposed Project could potentially conflict with or obstruct implementation of the BAAQMD air quality plan. In accordance with BAAQMD regulations, this issue will be evaluated further in the EIR. The District will conduct an air quality analysis of the proposed Project to estimate and evaluate potential emissions produced by the construction and operation of the project. Results will be compared to numeric significance thresholds.

b) Potentially Significant Issue. As described above, project construction activities have the potential to generate temporary impacts to air quality resulting from emissions from heavy equipment used during construction. Although the construction activities would be short-term and temporary, they would have the potential to exceed thresholds of significance unless the basic and enhanced mitigation measures are incorporated into construction activities. Long-term maintenance and operation of the project would not likely exceed the significance threshold for daily or annual emissions for ROG, NO_x, and PM_{10}. The air quality analysis conducted for the EIR analysis would evaluate both the short-term construction and long-term operation emissions, and compare these against numeric significance thresholds.

c) Potentially Significant Issue. This issue will be evaluated further in the EIR based on the emissions analysis and results comparison to numeric significance thresholds.

d) Potentially Significant Issue. Sensitive receptors within 0.25 mile of the project area include single-family residential, a juvenile correctional facility, and recreational uses within the Anderson Lake County Park. Construction of the project would have the potential to expose these sensitive receptors to substantial pollutant concentrations from heavy equipment emissions and generation of dust. Also, proposed borrow areas (Chert Hill and Silica-Carbonate Hill) and area surrounding the dam spillway on the northern side of the project area possibly contain naturally-occurring asbestos. Disturbance of asbestos during project construction could expose workers on-site and any downwind receptors to dust containing asbestos. Air quality impacts to sensitive receptors, including possible impacts from asbestos disturbance, could be significant. The potential for exposure to airborne pollutants in comparison will be evaluated further in the EIR.

e) Potentially Significant Issue. Construction of the proposed project could create objectionable odors, particularly while the reservoir is being dewatered. The odors would likely be associated with decomposing organic matter in the reservoir and diesel emissions from construction equipment. These odors may significantly adversely affect single family residences immediately adjacent to the reservoir and project site. Although the objectionable odors would be temporary, this issue will be evaluated further in the EIR.

IV. BIOLOGICAL RESOURCES: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	X		
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	X		
d) Interfere substantially with the movement of any native resident or migratory species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	X		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	X		
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?		X	

Environmental Setting

Plants and Wildlife.
The proposed Project is located in the California Floristic Province Bay Area subregion (Hickman 1993). The following vegetation communities occur in the Project site and vicinity: California Annual Grassland; Coast Live Oak Woodland and Forest; Coastal and Valley Freshwater Marsh; Developed; Foothill Pine-Oak Woodland; Northern Coastal Scrub/Diablan Coastal Scrub; Northern Mixed Chaparral/Chamise Chaparral; Riparian Woodland, Forest and Scrub; and Waters (e.g., reservoir, spillway pool).

Surrounding land uses of the Project site include Anderson Lake County Park, single family residences, agriculture, District-owned property, County-owned property, and privately-owned open space.

Special-status Plants. **Table A-1** in the Appendix lists the current Federal and State listed special-status plant species that may be affected by the Project. There are known occurrences of special-status plants, including Coyote ceanothus (*Ceanothus ferrisiae*) and Mt. Hamilton thistle (*Cirsium fontinale var. campylon*), within the project site; other special-status plants may also be present. Special-status plants are protected under federal and state regulations.

Special-status wildlife. **Table A-2** in the Appendix lists the current Federal and State listed special-status wildlife species that may be affected by the Project. Known occurrences of special-status wildlife species, including California tiger salamander (CTS), California red-legged frog (CRLF), and a bald eagle nest, are documented at or near to the project site. Impacts on individuals or habitat for special-status wildlife would require incidental take authorization from USFWS and CDFW or coverage through the Santa Clara Valley Habitat Plan.

Fisheries

Anderson Reservoir. According to the California Department of Fish and Wildlife (CDFW) website (2013a), Anderson Reservoir has population of warm-water fishes, including black bass, crappie, and catfish. Other species known to occupy the reservoir include bluegill and carp. Anderson Reservoir is not part of any formal fish stocking program, however, fish species have been introduced into the reservoir over time. No special-status fish species are known to occur in Anderson Reservoir.

Leidy et.al. (2005) reports collection of trout/steelhead (*Oncorhynchus mykiss*) from Coyote Creek in the canyon east of the Town of Madrone (located within present day Morgan Hill) in 1936 (Fry 1936 as cited in Leidy et al. [2005]). Therefore, remnant populations of trout upstream of the reservoir could exist and contribute occasional individuals to the reservoir.

Leidy et al. (2005) also reported that a 1953 CDFW field note described a healthy trout fishery in upper Coyote Creek, upstream of Coyote Reservoir (Pintler 1953 as cited in Leidy et al. [2005]).

Coyote Creek. Coyote Creek, downstream of Anderson Reservoir, has historically supported the most diverse fish fauna among the Santa Clara Basin watersheds. Native species recently recorded in Coyote Creek include splittail (*Pogonichthys macrolepidotus*), Pacific lamprey (*Entosphenus tridentata*), steelhead/resident rainbow trout (*O. mykiss*), Chinook salmon (*O. tshawytscha*), California roach (*Lavinia symmetricus*), hitch (*Lavinia.exilicauda*), Sacramento blackfish (*Orthodon microlepidotus*), Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*), threespine stickleback (*Gasterosteus aculeatus*), prickly sculpin (*Cottus asper*), riffle sculpin (*C. gulosus*), staghorn sculpin (*Leptocottus armatus*), and tule perch (*Hysterocarpus traskii*) (Buchan and Randall 2003).

Critical and Essential Fish Habitat. Critical habitat and essential fish habitat (EFH) is present in the Project area. Critical habitat for the Central California Coast steelhead Distinct Population Segment (DPS) was designated on September 2, 2005 (70 FR

52488 52630). Coyote Creek downstream of Anderson Dam is included in the critical habitat designation.

EFH is defined in the Magnuson-Stevens Fishery and Act as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. EFH includes areas where Chinook salmon have historically occurred. Coyote Creek is identified in the Pacific Coast Salmon Fishery Management Plan (USGS Hydrologic Unit No. 18050003) as EFH for Chinook salmon. Central Valley fall-run Chinook salmon have also been observed in Coyote Creek since the mid-1980s and successful reproduction has been documented (SCBWMI, 2001).

Wetlands and Waters
The area downstream of the spillway at the proposed Chert Hill borrow site supports riparian wetlands and a stream feature. These features are likely considered jurisdictional waters of the U.S. and State. In addition the reservoir itself below the elevation of the spillway, regardless of the current elevation of the reservoir water level, is likely considered jurisdictional waters of the U.S. and State.

Explanations

a) Potentially Significant Issue. Sensitive biological resources with potential to occur in the Project site were identified from a comprehensive review of the following literature: the Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan (VHP) (VHP 2012); the CDFW California Natural Diversity Database (CNDDB 2013); California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2013); and the U.S. Fish and Wildlife Service (USFWS) Species Lists (USFWS 2013), as well as information from previous studies performed for the District in portions of the Project site (e.g., District Dam Maintenance Program EIR [SCVWD 2012a] and District Stream Maintenance Program SEIR [SCVWD 2011]) and unpublished data from the District and H. T. Harvey & Associates.

According to the literature review, the Project site supports habitat for several special-status plant and wildlife species. **Table A-1** in the Appendix lists the current Federal and State listed special-status plant species that may be affected by the Project. **Table A-2** in the Appendix lists the current Federal and State listed special-status wildlife species that may be affected by the Project. During preparation of the EIR for the proposed Project, a detailed biological assessment for the proposed Project will be completed to determine impacts to special-status species. Further discussion is provided below.

Fisheries
No special-status fish species occur in Anderson Reservoir. However, federally threatened Central California Coast steelhead, Central Valley fall/late fall-run Chinook salmon, and Sacramento splittail have the potential to occur downstream from Anderson Dam.

Temporary Impacts: Construction-related effects on special-status fisheries habitat could potentially occur while construction activities and equipment are active on the downstream embankment of the dam, or associated with water discharges into Coyote Creek during construction. Potential increases in sedimentation and turbidity resulting from increased runoff and potential hazardous materials spills could result in impacts on Coyote Creek downstream of Anderson Dam.

Construction-related effects on Coyote Creek downstream of the dam associated with drawdown of the reservoir could occur. Turbidity levels in discharges from the reservoir are expected to gradually increase as the reservoir is lowered. Turbidity during the lower flow periods in summer months could impact rearing and emigrating anadromous salmonids, potentially leading to increased predation risk and decreased feeding, as well as respiratory distress.

Temperatures of discharges from the reservoir to Coyote Creek would be similar to existing conditions until the reservoir water levels substantially decline and the season changes from spring to summer. Warm water reservoir releases to Coyote Creek throughout the summer could affect juvenile rearing; resulting in increased stress, reduced predator avoidance, reduced feeding, increased metabolism without concurrent increases in food availability, and thermally-induced mortality could occur.

Decreases in dissolved oxygen (DO) levels also could occur as the reservoir is dewatered. However, DO levels in the creek likely would be rapidly moderated by aeration at the dam outlet and when aerated at downstream riffles.

Permanent Impacts: Implementation of the proposed Project would result in permanent impacts on a small portion of Coyote Creek. Specifically, construction of the outlet structure and new downstream buttress would fill the uppermost portion of Coyote Creek (extending approximately 100 feet from the existing dam), which would result in permanent loss of instream habitat.

Special-status Plant and Wildlife Species
Activities associated with the proposed Project could adversely affect special-status species individuals and/or their habitats. Project activities could directly injure or kill special-status species as a result of crushing or trampling by construction equipment. In addition, habitats for special-status species may be temporarily or permanently lost as a result of project activities. Project activities that occur in close proximity to occupied special-status species habitats (e.g., occupied nests, roosts, or burrows) could indirectly disturb individuals to the point where they abandon those habitats. If populations of these species and suitable habitat are limited locally and regionally, these impacts would be potentially significant.

The EIR will further evaluate the magnitude of Project impacts on special-status plant and animal species. This evaluation will be based on Project-specific design and construction details to be developed during the EIR process and conditions that will be required by the VHP, since this project is a "covered project" under the VHP. Measures to avoid, minimize, and/or compensate for impacts to special-status animal and plant species would be implemented by the Project in conformance with the VHP, National Environmental Policy Act (NEPA)/CEQA requirements, and permit conditions. Payment of impact fees to the VHP for construction impacts would be required. The District would also implement a small restoration project to establish a population of coyote ceanothus to meet conservation strategies of the VHP.

b) **Potentially Significant Issue.** Ecologically important riparian habitat regulated by CDFW under Section 1600 of the California Fish and Game Code occurs within the Project site, and other sensitive natural communities designated by CDFW[2] are known to be present within the Project site. CDFW is expected to take jurisdiction over riparian habitat

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[2] Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects (CDFW 2009; 2010).

associated with Coyote Creek, Anderson Reservoir, and their tributaries. Based on previous 2006-2008 surveys for the District Dam Maintenance Program EIR, the sensitive habitat "Coastal and Valley Freshwater Marsh" occurs below the spillway and "Riparian Woodland, Forest, and Scrub" occurs below the dam along an unnamed seasonal tributary that flows into Coyote Creek. These habitat types also extend downstream of these locations along Coyote Creek. Other sensitive natural communities present on the Project site include serpentine grassland and serpentine chaparral habitats. Mapping of riparian habitat and other sensitive communities will occur as part of the impact evaluation for the proposed Project.

Project activities, such as excavation and fill, could result in the temporary disturbance and permanent loss of riparian habitat and other sensitive natural communities. This impact is considered potentially significant because it could result in temporary degradation and permanent losses of these communities and habitats.

The EIR will further evaluate this impact based on additional mapping of riparian habitat and other sensitive natural communities and an analysis of the potential for construction activities to impact riparian habitat and special status natural communities based on Project-specific design and construction details to be developed during the EIR process.

c) **Potentially Significant Issue.** Wetlands and other waters of the U.S. are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA). Waters of the state are protected by the Regional Water Quality Control Board (RWQCB) under the Porter-Cologne Water Quality Control Act, and impacts to the beds and banks of streams, lakes, and ponds are regulated by the CDFW under Section 1600 of the California Fish and Game Code. The entire reservoir, up to the elevation of the spillway crest, is expected to be considered jurisdictional waters of the U.S. by the USACE and waters of the State by the RWQCB. Currently, due the reservoir's elevation restriction, small patches of vegetated wetlands have formed in a few areas where seeps are present along the shoreline, but the majority of the jurisdictional areas within the reservoir are non-vegetated "other waters." A formal jurisdictional delineation of the Project site will be conducted as part of the EIR process for the proposed Project.

Activities associated with the proposed Project could result in temporary and permanent disturbance of jurisdictional wetland and aquatic communities, which provide habitat for fish and wildlife. Project activities could result in the placement of fill, hydrological interruption (e.g., dewatering or diversion), alteration of bed and bank, degradation of water quality (e.g., increased sedimentation and turbidity), and other direct impacts. The activities would primarily result in the temporary loss and disturbance of wetlands and aquatic habitats. Impacts to wetlands and other waters are considered significant because they would result in temporary degradation and limited permanent losses of ecologically valuable wetlands and aquatic habitats, including jurisdictional wetlands and other waters, and temporary disruption of stream continuity during Project activities within the Coyote Creek channel.

The EIR will further evaluate the magnitude of impacts of construction activities on wetlands and waters. This evaluation will be based on Project-specific design and construction details to be developed during the EIR process and VHP conditions.

d) Potentially Significant Issue.

Fisheries
The construction of the proposed project could temporarily disrupt the movement of fish species in Anderson Reservoir and in Coyote Creek downstream of Anderson Dam.

Anderson Reservoir. The reservoir drawdown would result in near complete dewatering, and would result in substantial fish losses except for any fish able to swim into creeks still flowing into the reservoir bed. The combined reduction in habitat availability and water quality with the dewatered reservoir would result in a negative impact on the reservoir fishery, including any native resident fish that may reside in the reservoir. In addition, it may take several years for fish populations to rebound following completion of the dewatering event.

Coyote Creek downstream of Anderson Dam. Although anadromous salmonids (i.e., Chinook salmon and steelhead) are highly migratory and would be capable of moving freely throughout Coyote Creek, a sudden localized increase in turbidity could affect normal behaviors that are essential to growth and survival such as feeding, sheltering, and migrating.

Reduced water quality discharged from the reservoir as a result of dewatering has potential for adverse impacts on fish in Coyote Creek. As required by the VHP, a dewatering plan will be developed, and is subject to approval from regulatory agencies. Additionally, discharges from project construction activities such as tunneling, could contain elevated levels of turbidity. Where feasible, mitigation measures will be prescribed to reduce impacts to less than significant levels.

Wildlife Movement Corridors and Native Wildlife Nursery Sites
Within the Project site, natural habitats (e.g., riparian, oak woodlands, scrub), streams (e.g., Coyote Creek and its tributaries), and the shorelines of Anderson Reservoir may function as pathways for terrestrial wildlife movement that allow animals to move along these areas through the developed portions of the Project site (e.g., parking lot, roadways). Additionally, the project area is a popular nesting area for migratory birds and raptors, including a known bald eagle nest near the project site. Project activities are expected to temporarily impact wildlife movement in these areas.

Temporary dewatering of Anderson Reservoir would result in both temporary beneficial and negative effects for terrestrial wildlife movement (e.g., by mammals). Because more upland habitat would be available for use by these species, mammals may more easily cross the reservoir area in a dewatered condition. However, because terrestrial wildlife may have to travel longer distances to water, they may be potentially exposed to greater predation risk. These effects would also apply to other dispersing or migrating wildlife species, such as reptiles and amphibians. Noise and disturbance associated with construction activities could cause species which commonly use habitats in the Project site for dispersal (e.g., Coyote Creek and its tributaries) to at least temporarily avoid dispersal through the Project site. These effects would be temporary, and once construction activities are complete, wildlife movement conditions would be similar to pre-existing conditions.

One wildlife nursery site, a pallid bat maternity colony, is present in the Project site. This maternity colony, with up to 160 individuals, occurs in a barn southwest of Cochrane Road on one of the temporary staging areas for the proposed Project (Johnston pers. comm.).

Project activities, including use of the staging area and all nearby construction activities may result in the temporary disturbance or loss of this roost site.

The EIR will further evaluate the magnitude of impacts of construction activities on the movement of native wildlife species or with established wildlife corridors and wildlife nursery sites. This evaluation will be based on Project-specific design and construction details and consideration of the various types of species that currently move through and use the Project site.

e) Potentially Significant Issue. Ordinance trees are defined based on the applicable local ordinance (e.g., City of Morgan Hill Tree Ordinance, County of Santa Clara Tree Preservation and Removal Ordinance), unless an agreement between the District and a municipality states otherwise. Often, ordinance trees must meet a minimum size requirement.

Ordinance-sized trees occur on the Project site in upland areas (e.g., oak woodlands) and within the riparian habitats along Coyote Creek where tree removal would be necessary (e.g., downstream of the existing dam). Therefore, Project activities, such as excavation in and placement of fill on the downstream slope of the dam, could result in the permanent loss of ordinance-sized trees. This impact is considered potentially significant because it could result in permanent losses of ecologically valuable trees. The Project EIR will further evaluate this impact based on mapping of ordinance-sized trees and an analysis of the potential for construction activities to impact ordinance-sized trees based on Project-specific design and construction details to be developed during the EIR process.

f) Less than Significant.

Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan
The VHP (VHP 2012) and associated documents are approved and adopted by the six local partners (Cities of Gilroy, Morgan Hill, and San Jose, County of Santa Clara, Santa Clara Valley Transportation Authority, and Santa Clara Valley Water District). The proposed Project is a covered activity under this plan, and the VHP will provide the federal Endangered Species Act and state Natural Community Conservation Planning Act compliance for those species it covers.

Three Creeks Habitat Conservation Plan (HCP)
The Three Creeks HCP is intended to provide ESA and CESA compliance for the District's water supply operations for species under the jurisdiction of the National Marine Fisheries Service (NMFS). The Three Creeks HCP is currently in the draft preparation stage, and has not been adopted or approved by any local, regional or state authorities. No permanent operational changes are expected to result from this project; therefore the Project is not identified as a covered activity in the Three Creeks HCP.

No other HCPs have been approved or are in preparation in the Project site, and aside from the VHP, no other Natural Community Conservation Plans (NCCP) in Santa Clara County have been approved or are in preparation (CDFW 2013b). The proposed Project will comply with the conditions of the VHP. Therefore, the proposed Project would not conflict with the VHP or any other adopted HCPs or NCCPs, or with any other approved local, regional, or state habitat conservation plans, and thus the impact associated with conflicts between the Project and any adopted HCP or NCCP would be less than significant.

V. CULTURAL RESOURCES: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	X		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	X		
d) Disturb any human remains, including those interred outside of formal cemeteries?	X		

Environmental Setting

Information presented in this section is based on an initial cultural resources study conducted by Far Western (Byrd and Berg 2006) for the project area. A more detailed study will be conducted for the EIR analysis.

The Project is located in the southeast portion of San Clara Valley along Coyote Creek. This region was occupied during the ethnographic period by politically autonomous, hunter-gather tribelets composed of Ohlone language speakers (Byrd and Berg 2006). Archaeological evidence for the region documents occupation by prehistoric groups spanning 10,000 years BP. A significant portion of the archaeological resources may lie buried beneath the alluvial fans and floodplains that form the valley floors of the Project area. Although such buried resources cannot be detected during a traditional archaeological surface survey, it is possible to distinguish which areas of the modern landscape have potential for buried resources and which landforms are either too old to contain such archaeological remains or which were formed by processes that are unlikely to have preserved intact cultural remains. Based on literature reviews conducted for the District's Dam Maintenance Program EIR (2012), which included Anderson Dam, approximately 94% of the project area has no sensitivity for buried resources. This is due in part to the fact that the actual dam footprint comprises a large percentage of the project site. Another 1% of the area was concluded as having low sensitivity. The remaining 5% is classified as medium-high sensitivity for buried cultural resources. (Byrd and Berg 2006).

Historic Resources
There are two land parcels containing structures that may be disturbed by project construction. The property located at 2390 Cochrane Road, Morgan Hill (APN 728-34-011) is a 1.13-acre parcel that appears to contain a single residence. The building's exact date of construction is unknown, but mapping shows that it was built by 1951. This property has not been found to have any historical status.

The property located at 2290 Cochrane Road, Morgan Hill (APN 728-34-010) was evaluated for historical significance in 2010 and has been designated as a Santa Clara County Historic Landmark (CL11-001). It has also been found eligible for the National Register of Historic Places, California Register of Historical Resources and has a National Register nomination currently pending. The property is considered a historical resource under CEQA Guidelines section 15064.5. The property has been found significant for (a) representing agricultural development in Santa Clara County and for its association with the development of the California strawberry industry; (b) being associated with historically important individuals James Phegley, I. O. Rhoades and Dr. Harold E. Thomas and; (c) for the architectural value of the Phegley House and horse barn (1860s), and the Rhoades House (1920). The Rhoades house also represents the work of two locally important architects: Andrew Hill, Jr. and Howard Higbie.

Explanations

a) **Potentially Significant Issue.** JRP Historical Consulting (JRP) evaluated Anderson Dam for the District in 2006, concluding that the dam structure and its associated buildings are not eligible for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR; JRP 2006). Thus the dam and its associated buildings do not constitute a historic property under Section 106 of the National Historic Preservation Act or a historical resource for CEQA compliance.

The proposed Project includes two adjacent private properties (See **Table 2** and **Figure 7**) that have been identified for temporary or permanent acquisition. As described in the environmental setting discussion above, structures on the 2390 Cochrane Road Property have not been documented for eligibility as a historic resource. However, the 2290 Cochrane Road Property is designated as a historic landmark and has been nominated for inclusion in the National Register of Historic Places. Once a formal historic architectural Area of Potential Effect (APE) has been established for the proposed Project, a survey and evaluation of the buildings and structures on these two parcels will be conducted for the EIR. Additionally, the proposed borrow, staging, and spoil disposal areas will also be subject to review and study. The EIR will provide a further evaluation of potential issues related to historic resources; if any of the properties potentially affected by the project are identified as historical resources, the EIR will assess whether project impacts will cause a substantial adverse change in the significance of those resources.

b) **Potentially Significant Issue.** In 2006, Far Western completed a cultural resources investigation for the Dam Maintenance Program which included Anderson Dam. The study consisted of a records search, archaeological survey within the project APE, buried archaeological site sensitivity assessment, and consultations with the Native American community. Of note, the dam footprint and much of the landscape surrounding the dam had been substantially altered by heavy equipment, including artificial terracing of the area south of the spillway, a borrow cut parking area located east of the dam, and steep, cut hill slopes north of the spillway. Hilly areas south of the dam appeared relatively intact and were intensively surveyed.

The proposed Project will require investigation of an expanded archaeological APE compared to the Dam Maintenance Program APE to include additional lands to accommodate construction needs to incorporate borrow, staging, and spoil disposal areas. While most of these areas may have been subject to prior impacts, those locations with potentially intact soils, such as encountered in hilly areas during the prior survey, will require study.

If cultural resources are identified in the project area and cannot be avoided by the project, then they must be evaluated for listing on the National Register of Historic Places. If an eligible property cannot be avoided, then impacts to the resource must be mitigated. Such mitigation would likely consist of data recovery excavations.

c) Potentially Significant Issue.

Paleontological Resources
Activities that cause surface disturbance in areas not previously subject to disturbance have the potential to uncover paleontological resources (similar to the activities described above that could affect archaeological resources). Construction activities and exploratory work all have some potential to unearth paleontological resources. Anderson Reservoir is within an area that contains rocks of the Franciscan Complex (Wentworth et al. 1998). Overlying rocks include late Mesozoic age serpentinite, Franciscan Melange, and late Tertiary volcanic rocks (see Section VI *Geology and Soils* for more details). Fossil vertebrates from the Franciscan Complex are rare. Known invertebrate fauna from the Franciscan Complex consists of radiolaria and foraminifera from chert, sandstone, shale, and mudstone sediments (Brabb and Blondeau 1983; Sliter et al. 1993).

Irvingtonian-age vertebrate fossils have been recovered from outcrops of the Santa Clara Formation at a site in the foothills approximately three miles north of Anderson Reservoir (UCMP V5313). Barstovian-age vertebrate fossils have been recovered from outcrops of the late Miocene Briones Formation, a distinctly bedded, gray-to-white, fine-grained sandstone and siltstone (Graymer, Jones, and Brabb 1995), at a site in the foothills, approximately three miles north of Anderson Dam (UCMP V5723). Based on this finding, it is possible that fossils could be encountered on site. Exposure of a unique paleontological resource could lead to its destruction, which would be a significant impact. The EIR will conduct a record search to further analyze this potential, and mitigation measures such as construction monitoring and archiving fossils will be identified as appropriate.

Unique Geologic Formations
Geologic formations, their structure and the rocks in them provide information about past geologic conditions. Therefore, rocks may be of scientific, educational, and recreational value. For these reasons typical adverse impacts to unique geologic features include material impairment through destruction, permanent covering, or alteration. The project, as designed, would not materially impair a unique geologic feature by destroying or altering those physical characteristics that convey the uniqueness of the resource. The geologic formations that occur in the vicinity of the project site are not exclusive locally or regionally and are not representative of a type locality of a formation.

d) Potentially Significant Issue. There are no known burial locations within the project area. Nonetheless, there is a potential to unearth previously unidentified human remains during ground disturbing activities. In the unlikely event that human remains are encountered during project construction activities, work shall halt in the immediate vicinity in accord with the State Health and Safety Code section 7050.5. Along with notifying the project archaeologist, the county coroner must also promptly be contacted to determine the origin and disposition of the remains pursuant to Public Resources Code section 5097.98. If the human remains are determined to be prehistoric Native American, the coroner will notify the Native American Heritage Commission within 24 hours. The commission will assign and contact the Most Likely Descendant who will be responsible for making recommendations concerning the disposition of the remains. The archaeologist will assist with compliance of the Native American Graves Protection and Repatriation Act.

VI. GEOLOGY AND SOILS: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death related to:			
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X
ii. Strong seismic ground shaking?			X
iii. Seismic-related ground failure, including liquefaction?			X
iv. Landslides?	X		
b) Result in substantial soil erosion or the loss of topsoil?	X		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	X		
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?		X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?			X

Environmental Setting

The Project site is located on the southeastern margin of the Santa Clara Valley, a south-ward extension of the valley occupied by San Francisco Bay. The Santa Clara Valley is part of the San Andreas Fault System, which distributes shearing across a complex system of primarily northwest-trending, right lateral, strike-slip faults that include the San Andreas, Hayward, and Calaveras faults.

Anderson Dam is located within the active San Andreas Fault system with the San Andreas Fault located approximately 10 miles southwest of the city of Morgan Hill. The Calaveras Fault passes through the western part of the project area, (California Division of Mines and Geology

1982). These two faults contribute the greatest potential ground motions to this area (California Geological Survey 2004).

The Coyote Creek and Range Front faults (formerly Coyote fault of Dibblee 1973) are located along the eastern margin of southern Santa Clara Valley. Anderson Dam is situated on the Coyote Creek fault, at the boundary between the Coyote Creek fault to the north and the Range Front fault to the south. The purpose of the proposed Project is to protect the dam embankment and outlet against displacement caused by earthquake events on the Coyote Creek fault and nearby Calaveras fault.

Anderson Reservoir is within the Coyote Block and fills the canyon drained by Coyote Creek. Prior to construction of the dam, Coyote Creek drained directly into the Santa Clara Valley forming a broad alluvial fan. The depth of alluvium beneath the Santa Clara Valley surface ranges from several hundred feet, to many thousands of feet on the west side of the valley (California Geological Survey 2004). Coyote Creek continues north toward San Francisco Bay through the Coyote Narrows located between the Diablo Range and the Santa Teresa Hills.

The Coyote Block contains rocks of the Franciscan Complex that are structurally overlain by the Coast Range Ophiolite and Mesozoic marine deposits of the Great Valley Sequence (Wentworth et al. 1998). Rocks include late Mesozoic age serpentinite (Coast Range Ophiolite), Franciscan Melange (chert, greenstone, and (greywacke) sandstone), and late Tertiary volcanic rocks (basalt flows, sills, and dikes (Late Miocene-Pliocene). Stream and alluvial fan gravel deposits of the Mio-Pliocene Silver Creek Gravels are steeply dipping and deformed by regional tectonics. A large, northwest-trending, very steeply northeast-dipping linear ridge of silica-carbonate rock is present upstream of the right abutment and spillway.

The reservoir and dam site were altered by filling and excavation during initial construction. Undisturbed soil is not found on the dam faces; fill material to create the dams was taken from nearby quarries (SCVWD 2012a). Native soils exist adjacent to the dams and soils and surface deposits (SCVWD 2004; NRCS 1958; NRCS 1974). Serpentine soils are located immediately adjacent to Anderson Dam. Serpentine soil units support a number of endemic or nearly endemic species (USFWS 1998). Serpentine soils are discussed in Section IV, *Biological Resources.* Naturally-occurring asbestos, typically present in serpentine soils and serpentine rock within the County, is discussed further in Section III, *Air Quality* and Section VIII, *Hazards and Hazardous Materials*.

Three on-site borrow areas have been identified as potential sources for the materials needed to construct the dam embankment and buttresses, Basalt Hill, Chert Hill, and Silica-Carbonate Hill (See **Figure 5**). Excavation of these materials would likely require blasting and processing to obtain the desired sized material for use in the project.

Landslides in and around Anderson Reservoir have been documented by the District since and prior to dam construction in 1950 (HDR 2013). Aerial photographs dating back to 1939 show landslides existed on the reservoir slopes before the dam was built. Surveys conducted by Coyle (1988) indicate a widespread occurrence of landslides within the reservoir area, two of which are located adjacent to residential homes within the Holiday Lakes Estates neighborhood in the City of Morgan Hill. Factors influencing the landslides in the area include topography, geologic structure, earth materials, seismicity, and rainfall. The activity levels of more recent landsliding are further affected by reservoir operation and other human activities (HDR 2013).

Explanations

a.i, a.ii, a.iii) No Impact

Rupture of a Known Earthquake Fault
The Project site is in Santa Clara Valley which is part of the San Andreas Fault System. This fault system distributes shearing across the San Andreas, Hayward, and Calaveras faults. The purpose of the Project is to increase Anderson Dam's stability and reduce the exposure of people or structures from inundation of the Anderson Reservoir that could currently result from an earthquake. The Project would have an overall beneficial effect with respect to exposing people or structures to damage resulting from the rupture of a known earthquake fault.

Seismic Ground Shaking
As mentioned above, the purpose of the Project is to remediate Anderson Dam's seismic deficiencies and perform other improvements to its spillway and outlet works to meet applicable seismic standards. The primary objective of the Project is to improve Anderson Dam to ensure the facility can withstand seismic shaking generated by earthquakes. The Project would have an overall beneficial effect by improving the safety of the dams and associated facilities in the event of ground movement.

Liquefaction
Liquefaction is the temporary transformation of saturated and very low cohesion or cohesionless soils into a viscous liquid as a result of ground shaking. Liquefaction may occur in water-saturated sediment during moderate to great earthquakes. Liquefied sediment loses strength and may fail; causing damage to structures.

The majority of the Project site is situated on Quaternary alluvial and artificial fill in a known liquefaction hazard area in a region that is susceptible to ground shaking; liquefaction and loss of soil strength could result from such ground shaking. The presence of liquefiable materials in the embankment and foundation of the dam could result in major slumping and failure of the embankment following a future large earthquake. The Project would remove these liquefiable materials and reconstruct the dam in accordance with all relevant provisions of the current Division of Safety of Dams (DSOD) and Uniform Building Codes/ California Building Code (UBC/CBC) standards. With these provisions in place, risks would be minimized to the extent feasible. The Project would beneficially reduce potentially adverse impacts on people and structures due to dam failure caused by liquefaction.

a.iv, c) Potentially Significant Issue.

Landslides
Anderson Dam is located in mountainous areas having steep slopes. Landslide hazards are prevalent in the mountainous and foothill areas in the Project vicinity where there are occurrences of the Franciscan Complex that include highly sheared mélange.

Landslide mapping of the reservoir area has been performed by Scott (1976), Coyle (1988), Meehan (1988), Wahler (1988), and AMEC (2009). As part of the current project, AMEC performed a site reconnaissance of the landslides described in Meehan (1988) at the south end of the reservoir (HDR 2013). Four slides appear to toe out near the elevation of the historic Coyote Creek channel. These four landslides could pose a potential risk to existing homes and public roads if they were re-activated. Additionally, proposed quarry activities could trigger slope failures. The existing landslides around Anderson Reservoir are either active, or can be triggered (re-activated) by several factors including rainfall and reservoir drawdown. Landslide failure would be a potentially significant hazard to workers at the site, and to structures and vehicles. The potential for landslides to occur as a result of the proposed Project, and associated hazards, will be evaluated further in the EIR.

b) **Potentially Significant Issue.** The proposed Project would involve reservoir dewatering whereby water would be released from the reservoir at flow rates greater than typical existing conditions. Increased flow rates have the potential to scour or erode downstream habitat; however, dewatering rates would be limited to environmental flow rates established by the Santa Clara Valley Habitat Plan, which would not be large enough to cause substantial scour along the stream channel.

Construction activities would have the potential to contribute to accelerated erosion. During construction, clearing, grubbing, and grading activities would remove ground cover, and expose and disturb soil on slopes. Exposed and disturbed soil would be vulnerable to erosion from runoff during construction, with soil particles becoming entrained in the runoff. Altered drainage patterns on site as a result of construction could also cause redirection and concentration of runoff, potentially further exacerbating the erosion problem. However, the District routinely implements extensive erosion and sediment control Best Management Practices (BMPs). Exposed soils within the work area would be stabilized following the completion of earthmoving activities. Erosion control BMPs, such as silt fences, straw hay bales, gravel or rock-lined ditches, water check bars, broadcasted straw, hydroseeding, or other suitable measures would be implemented consistent with District requirements. A stormwater pollution prevention plan (SWPPP) would also be required, providing an additional regulatory mechanism to ensure effective erosion control during construction. With erosion control BMPs and SWPPP compliance impacts related to accelerated erosion during construction are expected to be less than significant.

After completion of construction activities, any temporary facilities would be demobilized and site restoration measures would be implemented to minimize soil erosion.

Construction earthwork would require removal of topsoil where it is present. Notably, proposed excavation associated with borrow mining activities and dam embankment remediation could have the potential to remove substantial quantities of intact topsoil from areas undisturbed by previous development. Substantial removal of topsoil in undisturbed areas, including sensitive serpentine areas, would be considered potentially significant.

d) **Less than Significant.** Soils that contain a relatively high percentage of clay minerals have the potential to shrink and swell with changing moisture conditions. The main soil types found in the vicinity of the Anderson Dam site, based on the Natural Resources Conservations Service (NRCS) (http://websoilsurvey.nrcs.usda.gov) for the eastern Santa Clara area, are characterized by the presence of the following soil units; Garretson loam, Gilroy clay loam, Inks stony clay loam, and Montara rocky clay loam. The parent material for these soils is residuum from weathered greenstone, basalt, and sandstone formations that occur at the site. These soil units are classified as being well drained, with bedrock occurring between 10 and 36 inches below the surface. Depth to ground water is in excess of 80 inches for all units. The impact of expansive soils is considered less than significant due to the well drained condition of the soil material and excessive depth to groundwater.

e) **No Impact.** No septic tanks or alternative wastewater disposal systems would be installed as part of the proposed project. No impacts would occur.

VII. GREENHOUSE GAS EMISSIONS: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	X		
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purposed of reducing the emissions of greenhouse gases?	X		

Environmental Setting

Climate change results from the accumulation in the atmosphere of Greenhouse Gas Emissions (GHGs) produced primarily by the burning of fossil fuels for energy. These man-made GHG emissions are widely accepted in the scientific community as contributing to global warming. While some of the increase is explained by natural occurrences, *Climate Change 2007: The Physical Science Basis: Summary for Policymakers* (IPCC 2007) asserts that the increase in temperature is very likely (approximately 90 percent) due to human activity, most notably the burning of fossil fuels. For California, similar effects are described in *Our Changing Climate: Assessing the Risks to California* (California Climate Change Center 2006).

Because GHGs (CO_2, methane, and nitrous oxide) persist and mix in the atmosphere, emissions anywhere in the world affect the climate everywhere in the world. Consequently, GHG emissions that contribute to climate change result in a worldwide cumulative impact (global warming) rather than a local or regional project-specific impact typically associated with criteria pollutants. Impacts related to GHG emissions are discussed in the context of the proposed Project's contribution to statewide and global GHG emissions.

The California Global Warming Solutions Act of 2006 (AB 32) established a comprehensive program of regulatory and market mechanisms to achieve reductions in greenhouse gases (GHGs) that are quantifiable, real, and cost-effective. The Act directs responsibility for monitoring and reducing GHG emissions to the Air Resources Board (ARB). Among the most significant components of the Act is the requirement to reduce carbon emissions in California to 1990 levels by 2020.

The BAAQMD developed CEQA guidelines, in 1999 and 2010, to assist local jurisdictions in evaluating potentially adverse impacts on air quality. The 1999 CEQA guidelines provided thresholds for air quality emissions, but did not provide thresholds for GHG emissions. In 2010, BAAQMD adopted air quality guidance which included quantitative thresholds of significance and recommended BMPs and mitigation measures for GHG emissions, among other pollutants. The 2010 BAAQMD thresholds were successfully challenged in court because they were not evaluated under CEQA prior to adoption, and so the BAAQMD does not currently recommend use of its 2010 GHG thresholds. The BAAQMD has indicated that lead agencies may continue to rely on the 1999 BAAQMD CEQA Guidelines for Thresholds, or make determinations of an individual project's air quality impacts based on substantial evidence for the project. Regardless of this fact, the District has adopted the 2010 BAAQMD thresholds for the purposes of this analysis because they were established based on the substantial evidence and represent the most current and appropriate thresholds for use at this time.

Explanations

a) **Potentially Significant Issue**. The project would generate temporary construction-related GHG emissions, with most of the emissions generated by off-road heavy construction equipment, materials hauling, and daily construction worker trips. The long-term operation of the project, however, would not differ substantially from baseline conditions, and as such would not generate substantial new or altered sources of GHGs emissions. Any potential impacts from GHG generation during construction would be short-term and temporary, but could be significant. This issue will be evaluated further in the EIR, which will quantify emissions and compare them to numeric significance thresholds.

b) **Potentially Significant Issue.** Construction of the proposed project would generate temporary short-term GHG emissions which may impact the reductions required by the California Global Warming Solutions Act of 2006. Long-term operation of the project would have a negligible effect on GHG emissions. Periodic maintenance activities would be incorporated into existing District maintenance schedules and would, therefore, result in a negligible change to vehicle miles traveled and GHG emissions.

   Emissions generated during project construction could be significant. This issue will be evaluated further in the EIR, which will quantify emissions and compare them to numeric significance thresholds.

VIII: HAZARDS AND HAZARDOUS MATERIALS: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, storage or disposal of hazardous materials?		X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	X		
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	X		
e) Create a significant hazard to the public or the environment from existing hazardous material contamination on site or nearby?	X		
f) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a substantial safety hazard for people residing or working in the project area?			X
g) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?			X
h) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?		X	
i) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?		X	

Environmental Setting

The Project site is on land owned either by the District, County of Santa Clara, or private parties. Surrounding land uses include grazing lands, single-family rural residences, and parklands on District- and County-owned property.

The nearest airport to the Project site is the South County Airport (E16) located approximately 7 miles south of the Project area in San Martin. The nearest school to the Project site is Live Oak High School, which is located 1.7 miles southwest of the Project area at 1505 E. Main Avenue, Morgan Hill. A juvenile detention facility, the William F. James Boys Ranch, operated by Santa Clara County Juvenile Probation Department is located 0.1 mile west of the project area along Coyote Creek at 19050 Malaguerra Avenue, Morgan Hill. This facility houses up to 96 boys that are 15 to 18 years old. Youth housed at this facility receive tutoring to pass the General Education Development (GED) test and participate in work programs on the ranch and community service programs throughout the county, including work for the District.

According to the California Environmental Protection Agency, the provisions in Government Code section 65962.5 are commonly referred to as the "Cortese List." The list, or a site's presence on the list, has bearing on the local permitting process as well as on compliance with CEQA. The Cortese list, which includes the resources listed below, was reviewed for references to the proposed project site:

- List of Hazardous Waste and Substances sites from the Department of Toxic Substances Control (DTSC) EnviroStor database;
- List of Leaking Underground Storage Tank Sites from the State Water Resources Control Board (SWRCB) GeoTracker database;
- List of solid waste disposal sites identified by SWRCB with waste constituents above hazardous waste levels outside the waste management unit;
- List of "active" Cease and Desist Orders and Cleanup and Abatement Orders from SWRCB; and
- List of hazardous waste facilities subject to corrective action identified by DTSC.

Explanations

a, b) Less than Significant Impact. Implementation of the Proposed Project would potentially require the routine transfer, use, storage, or disposal of hazardous materials. During construction, hazardous materials typically associated with proposed construction activities, such as fuel, oil, explosives and lubricants would be employed in the project and staging areas. Operation of intake valves and gates would require hydraulic fluids, typically oil. However, the project would utilize non-hazardous hydraulic fluids for hydraulic systems for the upstream valves and gates if feasible. If this is not feasible, then all hydraulic systems would be separated from reservoir and creek waters such that preventative maintenance can occur with no risk of spills, and if spills were to occur, they would be contained and separate from receiving waters. The District would comply with all relevant federal, state, and local statutes and regulations related to transport, use, storage, or disposal of hazardous materials, and all materials designated for disposal would be evaluated for appropriate State and Federal hazardous waste criteria. Construction and Operation activities would also incorporate BMPs such as hazardous materials storage and handling practices; vehicle and equipment maintenance, storage, and operation measures; maintenance of on-site spill control kits; stormwater pollution prevention plan development, and worksite housekeeping measures. These measures would minimize the potential release of hazardous materials into the wetlands/waterways resulting from the routine use, storage, or disposal of hazardous materials. Therefore, impacts related to the transport, use, storage, or disposal of hazardous materials would be less than significant, and the proposed Project is not anticipated to create a hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

c) Potentially Significant Issues. There are no existing or proposed city-operated schools within 0.25 mile of the Proposed Project (Morgan Hill Unified School District 2013). However, the county-operated William F. James Boys Ranch juvenile detention facility is located within 0.25 mile of the Proposed Project construction area; specifically 0.1 mile west of the proposed Chert Hill borrow area. Though this facility is not a standard school, up to 96 juveniles are housed there year round, and the county provides educational coursework. The youth housed at this facility are considered sensitive receptors for potentially hazardous impacts resulting from the proposed Project.

Hazardous materials would be present and handled in project construction areas, and transportation routes to and from the project site. Naturally occurring asbestos is known to be present at the construction site and the project involves a substantial amount of excavation activities. When disturbed and airborne, asbestos is a human health hazard of concern. Potential human health effects due to airborne asbestos are described in Section III, *Air Quality*. Due to the proximity of the project site to the juveniles present at the William F. James Boys Ranch year round, the proposed Project may result in potentially significant impacts. This issue will be evaluated further in the Air Quality section of the EIR.

d, e) Potentially Significant Issue. The proposed Project is not currently included on any list of hazardous materials sites. Based on a review of readily ascertainable public information for the site and vicinity, there is no existing hazardous material contamination on site or nearby (State Water Resources Control Board 2013). However, there is the potential for discovery of previously unknown contamination during ground excavation activities. If hazardous levels of contaminants are encountered, a significant impact on construction workers, the public, and environment could result. Additionally, as discussed in Section III, *Air Quality*, naturally occurring asbestos may be encountered in the project site. Exposure to airborne asbestos could adversely affect human health. These issues will be evaluated further in the EIR.

f, g) No Impact. There are no airports or airport land use plans established within two miles of the proposed Project (County of Santa Clara 2013a), therefore there would be no impact on public safety hazards related to airports.

h) Less than Significant Impact. The primary objectives of the proposed Project are to provide dam stabilization for earthquake protection purposes, and to incorporate measures to address safety deficiencies. Short-term lane closures or detours on Cochrane Road during construction could have the potential to interfere with implementation of emergency response plans. However, because the District would comply with all adopted emergency response plans, and other measures as required by the County during construction activities to ensure that appropriate safety measures are in place in the event of an emergency, impacts would be less than significant. See also Section XVI, *Transportation/Traffic*.

i) Less than Significant Impact. According to the Cal Fire map of Fire Hazard Severity Zones in Santa Clara County, a portion of the site is located within the wildland urban interface of the State Response Area, and it is considered a high fire hazard severity zone (Cal Fire 2007). A portion of the site is also located within the Local Response Area, and is not considered a high fire hazard severity zone. Wildlands in project area could catch fire if an errant spark or heat from construction equipment were to provide ignition. This impact is limited to construction of the project. During construction, the District would adhere to all fire prevention and protection requirements and regulations of the County and Public Resources Code wildland fire safety measures, as applicable. Therefore this impact is less than significant.

IX. HYDROLOGY: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	X		
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (for example, the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?		X	
c) Substantially alter the existing drainage patterns of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	X		
d) Substantially alter the existing drainage patterns of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?		X	
e) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?		X	
f) Otherwise substantially degrade water quality?	X		
g) Place housing within a 100-year flood-hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?			X
h) Place within a 100-year flood-hazard area structures which would impede or redirect flood flows?			X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?			X
j) Inundation by seiche, tsunami, or mudflow?		X	

Environmental Setting

The proposed Project is located in the Coyote Creek Watershed, the largest watershed in the Santa Clara Basin, encompassing an area of over 320 square miles. Coyote Creek terminates at San Francisco Bay. The entire City of Milpitas and portions of San Jose and Morgan Hill lie within the watershed boundaries, with the remaining area consisting of unincorporated lands within Santa Clara County. The Anderson Dam watershed is approximately 195 square miles and includes Coyote Dam and Reservoir upstream of Anderson Reservoir on Coyote Creek.

Anderson Reservoir is the largest of the District's ten reservoirs and provides a greater water storage capacity than the rest of the nine reservoirs combined. The reservoir also provides emergency backup water supply for the District and incidental flood protection for Santa Clara Valley and the City of San Jose and Morgan Hill. The reservoir has a maximum operating elevation of approximately 240 feet, and impounds approximately 90,373 acre-feet of water at its maximum reservoir operating elevation.[3] Water stored in Anderson Reservoir comes from within the watershed and from the United States Bureau of Reclamation (USBR) San Felipe Division of the Central Valley Project (CVP) – specifically, the San Luis Reservoir. Water stored in the reservoir is released into Coyote Creek to recharge the groundwater basin through filling a series of percolation ponds located downstream (SCVWD 2012b).

Water quality is regulated under the federal CWA and California Porter-Cologne Water Quality Control Act. Under these statutes, Beneficial Uses have been established by the San Francisco Bay RWQCB. Beneficial Uses at Anderson Reservoir include municipal and domestic supply, sport fishing, groundwater recharge, cold and warm freshwater habitat, fish spawning, wildlife habitat, non-contact water recreation, and limited water contact recreation. Beneficial Uses designated for Coyote Creek include sport fishing, groundwater recharge, cold and warm freshwater habitat, fish spawning, fish migration, preservation of rare and endangered species, wildlife habitat, non-contact water recreation, and water contact recreation. Beneficial Uses of the Santa Clara Valley groundwater basin/Santa Clara groundwater sub-basin (also known as Coyote Valley groundwater basin) include municipal, industrial and industrial process, and agricultural water supply (San Francisco Bay RWQCB 2011). Beneficial uses at Anderson Reservoir are identified as impaired under CWA Section 303(d) due to mercury and polychlorinated biphenyls (PCBs), based on fish tissue sampling from bass and carp collected from the lake. Beneficial uses of Coyote Creek in the lower reaches are identified as impaired under CWA Section 303(d) due to trash pollution (SWRCB 2011).

Explanations

a, f) Potentially Significant Issues. Several project construction-related activities have the potential to degrade water quality in a manner that could exceed federal and/or state water quality standards and/or otherwise substantially degrade water quality. The reservoir would be dewatered for one construction season and a coffer dam would be constructed to maintain a dry construction area around the dam. The reservoir would be returned to normal operation following completion of the second construction season. During dewatering, water from the reservoir would be discharged downstream to Coyote Creek through existing outlets.

Water discharged from the reservoir would be expected to contain elevated levels of suspended solids, high water temperatures, and low dissolved oxygen levels, especially as

[3] A reservoir restriction to approximately 45 feet below the crest of the dam (equivalent to approximately 61,000 acre-feet of reservoir storage) was voluntarily established by the District in December 2008.

the water level in the reservoir declines. Discharges of poor quality water from the reservoir could adversely affect water quality conditions in Coyote Creek, especially during the summer low flow period when temperature levels are already elevated. Adverse effects on water quality in Coyote Creek during reservoir dewatering may extend downstream for several miles.

There are known landslides in the southern end of the reservoir that may be triggered when the reservoir is dewatered (HDR 2013). If these landslides become active while the reservoir water levels are lowered, a substantial amount of sediment may slump into the reservoir. This could increase water turbidity temporarily.

Throughout project construction, the excavation areas including the dam embankments, borrow areas, and intake and outlet works tunnels would require dewatering of any nuisance inflows. These inflows, along with runoff from exposed soils in active work areas are likely to contain high concentrations of particulates (high suspended solids/turbidity) and potentially, residual petroleum products from construction equipment. If discharged to Coyote Creek directly, these pollutants would potentially exceed federal and state water quality standards or otherwise degrade beneficial uses.

Temporary staging areas are identified in various locations in the project site. Some of the staging areas would be used to store and process large quantities of rock material for dam reconstruction. These also would have the potential to generate contaminated runoff.

To address temporary impacts the District would incorporate soil stabilization, sediment control, tracking control, waste management and pollution control, and non-stormwater management BMPs into project design. A SWPPP would also be required, providing an additional regulatory mechanism to ensure adverse effects to water quality are minimized to the maximum extent practicable during construction. Potential water quality degradation from construction of the proposed Project will be evaluated further in the EIR. Measures will be identified in the EIR to potentially reduce the level of significance of this impact.

After project construction, the dam and reservoir would be operated similarly to existing conditions and in compliance with federal, state, and local regulations. Project operation would not contribute pollutants identified as impairing water quality in Anderson Reservoir or Coyote Creek. Operation of the proposed Project is anticipated to have less than significant impacts because there would not be any expected changes in operations from what is occurring in the existing conditions.

b) Less than Significant. Anderson Reservoir provides a substantial amount of surface supply for groundwater recharge in the valley downstream. During project construction, the reservoir would be dewatered for nearly three years, thus reducing availability of water for recharge of groundwater basins downstream. However, while the reservoir is dewatered, flows in Coyote Creek downstream of the reservoir would be maintained by water imported from other District supply sources. Therefore, groundwater recharge operations would continue throughout project construction. No adverse effects on groundwater supply would occur. Operational discharges from Anderson Reservoir to support groundwater recharge activities would resume after the project is constructed. This impact is considered less than significant.

c) Potentially Significant Issues. Project construction would involve dewatering Anderson Reservoir, discharges of water from construction work areas to Coyote Creek, and substantial ground excavations at the dam and at three material borrow locations near the dam. These actions could alter the existing drainage patterns in the project area, such that indirect erosion or siltation would occur.

During project construction, water discharged to Coyote Creek would occur through existing outlets from the dam, and temporary discharges from dewatered construction areas. Measures would be implemented to reduce the potential impacts of construction-related discharges to Coyote Creek.

Up to three borrow areas, Basalt Hill, Chert Hill, and Silica-Carbonate Hill, would be excavated to obtain materials for dam reconstruction (See **Figure 5**). Excavation of these large areas would locally alter drainage runoff patterns, but would not increase the timing or amount of runoff to nearby waters.

The downstream dam embankment would be extended by approximately 100 feet (See **Figure 4**), resulting in filling a portion of the Coyote Creek channel. Currently, the portion that would be filled is concrete-lined and contains multiple outlets: the dam low level outlet, a turnout from the Anderson Force Main, and a return line from the hydroelectric facility. The new outlet structure would be reconstructed in the Coyote Creek natural channel downstream from the existing concrete-lined channel. The new outlet structure would include a concrete lined channel and energy dissipation structure. Operation of the reservoir (i.e., flow releases from the outlet to the Creek) would be the same under post-project conditions. Therefore, a permanent loss of natural creek channel bed would result from the Project, but an increased potential for erosion due to project operational flow releases would not occur.

The impacts described above include several potentially significant issues, and will be evaluated further in the EIR.

d, e) Less than Significant Impact. The proposed Project would raise the dam crest by 7 feet and extend it to the south by about 100 feet (See **Figure 4**). Access roads to the boat ramp parking areas would be realigned around the extended dam crest. The spillway walls would also be raised by 7 feet. The raised dam crest, spillway walls, and access roads would be impervious; the access roads to parking areas and along the dam crest would be paved and the spillway walls would be constructed of concrete. Runoff from these expanded features would not substantially increase the total impervious area of the project site compared to existing conditions. All other existing impervious areas at the project site would likely remain the same size. No new sources of polluted runoff would be created by the proposed Project. After project completion, runoff from the project site would not substantially increase such that flooding on-site or off-site would occur or that the local stormwater drainage system would need to be upgraded. Furthermore, the raise of the dam crest and spillway walls are intended to allow the reservoir to accommodate the probable maximum flood, a beneficial effect related to flood protection and downstream drainage infrastructure. Therefore, this impact is less than significant.

g, h, i) No Impact; Beneficial Effect. Anderson Dam was constructed in part to protect people against large flood events, such as the 100-year flood hazard. The dam impounds flows within the reservoir and protects downstream areas from flood impacts. The dam would continue to provide these functions; the dam is not being removed. Therefore, significance criterion (h) does not apply to the proposed Project.

As described in the Project Description, Anderson Dam is currently at risk of failure and could expose people and structures downstream to flooding due to seismic events and structural deficiencies. If the dam were to fail, uncontrolled release of reservoir water could result in significant harm to people and structures downstream. The purpose of the proposed Project is to correct these deficiencies to reduce the risk of dam failure. Specifically, the proposed Project would: 1) stabilize the dam embankment for the maximum credible earthquakes on the Calaveras and Coyote Creek Faults; 2) modify or replace the outlet works to protect against potential fault rupture risk from the maximum credible earthquake on the Coyote Creek-Range Front fault zone; and 3) raise the dam and spillway walls to accommodate the probable maximum flood event. By repairing the dam, the proposed Project would reduce the risk of dam failure and protect people and structures against flooding impacts. Therefore, the Project would have a beneficial effect on protecting people and structures from downstream flood hazards.

The Project would not involve placement of housing within a flood hazard area. Therefore, significance criterion (g) would not apply.

j) **Less Than Significant Impact.** Landslides in the southern end of the reservoir exist that may be reactivated when the reservoir is dewatered (HDR 2013). If these landslides become active while the reservoir water levels are lowered, it is possible that water displaced in the reservoir could create a seiche or standing wave, however the likelihood of such a wave overtopping the dam is less than significant (FERC 2011). The Project site is located too far inland to be influenced by a tsunami event. Thus, the project would have a less than significant impact to exposing people or structures to loss, injury or death involving inundation by seiche, tsunami or mudflow.

X. LAND USE AND PLANNING: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Physically divide an established community?		X	
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	X		
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?		X	

Environmental Setting

Portions of the Project site are within the sphere of influence of the cities of Morgan Hill and San Jose or within unincorporated Santa Clara County (City of Morgan Hill 2012; City of San Jose 2010). The Project site is on land owned either by the District, County of Santa Clara, or private parties. Residential, small-scale agricultural, and open space lands uses border the Project site. **Table 2** lists the parcels that may be affected by the Project.

The majority of the Project site lies within Anderson Lake County Park, which is on District-owned property. The park includes six separate parking lots, a boat ramp and day-use facilities associated with the reservoir. See **Figure 2** for locations of these features within proposed project boundaries.

Explanations

a) Less than Significant. Project construction activities would primarily occur on property owned either by the District or County of Santa Clara. In addition, temporary and permanent rights-of-way and acquisitions of private property would be needed for project implementation. However, the Project would not involve activities or construction of features that would divide an established community.

b) Potentially Significant Issue. Project construction activities would primarily occur on District-owned property and adjoining County properties. Temporary loss of recreational land use would occur during project construction. Impacts on recreational use are discussed in Section XV, *Recreation*. Existing land uses on District and County properties would reinitiate after project completion and the post-project conditions would not conflict with existing or future designated uses of the properties. Because the disruption in land uses would be temporary, this is not considered a potentially significant impact.

Conflicts with existing use of private parcels, such as by preventing activities or occupation of structures from continuing, removal or relocation of structures, or preventing the designated use of the site from occurring in the future, may result in a potentially significant impact. The EIR will further evaluate this topic, using additional information regarding the existing uses of properties and the Project's proposed temporary and permanent alterations to the site.

c) Less than Significant. Habitat conservation plans covering the proposed Project are discussed in Section IV, *Biological Resources*.

XI. MINERAL RESOURCES: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?			X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?			X

Environmental Setting

Many mineral resource deposits in Santa Clara County are of regional or state-wide significance, as determined by state agencies (County of Santa Clara 1994). Mineral resources of regional or state-wide significance found and extracted in Santa Clara County include construction aggregate (crushed stone, sands, and gravels), deposits of limestone, and, to a lesser extent, salts derived from evaporation ponds at the edge of San Francisco Bay. These minerals are not known to occur at the proposed Project site. The materials to be quarried from the project areas are not commonly economically desirable for mining.

The California Geological Survey Guidelines for Classification and Designation of Mineral Lands (California State Mining and Geology Board 2000) contains guidelines for classification and designation of mineral lands for determining suitability as Aggregate Resources Areas (ARAs). The guidelines include specific land uses that are considered to be generally incompatible with mining and have been excluded as ARAs. The Economic Exclusion category includes major public or private engineering projects, including dams, and therefore would exclude the project area as containing minerals of state or local importance. Therefore, even if the project site contained minerals of state-wide or local importance, the Project would be exempt from complying with the state's guidelines.

Explanation

a, b) No Impact. Three on-site borrow areas have been identified as sources for the materials necessary to construct the Anderson Dam embankment and buttresses (See **Figure 5**). The three borrow areas are situated in areas previously used as the main sources of borrow material for original construction of the dam. The three on-site borrow areas are generally feasible for use as borrow areas for the proposed Project, and three of the four basic material types needed for construction (General Rockfill, Select Rockfill, and Clayey Earthfill) likely can be developed from these on-site borrow areas and from the excavations within the embankment. Based on the Economic Exclusion category presented in the California Geological Survey Guidelines for Classification and Designation of Mineral Lands, the material from these borrow areas are not considered minerals of state-wide importance and would not affect future mining of mineral resources. Excavated materials would be directly used for dam reconstruction and would not be sold or distributed to other parties.

The fourth material required for project construction, Drain Rock, may be obtained from the on-site silica-carbonate quarry, but additional investigations are needed to determine if this area is suitable for production of Drain Rock. Approximately 15,000 cy of Drain Rock, may be required for the Project. Currently, it is expected that this material would come from an off-site quarry. The amount of off-site Drain Rock material needed for construction of the proposed Project is anticipated to be relatively small and within the capacity of existing quarries.

In conclusion, Project activities would primarily rely upon mineral resources found on site. No important mineral resources are present within the Project footprint that would become unavailable as a result of the Project, nor would the Project use a substantial amount of mineral resources from offsite or involve other activities that would adversely affect future mining in the County. There would be no impact on mineral resources of local or state-wide importance.

XII. NOISE: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	X		
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	X		
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?		X	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels without the project?	X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?			X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?			X

Environmental Setting

Surrounding land uses include single-family residential, agricultural, a juvenile correctional facility, and recreational uses. Residential homes and recreational trails along the southwestern bank of the reservoir and in the south area of the dam are within the City of Morgan Hill. The juvenile correctional facility is located on unincorporated county land. Recreational use in the county park along the northwestern bank and the northern dam area is within the City of San Jose. The project area borders the Anderson Lake County Park, which includes hiking trails and boating activities within the project area. There are no substantial noise sources within the project area and the existing noise environment is dominated by natural sounds and light traffic on Cochrane Road. The District will prepare a noise and vibration analysis, the findings of which will be presented in the EIR.

Explanations

a) Potentially Significant Issue. The proposed Project involves construction of seismic retrofits to the Anderson Dam, including excavating portions of both the upstream and downstream slopes of the dam, removing potentially liquefiable fill and alluvium exposed in the excavations, replacing the excavated material with compacted rockfill, and constructing buttresses on both sides of the dam. Each phase of the project construction would generate noise from the operation of heavy equipment and supporting stationary equipment, such as generators and materials screening equipment, as well as noise from blasting which is anticipated to occur one or two times per week. This issue will be evaluated further in the EIR, based on the results of the noise and vibration analysis described above and applicable noise standards.

b) **Potentially Significant Issue**. Heavy equipment would be used during construction of the proposed Project that could expose people to groundborne vibration and groundborne noise levels. The noise and vibration analysis will determine the potential impacts related to these issues. The EIR will evaluate the issue further, utilizing the conclusions of that analysis.

c) **Less Than Significant Impact**. Operation of the proposed Project would involve occasional maintenance activities, functional use of the spillway and intake and outlet structures, and possible operation of pumps and other equipment. Noise associated with these activities is currently occurring, and it is not expected that there would be any increase in noise levels over existing conditions. This impact is considered less than significant.

d) **Potentially Significant Issue**. During construction, there would be a temporary noise increase from the use of heavy equipment and blasting. The District would require the contractor to comply with all applicable noise and occupational safety standards as defined in the construction specifications, and to protect workers and other persons from the health effects of increased noise levels from the use of construction equipment. The EIR will evaluate this issue further in the EIR.

e) **No Impact**. The project is not located within an airport land use plan and there are no public airports or public use airports within two miles of the project. The nearest public or public use airport is the San Martin Airport, approximately five miles south of the project area. There would be no impact.

f) **No Impact**. There are no known private airstrips within two miles of the project area. There would be no impact.

XIII. POPULATION AND HOUSING: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Induce substantial growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?		X	
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?		X	
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?		X	

Explanations

a) **Less than Significant.** The proposed Project includes construction activities necessary to retrofit the Anderson Dam. Construction workers would be temporarily employed at the Project site, and these jobs would generally be anticipated to be filled by the local work force. No new long-term employment opportunities, or substantial population growth, would result from construction activities.

There would be no change in reservoir operations causing an increase in employment opportunities that could lead to population growth. Furthermore, the proposed Project would not increase the capacity of the reservoir or involve any other actions that could lead to an increased water supply that could induce population growth.

b, c) Less than Significant. Table 2 identifies properties that may be directly affected by the Project. The 12.3-acre 2290 Cochrane Road property (APN 728-34-010) and 1.1-acre 2390 Cochrane Road property (APN 728-34-011) contain single-family housing. Depending on final design, downstream embankment construction and Cochrane Road realignment could require the removal of one single-family residential home on the 2390 Cochrane Road property. Additional structures including housing on the 2290 Cochrane Road property may also be temporarily affected by construction activities. Feasible measures, including limiting the staging and construction area extents to the minimum needed to construct the Project, would be incorporated into Project design to avoid displacement of people or housing.

Should the Project require displacement of people or housing, occupants of affected structures would be relocated consistent with District Relocation Assistance Program procedures (Quality Environmental Management System Work Instruction W630D08, SCVWD 2013b) and applicable Uniform Relocation Assistance and Real Properties Acquisition Policies Act requirements (49 CFR Part 24). Relocation assistance procedures include confirmation that adequate replacement housing is available prior to displacement. Compliance with District and legal requirements would ensure that relocation of occupants of homes acquired for the Project would not be considered a substantial displacement of housing or people. Relocation for residents would not require construction of new housing elsewhere; therefore, this is a less than significant impact.

XIV. PUBLIC SERVICES: Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Fire protection?			X
b) Police protection?			X
c) Schools?			X
d) Parks?			X
e) Other public facilities?			X

Environmental Setting

The project site is located within the cities of Morgan Hill and San José and an unincorporated area of Santa Clara County, and is within the jurisdiction of the Santa Clara County's Sheriff's Department and Fire Protection District. The project site is within the Morgan Hill Unified School District.

Explanations

a, b) No Impact. Completion of the Project would not contribute to an increased need for fire or police protection services, since the proposed Project would not contribute to population growth or other long-term land use modifications.

c) No Impact. The nearest school is Live Oak High School, which is located 1.7 miles southwest of the project area at 1505 E. Main Avenue, Morgan Hill. The Project would not impact existing school facilities, nor would it contribute to any change in population, or other land use modifications that would impact the local school district. Therefore, there are no impacts associated with the need to expand any school facilities.

d) Not Applicable. Effects associated with the County Park are discussed in Section XV, *Recreation*.

e) No Impact. The county-operated William F. James Boys Ranch juvenile detention facility is located 0.1 mile west of the proposed Chert Hill borrow area. A large concentration of youth is housed there year round. The proposed Project would have no impact on the public services of the facility. Completion of the proposed Project would not contribute to an increased need for other government facilities, since the proposed activity would not contribute to population growth or other long-term land use modifications.

XV. RECREATION: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	X		
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?		X	

Environmental Setting

The Anderson Lake County Park encompasses the reservoir and includes recreational amenities such as the Coyote Creek Parkway multiple use trails, the Jackson Ranch Historic Park site, the Moses L. Rosendin Park, and the Burnett Park area. The trails within Anderson Lake County Park follow Coyote Creek and offer views of wildlife and riparian habitat. Shoreline picnic and barbecue facilities are provided at the Woodchopper's picnic area, which can be accessed by boat or vehicle at the south end of the lake. Additional picnic areas and four parking lots are located along Coyote Creek below Anderson Dam.

Hikers, runners, bicyclists, and skaters use the 15-mile multiple use paved trail which follows Coyote Creek north to Coyote Hellyer County Park. This asphalt path is relatively flat and meanders along the creek underneath oak, cottonwood, and sycamores trees. An equestrian staging area with trailer parking, picnic facilities, and a horse trough heads the 8-mile horse trail which begins at Burnett Avenue and runs north along Coyote Creek generally parallel to the paved trail. A one mile nature trail is also located along Coyote Creek between Malaguerra and Burnett Avenues (County of Santa Clara 2013b).

Water-based recreational uses at Anderson Reservoir include power and non-power boating, and jet skiing. The boating capacity for Anderson Reservoir is determined by the amount of surface acres of water. The ratio used by the Santa Clara County Parks Department is 1 vessel to every 6 surface acres. As the water level decreases, so does the capacity of vessels allowed on the water. The boat ramp is closed if the ramp stops short of the water line, as occasionally happens during periods of lower than normal inflows to the reservoir. Additionally, a total daily launch limit is established by the District based on water quality testing. The average daily launch limit at Anderson Reservoir is 170 vessels (County of Santa Clara 2013c).

Fishing is a popular activity at Anderson Reservoir, where fishing is permitted year-round. Downstream of Anderson Dam, fishing is permitted in Coyote Creek from April to November (County of Santa Clara 2013b).

Explanations

a) Potentially Significant Issue.

Land-Based Recreation
Portions of the County park would be utilized for temporary staging of construction equipment, thereby limiting public parking in those areas for nearly three years. Some trail access and picnicking areas would be temporarily closed for public safety during construction (See **Figure 6**). When possible, the closures would be phased so that some areas could remain open for land-based recreation during construction. It is expected that some park users would seek recreation at neighboring facilities. This will be further examined in the EIR.

Following construction of the proposed Project, all park facilities within the active area would be restored to their previous condition, providing the same level of access to recreationists as prior to project construction. Physical impacts to hiking and picnicking facilities caused by the project would be less than significant.

Water-Based Recreation
During Project construction, low water levels would prohibit boating in the reservoir for as long as three years. Upon completion of the Project, boating facilities would be reopened and returned to full use. Physical impacts to the boating facilities at Anderson Reservoir caused by the Project would be less than significant. During the temporary reservoir closure, there is potential for nearby reservoirs to receive increased recreational usage. Within the County, Calero and Coyote Reservoirs offer alternative power boating opportunities, and Lexington and Stevens Creek reservoirs offer alternative non-powered boating opportunities. It is anticipated the balance of open water recreational areas in the region would accommodate the demand for boating throughout the reservoir restriction. The potential for adverse affects to the physical environment resulting from increased usage of other boating destinations will be examined in the EIR.

During construction, fishing activities would be restricted within the Project area. The downstream park area west of Coyote Creek would continue to be available for fishing as allowed by California Fish and Game Code. While flows in Coyote Creek would remain consistent with existing conditions, the Anderson Reservoir fishery would be affected by dewatering for construction as described in the Section IV, *Biology*. Anderson Reservoir is one of ten reservoirs managed by the District that offer sport-fishing opportunities. It is anticipated the balance of fishing areas in the region would accommodate the demand for reservoir fishing throughout the construction period avoiding any significant adverse affects. The temporary loss of a reservoir fishery will be examined in the EIR.

b) Less than Significant. Construction would involve temporary closure or alteration of some recreational facilities, including trail access, picnic areas, bathroom facilities, and parking spaces. Following construction of the proposed Project, all park facilities within the project area would be restored to their previous condition. The present quantity and quality of recreational facilities, including parking spaces, would be restored. The proposed Project would not increase demand for recreational facilities in the project area. Therefore, no expansion of recreational facilities would result due to the proposed Project. This would be a less than significant impact.

XVI. TRANSPORTATION/TRAFFIC: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	X		
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	X		
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?			X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		X	
e) Result in inadequate emergency access?	X		
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	X		

Environmental Setting

The project area is within the City of Morgan Hill and would be subject to adopted policies and plans related to transportation and traffic. Level of Service (LOS) is a way of measuring how well a road is operating, based on average control delay per vehicle, and in some analyses based on the ratio of the volume of traffic to the capacity of the road. LOS A is a free flowing condition and LOS F is extreme congestion, with traffic volumes at or over capacity. The LOS policies of the City of Morgan Hill are designed to reduce the incentive for regional travel to be drawn off the freeway and onto local streets, protect neighborhoods, promote a vital downtown, and focus transportation expenditures on priority improvements offering high performance value (City of Morgan Hill 2010). The City's circulation policy is intended to ensure that traffic does not spill over into residential neighborhoods onto streets which are not designed to accommodate sub-regional and regional traffic; as such spillover would create safety and livability issues for local residents. The City's roadway system has been planned to accommodate all travel demands and avoid spillover traffic in neighborhoods. The planned city circulation system is designed to operate at LOS D for most intersections and roadway segments, except LOS F is acceptable on downtown streets and LOS E is acceptable for certain intersections, freeway ramps/zones, and segments (City of Morgan Hill 2010).

Roadways of particular relevance for the Project include roadways that would be used during Project construction, roadways used as transportation routes to and from the project site, and roadways that would be directly modified as part of the Project. Vehicle use resulting from the proposed Project would primarily occur on Cochrane Road and US-101. The Circulation Element of the Morgan Hill General Plan (2010) designates Cochrane Road as a 6-lane major arterial with no on-street parking from Monterey Road east across US-101 to Mission View Road, with four lanes from there east to Peet Road. In 2003, US-101 was widened from two to four lanes in each direction north of Cochrane Road, and from two to three lanes in each direction south of Cochrane Road. The widening has substantially eased congestion on local Morgan Hill roads from regional traffic.

Explanations

a, b, f) Potentially Significant Issue. The proposed Project would not conflict with or prevent implementation of adopted plans, policies, or programs related to performance of circulation systems or programs supporting alternative transportation. There are no public transit services that would be impacted in the project vicinity. Existing bicycle lanes on Cochrane Road would not be permanently removed or altered as part of the project.

Construction activities would result in an increase in traffic in the Project area which could exceed the capacity of some segments in the road network. Initial mobilization of the proposed Project and import of materials from off-site locations would result in heavy vehicles and equipment accessing the project site via Cochrane Road, which provides access to residential neighborhoods. Construction personnel, equipment, and materials would travel to the site via US-101, Cochrane Road, and Coyote Road. Cochrane Road would be temporarily closed to through traffic or detours would be implemented from San Rafael Street to approximately 100 feet south of the dam access road during construction (including during construction mobilization and demobilization). No project parking or staging activities would be established on residential streets; all construction contractor parking would be located within the project site. Residential access would be maintained; however, public through traffic would not be permitted to travel on this segment.

Public bicycle and pedestrian traffic would not be permitted to travel on the temporarily closed segment of Cochrane Road. Alternative bicycle and pedestrian routes would be provided as part of the construction traffic management plan. Bicycle and pedestrian traffic would likely shift to Peet Road and Half Road.

Traffic patterns would return to existing conditions upon project completion. There would be no permanent changes to the level of service standards, travel demands, or congestion after project construction. However, the transportation effects during project construction (lasting approximately three years) would constitute a potentially significant issue that will be evaluated further in the EIR.

c) No Impact. The project would not affect existing air traffic patterns during construction. There would be no change in air traffic patterns or air safety risks.

d) Less than Significant. Cochrane Road currently makes a sharp turn at the base of the dam, near the entrance to Anderson Lake County Park. The current road alignment is unsafe at high speeds and visibility is low due the sharpness of the curve and dense roadside vegetation. If the reconstructed dam face extends into Cochrane Road, the road would be realigned (See **Figure 3**). The reconstructed portion of Cochrane Road would provide at least the same traffic capacity as the existing section, and would likely result in a safer curve with improved lines of sight compared to existing conditions. This is considered a less than significant impact.

e) **Potentially Significant Issue**. Initial mobilization of the proposed Project and import of project materials from off-site locations would result in heavy vehicles and equipment accessing the project site via Cochrane Road, which provides access to residential neighborhoods. The presence of large, slow-moving equipment among the general-purpose traffic on roadways in the project area could result in temporary safety hazards.

Temporary lane closures or detours on Cochrane Road during construction could have the potential to interfere with implementation of City and County emergency response or emergency evacuation plans, including access for emergency providers (police and fire). The District will analyze potential impacts to emergency response times and evacuation plans in a traffic study. The results of the traffic study will be presented in the EIR.

XVII. UTILITES AND SERVICE SYSTEMS: Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			X
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	X		
g) Comply with federal, state, and local statutes and regulations related to solid waste?	X		

Environmental Setting

The District manages an integrated water resources system that includes the supply of clean, safe water, flood protection and stewardship of streams on behalf of Santa Clara County's 1.8 million residents (SCVWD 2013a). The District manages 10 dams and surface water reservoirs, three water treatment plants, and more than 275 miles of streams (SCVWD 2013a).

Anderson Dam was completed in 1950 and retains approximately 90,373 acre-feet of water at its maximum reservoir operating elevation. Water stored in Anderson Reservoir comes from within the watershed, specifically from the Coyote Reservoir and other influent sources, as well as from the CVP through USBR’s San Felipe Division. Anderson Reservoir is the District’s primary raw water supply alternative to the CVP supply.

Public restroom facilities are located in several locations in Anderson Lake County Park. Wastewater in the Project Area is treated at the South County Regional Wastewater Authority’s (SCRWA) Treatment Plant located in the City of Gilroy.

Anderson Dam includes a hydroelectric generation plant located approximately 1,300 feet downstream of the dam. This plant would likely remain operational throughout project construction.

Non-District-owned utilities above or below ground may be present within the project site and would have to be relocated; a detailed survey for locations of existing utilities would be completed prior to construction.

Explanations

a, b, d, e) No Impact. During Project construction, portable toilets would be provided at the construction site and wastewater generated from construction employees would be disposed of at the SCRWA wastewater treatment plant. The Project would comply with all state, RWCQB and local requirements related to the disposal of sewage, and daily wastewater generated at the construction site would not exceed wastewater treatment requirements. Additionally, the Project would not result in any changes to the restrooms at Anderson Lake County Park and would not result in the generation of additional wastewater requiring treatment and disposal. No new or expanded water supply facilities would result from the proposed Project.

After construction, the Project would improve the safety, reliability, and flexibility of the District’s water supply by improving dam seismic stability. The Project would not affect the District’s diversion capacity, water rights, or hydropower generation capacity. Therefore, the Project would not increase water supply demand or require new or expanded water supply entitlements.

The project has no impacts associated with wastewater treatment requirements, no impact on new water or wastewater facilities, no impact on water entitlements, and no impact on wastewater treatment demands.

c) Less than Significant Impact. Onsite storm drainage facilities in the project area address runoff from paved areas like the parking lots and access roads. These areas would be restored to existing conditions and would not be expanded. See Sections VI, *Geology and Soils* and IX, *Hydrology and Water Quality* for further discussion of potential stormwater drainage impacts during and after project construction. This is considered a less than significant impact.

f, g) Potentially Significant Issues. Construction of the Project would produce solid waste associated with the various construction activities. Excavation at the embankments would result in waste rockfill that would require permanent disposal. Three disposal sites have been identified to receive excess spoils: Boat ramp, Chert Hill, and Silica-Carbonate Hill (See **Figure 5**). Overburden material may also be used for haul road development and for the dam crest raise. Spoils disposed in these locations would remain permanently. As necessary, these sites would be treated with erosion controls and vegetated upon project completion.

Waste generated from site demolition and modifications would include concrete rubble, asphalt, and building components from the demolition of inlet/outlet facilities, portions of the spillway, curb and asphalt at the parking lots and site roadways, the park entrance kiosk and relocated restroom facilities. The majority of waste generated from site demolition and modifications would be recycled at a concrete or asphalt batching facility. Additional solid waste generated from construction and contractor activities that cannot be recycled would be transported to a permitted solid waste facility. The generated waste is likely to be relatively small, but has not been quantified, nor has a solid waste facility been identified at this time. Therefore, the potential exists that waste generated by the Project could cause the solid waste facility to exceed the maximum daily disposal limits. Project operations would not generate new solid waste. Impacts on solid waste disposal during construction could be significant and will therefore be evaluated further in the EIR.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE: Does the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	X		
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.)	X		
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	X		

Explanations

a) Potentially Significant Issues. Construction activities of the proposed Project could potentially have significant impacts on aesthetics, agricultural and forestry resources, air quality, biological resources including special-status plant and animal species, cultural and historical resources, geology/soils, greenhouse gas emissions, hazards and hazardous materials, hydrology/water quality, land use/planning, noise, recreation, transportation/traffic, and utilities. These issues will be evaluated in the Project EIR.

b) **Potentially Significant Issues.** As defined by the State of California, cumulative impacts reflect "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (CEQA Guidelines, § 15355[b]).

The degree to which project effects would contribute to a significant cumulative impact will be evaluated in the EIR. To meet the adequacy standard established by the CEQA Guidelines section 15130, the EIR will identify past, present, and reasonably probable future projects producing related or cumulative impacts. Other projects or plans in the geographic scope of the proposed Project may include projects in the Coyote Creek watershed and larger Santa Clara Valley.

c) **Potentially Significant Issues.** Construction activities of the proposed Project could have potential for adverse direct impacts on people due to impacts such as air pollutant and GHGs. After completion, the proposed Project would substantially benefit people through providing increased protection against flooding impacts. This topic will be evaluated in the EIR.

C. DETERMINATION

On the basis of this initial evaluation:

I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

X I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

I find that the proposed Project MAY have an impact on the environment that is "potentially significant" or "potentially significant unless mitigated" but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards and (2) has been addressed by mitigation measures based on the earlier analysis, as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Project, nothing further is required.

Kurt Lueneburger (signature) 8/12/13

Signature | Date

Kurt Lueneburger
Environmental Planner

Santa Clara Valley Water District

D. LIST OF INITIAL STUDY PREPARERS

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Dustin Watson	Air Quality, Greenhouse Gas Emissions, Noise
Daniel Kramer	Geology/Soils, Minerals, Paleontology
Adrian Pitts	Biological Resources-Fisheries
Jelica Arsenijevic	Biological Resources-Fisheries

Horizon Water and Environment

Michael Stevenson	CEQA oversight
Jill Sunahara	Project Description, Hydrology/Water Quality, Land Use, Population/Housing
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F. APPENDIX

Table A-1. Special-Status Plant Species Known to Occur or Potentially Present, Their Status, Habitat Description, and Potential for Occurrence in the ADSRP Project site[1]

Name	Regulatory Status[2]	General Habitat Description[3]	Potential for Occurrence in the Project site
Federal or State-Endangered and Threatened Species			
Coyote ceanothus (Ceanothus ferrisiae)	FE, CNPS List 1B.1, VHP	Chaparral, coastal scrub, valley and foothill grassland on serpentinite	**Present.** Populations observed on both the northern and southern sides of Anderson Dam (occurrence #6) and at the Kirby Canyon landfill to the northwest (CNDDB 2013, SCVWD 2012a).
CNPS-listed Species			
Mt. Hamilton thistle (Cirsium fontinale var. campylon)	CNPS 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland in serpentinite seeps	**Present.** This species is present at the Anderson Dam (occurrence #6) in the drainage below the spillway in serpentine seeps (CNDDB 2013, SCVWD 2012a). Numerous (21) additional records occur on and adjacent to Coyote Ridge to the northwest of the Project site (CCH 2013, Corelli 2011).
San Francisco collinsia (Collinsia multicolor)	CNPS 1B.2	Closed-cone coniferous forest, coastal scrub, sometimes serpentinite	**Present.** Although this species is not known to occur on or immediately adjacent to Anderson Dam itself, a population (#24) is present on an eroding serpentine slope along the shoreline of Anderson Reservoir east/southeast of the dam (CNDDB 2013, SCVWD 2012b).
Smooth lessingia (Lessingia micradenia var. glabrata)	CNPS1B.2, VHP	Chaparral, cismontane woodland- on serpentinite, often roadsides	**Present.** This species has been recorded at the Anderson Dam on rocky, serpentine grassland (occurrence #6), primarily north and west of the spillway (CNDDB 2013, SCVWD 2012a). Numerous additional occurrences are known from Coyote Ridge to the northwest (CCH 2013, Corelli 2011).
Hall's bush-mallow (Malacothamnus hallii)	CNPS 1B.2	Chaparral, coastal scrub	**Present.** Occurrence #4 is mapped along Cochrane Road on the west side of Anderson Dam (CNDDB 2013). In addition, suitable habitat is present along Coyote Ridge, as there are four other records located in the area (CCH 2013).
Most beautiful jewel-flower (Streptanthus albidus ssp. peramoenus)	CNPS 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland in serpentinite	**Present.** A CNDDB record (#87) is located at Anderson Dam on a serpentine embankment, north of the spillway (CNDDB 2013); 13 plants were observed at this location during protocol-level surveys conducted for Dam Maintenance Program Final PEIR (SCVWD 2012a). Additional populations are documented along Coyote Ridge, on serpentine soils, to the northwest (CCH 2013).

Footnotes:

[1] The potential for occurrence is based on a desktop review and prior experience in the Project site, and is only a preliminary assessment. Final determinations for potential for occurrence will be made following completion of a Project footprint boundary and a field assessment of the Project site's potential to support special-status plants. At that time, additional special-status plant species not included in this table, will also be reviewed to determine whether impacts to any of those species need to be considered for CEQA/NEPA compliance purposes.

[2] Status:

Federal Status

FD: Delisted. Status to be monitored for 5 years

FE: Listed as endangered under the Endangered Species Act

FT: Listed as threatened under the Endangered Species Act

State Status

SE: Listed as endangered under the California Endangered Species Act

ST: Listed as threatened under the California Endangered Species Act

CNPS

1B: Rare, threatened, or endangered in California and elsewhere

2: Rare, threatened, or endangered in California, but more common elsewhere

0.1: Seriously endangered in California

0.2: Fairly endangered in California

0.3: Not very endangered in California

VHP Valley Habitat Plan Covered Species

[3] The terms used to describe the general habitat descriptions in this column include the CNPS habitat designations separated by a slash (/) from the terms describing natural communities and habitats in this existing conditions report (i.e., CNPS habitats/existing conditions habitats).

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Table A-2. Special-Status Animal Species, Their Status, Habitat Description, and Potential for Occurrence in the ADSRP Project site[1]

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project site
Federal or State Endangered, Threatened, or Candidate Species			
Bay checkerspot butterfly (Euphydryas editha bayensis)	FT, VHP	Native grasslands on serpentine soils. Larval host plants are *Plantago erecta* and/or *Castilleja* sp.	**Potentially Present.** Unlikely to occur on the immediate dam itself, but present on Coyote Ridge north of the dam, potentially extending into the Project site on the northern side of the dam. Four small isolated areas at the dam support populations of its larval host plant, dwarf plantain (*Plantago erecta*), but are considered unsuitable (SCVWD 2012). Designated critical habitat Unit 13 and extends southward along Coyote Ridge to the northern edge of the dam, possibly incorporating two potential borrow sites (Chert Hill and Silica-Carbonate Hill) and areas along the north side of the spillway.
Central California coast steelhead (Oncorhynchus mykiss)	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats.	**Present.** Occurs in Coyote Creek immediately downstream of the dam, and in tributaries to Coyote Creek.
California tiger salamander (Ambystoma californiense)	FT, SE, VHP	Vernal or temporary pools in annual grasslands or open woodlands.	**Present.** Known to occur within the Project site. In 2001, one was observed on the roadway between the top of the parking lot and the dam (CNDDB occurrence No. 651, CNDDB 2013). In 2011, one was found during a routine pre-work biological inspection in a weep hole in the floor of the dam spillway (SCVWD 2012). A large seasonal pond (Rosendin Pond) 0.3 mile southeast of the dam is a known breeding pond. May also breed in and disperse from a small perennial pond outside of the Project site, approximately 230 feet southeast of the park entrance road off of Cochrane Road. Could occur as a dispersant or could use mammal burrows and crevices as refugia throughout the Project site.
California red-legged frog (Rana draytonii)	FT, CSSC, VHP	Streams, freshwater pools, and ponds with emergent or overhanging vegetation.	**Potentially Present.** Likely breeds in Rosendin Pond, 0.3 mile southeast of the dam, based on multi-year observation of juveniles at the pond (Steve Rottenborn, pers. obs.). May also breed in and disperse from perennial ponds in the Project site below the spillway, as well as a small perennial pond, outside of the Project site, approximately 230 feet southeast of the park entrance road off of Cochrane Road. Could occur as a dispersant or could use mammal burrows and crevices as refugia throughout the Project site, though most likely to occur in aquatic habitat such as pools below the spillway.

Table A-2. Special-Status Animal Species, Their Status, Habitat Description, and Potential for Occurrence in the ADSRP Project site[1]

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project site
Bald eagle (Haliaeetus leucocephalus)	SE, SP	Occurs mainly along seacoasts, rivers, and lakes; nests in tall trees or in cliffs, occasionally on electrical towers. Feeds mostly on fish.	**Present.** A single pair has nested in a gray pine (*Pinus sabiniana*) on the northeastern shore of Anderson Reservoir at least since 2010, and possibly in several prior years. Due to human activity, it is unlikely to nest within or immediately adjacent to the Project footprint at the dam. This pair forages throughout the Reservoir area, and additional birds forage here as well, particularly during the nonbreeding season.
California Species of Special Concern			
Central Valley fall-run Chinook salmon (Oncorhynchus tshawytscha)	FSC/CSSC	Cool rivers and large streams that reach the ocean and that have shallow, partly shaded pools, riffles, and runs.	**Potentially Present.** Chinook salmon have been observed in Coyote Creek since the mid-1980s and successful reproduction has been documented. Observations have been made that most Chinook salmon spawning occurs in the lowermost reaches of Coyote Creek, although adult Chinook salmon have been observed as far upstream as Metcalf Dam.
Sacramento splittail (Pogonichthys macrolepidotus)	CSSC	Estuarine river reaches.	**Potentially Present.** Buchan and Randall (2003) report splittail as absent from the upper Coyote Creek section. They also reported that splittail were last sampled in lower Coyote Creek between the 1987 and 2000 period. Other documents such as SCVWD (2008), report that splittail were first and last reported in Coyote Creek in 1904.
Western pond turtle (Actinemys marmorata)	CSSC, VHP	Permanent or nearly permanent water in a variety of habitats.	**Present.** Known occurrence (CNDDB No. 230) in Anderson Reservoir (CNDDB 2013). May also occur in the perennial ponds in the Project site below spillway, as well as a small perennial pond, outside of the Project site, approximately 230 feet southeast of the park entrance road off of Cochrane road. Away from these waterbodies, may occasionally disperse across upland portions of the Project site.
Loggerhead shrike (Lanius ludovicianus)	CSSC (nesting)	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats.	**Potentially Present.** Could possibly breed in the Project site, potentially using the annual grasslands on the dam face for foraging and nesting in trees or shrubs.
Yellow warbler (Dendroica petechia)	CSSC (nesting)	Nests in riparian woodlands.	**Potentially Present.** Could possibly breed in the riparian habitat along Coyote Creek downstream from the dam and below the spillway in the Project site.

Table A-2. Special-Status Animal Species, Their Status, Habitat Description, and Potential for Occurrence in the ADSRP Project site[1]

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project site
Pallid bat (Antrozous pallidus)	CSSC	Forages over many habitats; roosts in caves, rock outcrops, buildings, and hollow trees.	**Likely Present.** Known maternity colony, with up to 160 individuals, occurs in a barn southwest of Cochrane Road near the base of Anderson Dam. Individuals could potentially forage in the Project site in open areas. May also have roosts in the Project site in hollow trees or in crevices and cavities along rock faces, such as the rock outcrops on the northern side of the dam.
Western red bat (Lasiurus blossevillii)	CSSC	Roosts in foliage in forest or woodlands, especially in or near riparian habitat.	**Potentially Present.** May occur in low numbers as a migrant and winter resident, but does not breed in the Project site. May roost in foliage in trees virtually anywhere in the Project site, but expected to roost primarily in riparian areas.
San Francisco dusky-footed woodrat (Neotoma fuscipes annectens)	CSSC	Nests in a variety of habitats including riparian areas, oak woodlands, and scrub.	**Present.** Known to occur on the dam in the Project site (SCVWD 2012). May have additional scattered nests in woodland or scrub habitats in the Project site.
American badger (Taxidea taxus)	CSSC	Burrows in grasslands and occasionally in infrequently disked agricultural areas.	**Potentially Present.** May disperse through the Project site. Annual grasslands in the Project site provide only marginal quality habitat due to the rocky and hard-packed nature of soils on the dam face. Extensive grasslands with burrows are absent. However, badgers may occur in the Project site when moving between adjacent higher quality annual grasslands.
State Fully Protected Species			
American peregrine falcon (Falco peregrinus anatum)	SP	Forages in many habitats; nests on cliffs and tall bridges and buildings.	**Potentially Present.** May occasionally forage in the Project vicinity during the non-breeding season, though always at low densities. Not expected to breed in the Project site, which lacks suitable nesting habitat.
Golden eagle (Aquila chrysaetos)	SP	Breeds on cliffs or in large trees (rarely on electrical towers), forages in open areas.	**Potentially Present.** May occasionally occur as a forager, and could potentially nest in trees around the reservoir. However, there are no known nest sites in the Project site, and due to human activity, it is unlikely to nest within or immediately adjacent to the Project footprint at the dam.

Table A-2. Special-Status Animal Species, Their Status, Habitat Description, and Potential for Occurrence in the ADSRP Project site[1]

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project site
White-tailed kite (Elanus leucurus)	SP	Nests in tall shrubs and trees, forages in grasslands, marshes, and ruderal habitats.	**Likely Present**. May occur as forager and breeder. Trees in the Project site may be used for breeding, and the species may forage in open habitats throughout the Project site. Known to occur at Anderson Lake County Park near Rosendin Pond, immediately southeast of the Project site (Steve Rottenborn, pers. obs.). Up to two pairs may nest in or immediately adjacent to the Project site.
Ringtail (Bassariscus astutus)	SP	Cavities in rock outcrops and talus slopes, as well as hollows in trees, logs, and snags that occur in riparian habitats and dense woodlands, usually in close proximity to water.	**Potentially Present.** Rock outcrops on northern side of dam, as well as riparian and oak woodland habitats, may provide suitable foraging and denning habitat.
Other Special-Status Species[2]			
Pacific lamprey (Lampetra tridentata)	FSC	Spawns in gravel-bottomed streams or rivers upstream of riffle habitat. Adults forage in marine areas.	**Potentially Present.** Pacific lamprey are known to occur in Coyote Creek, and according to Buchan and Randall (2003), have been observed in both the upper and lower Coyote Creek.

Key to Abbreviations:
Status: Federally Threatened (FT); Federal Species of Concern (FSC); State Endangered (SE); State Fully Protected (SP); California Species of Special Concern (CSSC); Valley Habitat Plan Covered Species (VHP).

Footnotes:

[1] The potential for occurrence is based on a desktop review and prior experience in the Project site, and is only a preliminary assessment. Final determinations for potential for occurrence will be made following completion of a Project footprint boundary and a field assessment of the Project site's potential to support special-status plants. At that time, additional special-status plant species not included in this table, will also be reviewed to determine whether impacts to any of those species need to be considered for CEQA/NEPA compliance purposes.

[2] "Other special-status species" include the Pacific lamprey, for which the USFWS has expressed some conservation concern.

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Appendix B

Scoping Report

SANTA CLARA VALLEY WATER DISTRICT

Anderson Dam Seismic Retrofit Project

SCVWD Project No. 91864005
SCVWD Agreement No. A3578A

SCOPING SUMMARY REPORT

December, 2013

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Approved By:

Emmanuel Aryee
Engineering Unit Manager
Dams and Pipelines Project Delivery Unit

DATE: 01/09/2014

Santa Clara Valley Water District

HDR

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Anderson Dam Seismic Retrofit Project

Project No. 91864005

FERC Project 5737

Scoping Summary Report

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Contact: Kurt Lueneburger, Environmental Planner
(408) 630-3055

November 2013

Contents

Scoping Summary

Scoping refers to the public outreach process used under CEQA to determine the coverage and content of an environmental impact report (EIR). The scoping comment period offers an important opportunity for the public and agencies to review and comment during the early phases of the environmental compliance process. Scoping contributes to the selection of a range of alternatives to be considered in the EIR, and can also help to establish methods of analysis, identify the environmental effects that will be considered in detail, and develop mitigation measures to avoid or compensate for adverse effects. In some cases, it may also identify issues that the public feels do not warrant analysis.

This report describes the scoping process undertaken by Santa Clara Valley Water District (District) staff for the Anderson Dam Seismic Retrofit Project (Project). It also summarizes agency and public comments received and identifies key issues for EIR analysis. Comments are reproduced in their entirety in the appendices to this report.

Overview of Project Scoping Process

Scoping is initiated when the lead agency issues a Notice of Preparation (NOP) announcing the beginning of the EIR process. The NOP for the Project was received by the State Office of Planning and Research, State Clearinghouse on August 19, 2013. The NOP was then distributed to numerous federal and state agencies; regional and local land trusts; departmental agencies within Santa Clara County, the Cities of Morgan Hill and San Jose; private property owners, and environmental interest groups for review and comment. The public review ended on September 25, 2013. As required by CEQA and the CEQA Guidelines, the NOP provided information on the background, goals, and objectives of the proposed Project; announced preparation of, and requested public and agency comment on, the EIR; and provided information on the public scoping meetings to be held in support of the EIR. A copy of the NOP is included in the attachments to this report.

On August 26, 2013, the District conducted a public scoping meeting for the proposed Project. The meeting was held from 6:30pm to 8:30 pm at the Morgan Hill Community & Cultural Center located at 17000 Monterey Street in Morgan Hill, CA. The public meeting was publicized in local area newspapers and via direct mailings to numerous households, offices, and agencies. Copies of the newspaper ads and distribution list are included in the attachments to this report.

The District hosted a second meeting at the District's Headquarters at 5700 Almaden Expressway in San Jose, CA on August 29th, 2013 from 9:30am to 11:30 am. Representatives from federal, state, and local agencies were invited to attend.

At each meeting, attendees were greeted by District staff on arrival, and asked to add their names and contact information to an attendance record to ensure that they would receive information on additional meetings and the EIR review period. Copies of the sign-in sheets are provided in the attachments to this report. An informational packet on the Project was available. Posters were on display and District staff was available to answer questions and take comments. A PowerPoint presentation on the proposed Project and solicited comments from the attendees. Opportunities to provide comments included comment cards and a link to the District's website (www.valleywater.org). At the public meeting in Morgan Hill, District staff provided an interactive opportunity to prioritize their issues of concern. Attendees were each provided stickers to place next to the comments they felt were most important. The list of these comments and a count of the dots placed next to them are provided in the attachments to this report.

Public Comments Received

August 26, 2013 Meeting

Approximately 50 members of the public attended this meeting. Detailed notes from this meeting are included in the attachments to this report. The majority of questions and comments received from the public at the August 26th scoping meeting can be separated into six basic areas of concern. These include: (1) effects of Project construction (including noise, air quality, road closures, reservoir dewatering); (2) effects on private property; (3) effects on recreational use of the area; (4) effects of post-Project operations (including reservoir water levels, groundwater levels, water supply); (5) concerns regarding Project funding and phasing steps; and (6) general questions about the decision making process (including the alternatives generated, agencies involved, etc.).

From the sticker exercise, the most popular comments and questions at the meeting were related to: (1) noise impacts of construction; (2) potential alternatives or mitigation measures to reduce impacts on wildlife, such as elk and bald eagles; (3) air quality impacts on seniors and others downwind of construction activities; (4) duration of Cochrane Road closure; (5) potential erosion or landslides at lakefront properties; and (6) potential alternatives associated with reservoir dewatering and the coffer dams.

Comment Letters

Comment letters were received from several members of the public. One commenter expressed concern regarding the impacts of the project on properties along Cochrane Road listed as historically significant in the California Register of Historic Resources and the National Register of Historic Places (NRHP). The commenter asked that the Santa Clara County Historical Heritage Commission, the National Park Service Department of the Interior, the Secretary of the Interior, and Morgan Hill Historical Society be notified about such properties during the environmental review process and that the District consider alternatives that limit impacts to Rhoades Ranch. The commenter also expressed concern about the potential loss to property owners impacted by the project of their tenants and rental income, health problems for adjacent residents due to air quality impacts, noise from machinery and blasting, potential for vibrations and ground shaking from project activities to cause harm to buildings and groundwater wells in the area, loss of trees and wildlife, reduced access of emergency vehicles during construction, and depletion of groundwater supplies.

Another member of the public expressed concern about potential damage to concrete walkways, patios, foundations, and windows caused by blasting and other project activities. The commenter also expressed concern about the availability of irrigation water during project construction to residents that rely upon the Coyote Road Main Line, as well as impacts of the project on groundwater levels. The commenter also inquired about the possibility of lost revenue compensation for business owners affected by the project (e.g., boat storage facility owners) and the possibility of replacing the old main water line that runs along Coyote Road and/or having water piped from the City of Morgan Hill to accommodate residences on Coyote Road during construction.

A third member of the public expressed concerns about noise from construction activities and inquired about construction hours. The commenter also had questions about the reservoir drawdown and how much the water level in the reservoir would be lowered during the project.

Agency Comments Received

Comments on the proposed Project were received from a number of agencies, including the Federal Energy Regulatory Commission (FERC), National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), California Department of Conservation, Division of Land Resource Protection; California Department of Water Resources (DWR); County of Santa Clara County Department of Planning and Development, Planning Office; County of Santa Clara Parks and Recreation and Roads and Airports Departments; and the Santa Clara Valley Transportation Authority (VTA).

Four public agency staff attended the September 5, 2013 agency scoping meeting. The sign-in sheet and detailed notes from this meeting are included in the attachments to this report.

Comments received from public agencies are summarized below.

Federal Energy Regulatory Commission

FERC requested that more detailed information on project operation be provided in the EIR, for instance information related to groundwater recharge, flood control, water supply, power generation, aquatic habitat, maintenance and emergencies. The agency requested more information on how the project would be operated in conjunction with the hydroelectric facility (i.e., timing and amount of flows). In addition, FERC requested that the EIR provide additional detailed information on the placement of the cofferdam and its relationship to the bathymetry of the reservoir. With respect to the proposed natural refilling of the reservoir, FERC expressed concern about public safety, erosion, water quality, turbidity, landslides, and public awareness regarding the status of the refill. Finally, FERC inquired as to what kind of consultation the District intends to have with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act (ESA) for the Project.

National Marine Fisheries Service

NMFS commented that Anderson Dam is a very good candidate for the addition of fish passage facilities due to the high quality habitat in tributary streams above Anderson and Coyote Dams (described further below). NMFS stated that with improved stream flows from Anderson Dam, instream habitat and channel restoration in Coyote Creek, and remediation of fish barriers, the current population of steelhead below Anderson Dam could rebound significantly. NMFS also expressed concern about impacts to water quality, stream flow rates, and fish movement during project construction, especially with respect to native steelhead.

NMFS noted that, as the National Environmental Policy Act federal lead agency, FERC is the appropriate agency to conduct ESA section 7 consultation with NMFS for the project. NMFS commented that, given the overlapping schedules for completion of the Three Creeks Habitat Conservation Plan and ESA Section 7 consultation for the proposed Project (both expected to be completed in 2015), it will be necessary for the biological assessment and Section 7 consultation for the Project to include an assessment of the effects of the future operations of Anderson Dam on Central California Coast steelhead and critical habitat following project construction under various water year types. NMFS recommended that the EIR and ESA section 7 biological assessment consider the Coyote Creek flow schedule and Anderson Reservoir rule curve for the protection of anadromous fish that was developed in 2001 and incorporated into the May 2003 draft settlement agreement. The comment letter suggests updating the Fisheries & Aquatic Habitat Collaborative Effort (FAHCE) modeling and assumptions with data collected since 2001.

NMFS also commented that the Project provides an excellent opportunity to incorporate dam features to protect and restore anadromous fish, such as (1) upstream and downstream fish passage structures; (2) outlet works with the ability to release a range of flows for the various salmonid life history stages and allowance for high flow releases for channel maintenance and geomorphic functioning; and (3) outlet works with the capability for selective withdrawal from various elevations in the reservoir to control water temperate downstream.

California Department of Conservation, Division of Land Resource Protection

The Department of Conservation, Division of Land Resource Protection noted that the proposed staging areas were improperly designated as Prime Farmland in the Notice of Preparation. These areas actually appear to be designated as a combination of Grazing Land and Farmland of Local Potential. They recommend that the Draft EIR correct this designation and evaluate the appropriate potential agricultural resource impacts for the temporary (and small amount of permanent) conversion of Grazing Land and Farmland of Local Potential.

Department of Water Resources

DWR indicated that it has jurisdiction over Anderson Dam with respect to dam safety. The agency advised that a repair application, together with plans and specifications, must be filed with the Division of Safety of Dams (DSOD) for this project. The letter goes on to state that prior to approval of the application, all dam safety issues will need to have been resolved, with work being performed under the supervision of a civil engineer registered in California.

County Department of Planning and Development, Planning Office

The Santa Clara County Department of Planning and Development, Planning Office commented that the Project is exempt from the California Surface Mine and Reclamation Act (SMARA). Given that DSOD is a permitting agency for the Project, however, they recommend that DSOD formally request a determination from the State Mining and Geology Board regarding exemption of the project from SMARA and provided contact information for that Board's executive officer.

The Planning Office provided a list of properties (by APN, address, and ownership) within the land use authorities of unincorporated Santa Clara County and City of San Jose. The office also noted that a Landmark Alteration Permit would be required for proposed work within the property at 2290 Cochrane Road, which is a historic resource listed in the NRHP, and that the EIR should evaluate all possible Project alternatives to avoid impacts to historic resources.

The County Planning Office also advised that the Draft EIR should assess the prime farmland loss impacts of the project, noting that under County thresholds. a loss of 10 acres or more of prime farmland is considered to be a potentially significant impact.

The County Planning Office noted that removal of trees on unincorporated parcels of land is subject to Tree Removal Permits and that the Draft EIR should include mitigation measures for loss of ordinance-sized trees.

According to the County Planning Office, the Project would also be subject to County Noise Ordinance requirements.

With respect to floodplain issues, the County noted that the segment of Coyote Creek downstream of Anderson Dam has been identified in the current Federal Insurance Study as a regulatory floodway and floodplain of known base flood elevation and is located in unincorporated Santa Clara County. The letter states that the effects of the project on the flood carrying capacity of Coyote Creek will have to be determined and a Floodplain Development Permit will be required from the Building Office. The permit application process involves submittal of a Conditional Letter of Map Revisions, and possibly a Letter of Map Revisions, prepared to Federal Emergency Management Agency (FEMA) requirements and approved by FEMA staff.

County Parks and Recreation Department and Roads and Airports Department

The County Parks and Recreation Department and Roads and Airports Department suggested that the Draft EIR should consider and discuss potential short and long-term impacts to all recreational uses and facilities in Anderson Lake County Park. These potential impacts include noise, odors, dust, and access restriction from project construction, as well as development of ingress and egress roads and loss of parking. They recommended a comprehensive and detailed discussion of park facilities, regional and internal trails, and recreational uses that may be impacted by the Project be included in the environmental setting. The County also advised that the impacts of the temporary closure of Anderson Lake County Park on nearby recreational facilities (i.e., increased use) be considered. They commented that, given the current design of the dam embankment and outlet works, restoration of recreational facilities to pre-construction levels seems infeasible and this impact should be considered potentially significant. The County would prefer that the Live Oak Area not be used for staging. With respect to transportation and traffic, the County Parks and Roads Departments commented that the District should coordinate with the County regarding realignment plans for Cochrane Road. They also expressed concern about the impacts of heavy excavation and construction activities on park roads, parking areas and other park facilities (i.e., pavement damage). In addition, the County provided comments and expressed concerns regarding:

(1) impacts to recreational facilities associated with dam crest elevation increase;

(2) impacts to park facilities associated with intake and outlet works construction;

(3) short- and long-term impacts to boat launch and boat launch parking lot from borrow area mining;

(4) stability of spoils disposal sites;

(5) traffic circulation during construction;

(6) impact of reservoir drawdown of park facilities;

(7) impacts associated with access and site staging;

(8) aesthetic impacts;

(9) potential for objectionable odors created by construction and effects on recreational users and nearby residents;

(10) loss of trees;

(11) soil erosion and re-vegetation of disturbed areas;

(12) impact of reservoir dewatering on park facilities downstream;

(13) long-term maintenance and operations impacts on recreational trail uses; and

(14) noise impacts to nearby recreational trails.

Santa Clara Valley Transportation Authority

The Santa Clara VTA commented that the pedestrian and bicycle route closure (segment of Cochrane Road) should be posted 30 days in advance and that the detour routes should be designed in conformance with the VTA Bicycle Technical Guidelines.

Key Concerns to Be Addressed in the EIR

The comments and concerns received during the scoping period can be generally categorized as related to the CEQA process, project description, alternatives, or project impacts. Comments and concerns on the CEQA process relate to the formal environmental review process as outlined by CEQA and the CEQA Guidelines, such as the length of the public review period. Project description comments relate a specific aspect of the proposed Project, such as Project design, schedule, or cost. Comments on alternatives relate to potential alternatives to the proposed Project, such as use of a larger coffer dam to keep a portion of the reservoir open for boating. Comments on Project impacts relate to the potential impacts of the Project, such as concerns about the noise impacts on trail users from blasting, or the impacts of reservoir dewatering on wildlife.

CEQA Process

Based on the comments received to date, key concerns to be addressed in the EIR related to the CEQA process include:

- The District's Board approval process, specifically as it relates to the timing of selection of a preferred alternative relative to the CEQA process.
- Objectivity of the alternatives analysis, given the recommendation of a preferred alternative.
- Duration of public comment period (comments state that 45 days is too short for what is anticipated to be a large EIR).
- Timeline for making information regarding the Project alternatives available to the public (comments request that information be provided in advance of release of the Draft EIR).
- Alternatives development process, including cost assumptions.

Project Description

Based on the comments received to date, key concerns to be addressed in the Project Description of the EIR include:

- Necessity of the project, with respect to cost and probability of earthquake damage.
- Details of the construction schedule, including construction work hours.
- Measures to speed construction, such as the issuance of performance bonuses and penalties.
- Duration of time that Cochrane Road will be closed.
- Necessity of blasting.

- Testing of materials prior to blasting.
- Responsible party for impacts on properties around the lake.
- Total budget for the project.
- High-level outlet design (pumped or gravity-driven, relationship to spillway) and operation (situational use).
- Low-level outlet design (location of daylighting, capacity).
- Spillway modification construction (necessity of fill material).
- Extent of borrow area excavation, in terms of land area and volume of material.
- Order of preference for borrow areas.
- Borrow site access (i.e., construction of roads).
- Timing of reservoir drawdown.
- Dam operation with respect to groundwater recharge, flood control, water supply, power generation, aquatic habitat, maintenance, and emergencies.
- Operation of hydroelectric facility.
- Purpose and function of the Anderson Force Main.
- Estimated length of time of natural refill of reservoir and plans for monitoring refill.
- Possible extension of boat ramp as part of the project.

Alternatives

Based on the comments received to date, key issues to be addressed in the Alternatives Analysis section of the EIR include:

- Development of alternatives for both wet and dry years.
- Potential for a coffer dam to be built to protect the reservoir.
- Cost of a coffer dam alternative.
- Possibility of dredging the reservoir as part of the project.
- Inclusion of fish passage facilities for native steelhead and other fish.
- Construction of a second coffer dam on the upper, north end of the reservoir to protect wildlife.
- Inclusion of outlet works with capability for selective withdrawal from various elevations in reservoir for purpose of controlling water temperature in Coyote Creek downstream of the dam.
- Inclusion of outlet works with ability to release a range of flows for the various life history stages of anadromous salmonids downstream of the dam.

- Alternatives that avoid impacts to historic resources (Cochrane Road properties).
- Alternatives to using Live Oak Area as a staging area.

Impacts

Based on the comments received to date, key concerns to be addressed in the Impacts Analysis section of the EIR include:

Aesthetics

- Visual and aesthetic impacts to the entire project area.

Agricultural Resources

- Loss of prime farmland.
- Conversion of Grazing Land and Farmland of Local Potential.

Air Quality

- The impact of construction-related air pollutants on seniors and lakefront residents.
- Objectionable odors created during project construction and affect on residences adjacent to project site, park visitors and trail users.
- Dust exposure for adjacent property owners.

Biological Resources

- Impacts on sensitive and rare wildlife, such as elk and bald eagles.
- Impact of reservoir drawdown on biological species.
- Impacts on wildlife from construction equipment.
- Impacts of the project on fish species in Coyote Creek downstream of the dam.
- Removal and/or damage to trees, especially historic oak trees.

Cultural Resources

- Movement of historic landmarks.
- Impacts on the historic Giancola property.
- Impacts to historic resources along Cochrane Road.
- Impacts on paleontological resources (i.e., fossils).

Geology and Soils

- Impacts of reservoir drawdown and potential erosion on lakefront properties.

- Damage to historic homes and buildings in the project vicinity from vibrations and ground shaking associated with project construction.
- Impacts to wells in the Project vicinity from vibrations and ground shaking caused by equipment and explosives used in project construction.

Hydrology and Water Quality

- Maximum expected outflows in emergency conditions.
- Management of Coyote Creek inflows during the winter.
- Cofferdam placement and its effect on bathymetry of reservoir.
- Impact of blasting on local wells and springs.
- Impacts of the project on groundwater well users in the area given existing nitrate problems.
- Impact of the project on water supply to Morgan Hill.
- Impact on properties at Holiday Lake Estates due to the potential for the reservoir to be operated at a higher water level after project construction.
- Impacts of reservoir drawdown and potential erosion of lakefront properties.
- Increased maximum flood elevation and potential impact on properties.
- Impacts of potentially increased reservoir releases on floodplain downstream.
- Public safety risks associated with reservoir refill.
- Effects of reservoir releases and stream flow conditions anticipated to occur below Anderson Dam post-construction under various water year types.
- Effect of spillway modification and high level outlet construction on flood carrying capacity of Coyote Creek downstream of the dam.
- Impacts of emergency reservoir drawdown with respect to flooding downstream.
- Damage to Live Oak bridge abutments from erosion caused by greater volume releases from Anderson Dam.

Noise

- The noise impacts of construction on residents in the southern area of the lake, considering that the lake can act as a natural amphitheater.
- Noise impacts of project construction on park visitors, parks staff, and recreational use of the areas outside of the project area but within the surrounding area, including areas that will remain open during project activities.

Recreation

- Impacts of reservoir closure on boating opportunities.
- Impacts of trail, picnic area and facility closure on recreational users.
- Status of trails in the project vicinity during construction.
- Construction phasing with respect to trail access.
- Existing park facilities not within the immediate project area which may be affected by project construction, such as Jackson Ranch Historic Site, Live Oak Day Use Area, Anderson Lake County Park Visitor Center and Park Office, and Anderson Lake County Park Maintenance facility.
- Status of the Rosendin Park Area of Anderson Lake County Park during construction (open or closed).
- Impacts of the project on Coyote Creek trail users.
- Short-term impacts of project construction (i.e., noise, dust) on recreational uses within Anderson Lake County Park that remain open.
- Impacts of Anderson Lake County Park closure on nearby recreational facilities, such as Coyote Creek Parkway County Park, Calero County Park, and Coyote Lake-Harvey Bear Ranch County Park.
- Long-term impacts to public parklands and recreational facilities, such as ingress and egress roads.
- Damage to park facilities from construction.
- Short and long-term impacts to adjacent park facilities from borrow area mining.
- Long-term dam maintenance and operations impacts on recreational trail uses and park facilities on adjoining park property.

Transportation and Traffic

- Route of construction traffic into and out of project area
- Increased bicycle and pedestrian traffic on Peet and Half Road due to closure of Cochrane Road.
- Impact of Cochrane Road closure on mobility of residents.
- Reduced access of emergency vehicles to residences adjacent to project during construction.

Utilities and Service Systems

- Availability of irrigation water to residents along Coyote Road during Project construction.

Public Notices

NOTICE OF PREPARATION

From: Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Project Title: Anderson Dam Seismic Retrofit Project

Project Location: Santa Clara County, California

The Santa Clara Valley Water District will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the above project. The District would like to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached Initial Study.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than 30 days after receipt of this notice**. The District will also hold a scoping meeting to provide an additional opportunity for input on the scope and content of the information to be addressed in the draft EIR. The scoping meeting will be held at **6:30 pm on Monday, August 26, 2013,** in the Hiram Morgan Hill Room of the Morgan Hill Community & Cultural Center located at 17000 Monterey Road, Morgan Hill.

Please send your response to:

Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 630-3055
klueneburger@valleywater.org

Please provide the name for a contact person in your agency.

Beau Goldie
Chief Executive Officer

8-13-13
Date

Meeting Materials

Scoping meeting for Environmental Impact Report

Anderson Dam Seismic Retrofit Project

Santa Clara Valley Water District

You're invited

Date: Monday, August 26, 2013

Time: 6:30 - 8:30 p.m.

Place: Morgan Hill Community & Cultural Center, Hiram Morgan Hill Room 17000 Monterey Road, Morgan Hill

Light refreshments will be served.

Please join the Santa Clara Valley Water District to learn about the proposed Anderson Dam Seismic Retrofit Project, a large-scale capital project scheduled to break ground in 2016, and the upcoming environmental review process for the project. The scoping meeting will provide an opportunity to provide comments about the scope and content of the information to be addressed in the draft Environmental Impact Report (EIR).

Comments received at the meeting, formally known as "scoping" meetings, are part of a required process to define environmental issues to be studied in an environmental review of the project.

The proposed project would include substantial excavation and reconstruction of the dam embankments, mining of rock from nearby borrow areas, raising the dam crest and spillway by approximately seven feet, constructing a new intake structure in the reservoir, and constructing new outlet facilities to the spillway and creek below the dam. A more detailed description of the project can be viewed in the Initial Study (IS) prepared by the water district.

The water district, acting as lead agency for the proposed project, has determined that an EIR is required to satisfy requirements enumerated in the California Environmental Quality Act. A draft EIR will evaluate the environmental conditions in and around the project area and analyze the potential environmental impacts associated with implementation of the project.

A Notice of Preparation (NOP) and IS have been prepared and circulated to local, state, and federal agencies responsible for project approval or permitting for a 30-day review period for the purpose of defining the scope and content of the draft EIR.

Copies of the NOP and IS are available for review from 8 a.m. to 5 p.m. weekdays at the Santa Clara Valley Water District Headquarters Building, 5700 Almaden Expressway, San Jose, CA 95118, starting Wednesday, August 14, 2013. The NOP and IS can also be accessed online at: www.valleywater.org/PublicReviewDocuments.aspx.

If you are not able to attend the scoping meeting but would like to provide written comments for consideration during preparation of the draft EIR, please send comments no later than **Wednesday, September 25, 2013** at 5 p.m. to:

Santa Clara Valley Water District
Attention: Kurt Lueneburger
5750 Almaden Expressway, San Jose, CA 95118
or e-mail klueneburger@valleywater.org

Anderson Dam and Reservoir

Anderson Dam and Reservoir was named for Leroy Anderson, a key founder and first president of the Santa Clara Valley Water Conservation District.

Built in 1950 on a 500-acre dairy and cattle ranch along Coyote Creek, the 7.8 miles-long reservoir is the largest man-made reservoir in Santa Clara County. The reservoir can store 89,073-acre-feet of water, larger than all of the other nine county reservoirs combined.

More information can be found on www.valleywater.org/Services/AndersonDamAndReservoir.aspx.

continued on back...

Project background

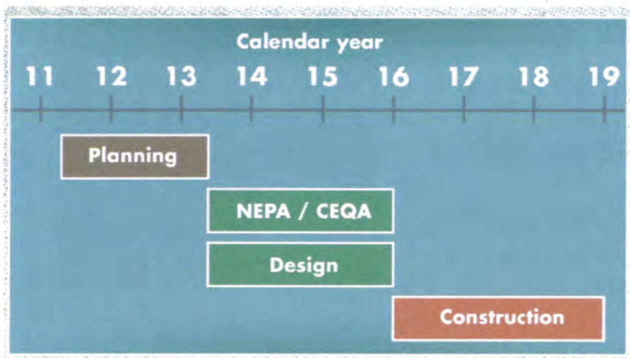
At the time of its construction in the 1950s, the dam was considered safe, complying with all engineering standards and requirements of that time.

The water district periodically undertakes engineering studies to ensure that its dams comply with the latest design guidelines and regulations. Like building codes, the methods and analysis used in the 1970s and 1980s are now outdated and require modifications to keep pace with the growing body of knowledge surrounding earthquakes. In addition, the Federal Energy Regulatory Commission requires the water district to bring in a team of independent experts to inspect Anderson Dam every five years.

In July 2011, the water district announced the results of a seismic study that determined Anderson Dam is subject to significant damage if a large earthquake were to occur within two kilometers of the dam.

Since then a team of water district engineers and consulting firms have initiated a capital project to perform project management, planning, design and construction management work to improve and stabilize the dam for the maximum credible earthquake and possible modifications to the outlet and spillway facilities.

Project schedule



What is a scoping meeting?

A scoping meeting is part of a process to determine the scope of a legally-required review known as an Environmental Impact Report (EIR).

An EIR ensures that issues are identified early and properly studied. Scoping ensures that a draft EIR produced for public review and comment is thorough.

The scoping process identifies concerns of agencies proposing a project and the affected public. It also helps clearly define environmental issues and alternatives that should be examined in an EIR.

If there are important environmental issues that the public wants considered, the time to identify those issues is at the scoping meeting.

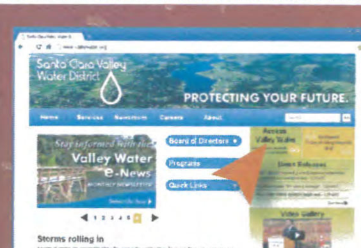
In this way, an EIR can be structured to better address public and agency concerns, and help lead to better decision-making.

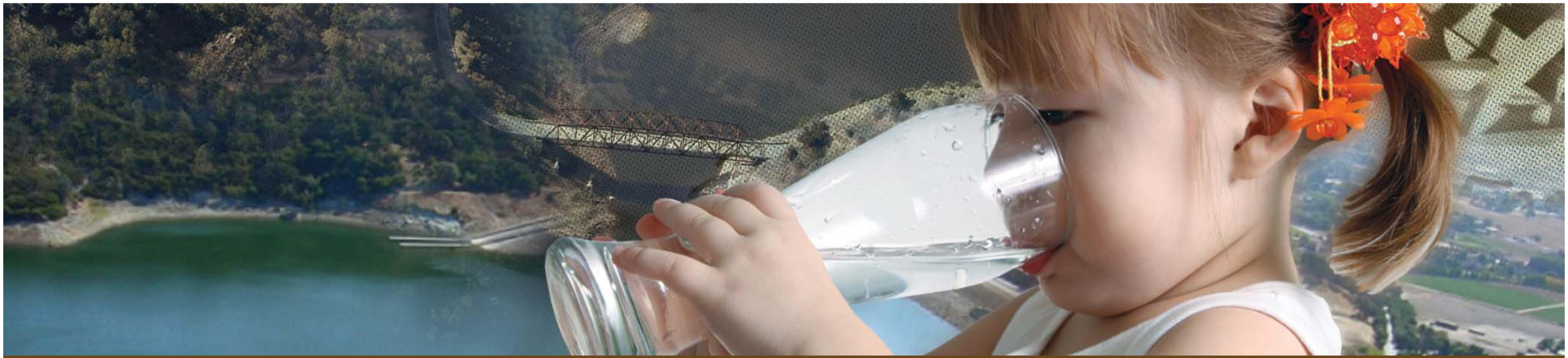
Valley Water E-NEWS

Would you like to sign up for our monthly e-newsletter?

Access Valley Water

For more information about the Anderson Dam Seismic Retrofit Project, call **Ed Morales** at **(408) 630-2880**. You may also visit our website at **www.valleywater.org**, and use our Access Valley Water customer request and information system. With three easy steps, you can submit questions, complaints and compliments directly to a staff person.





Anderson Dam Seismic Retrofit Project

Environmental Impact Report Scoping Meeting | August 26, 2013

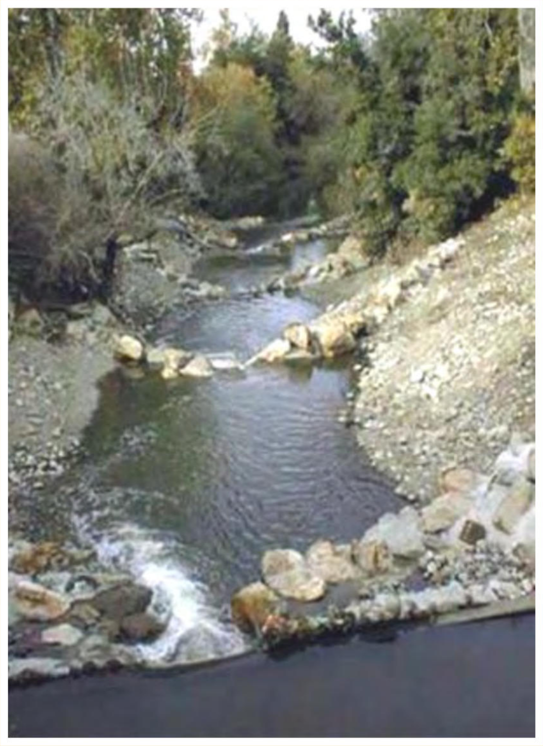
Santa Clara Valley Water District

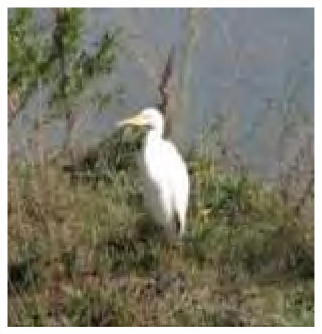
Agenda

- **About the water district and Anderson Dam**
- Proposed project / Q&A
- Environmental process
- Comments on scope of Environmental Impact Report
- Priority ranking of received comments

Mission of the water district

The mission of the Santa Clara Valley Water District is to provide Silicon Valley safe, clean water for a healthy life, environment, and economy.





Water supply system

Dam safety program

- Potential failure mode analyses
- Periodic special engineering studies
- Surveillance and monitoring program
- Routine inspections and maintenance activities
- Maintaining emergency response and preparedness plans
- State and Federal Regulators

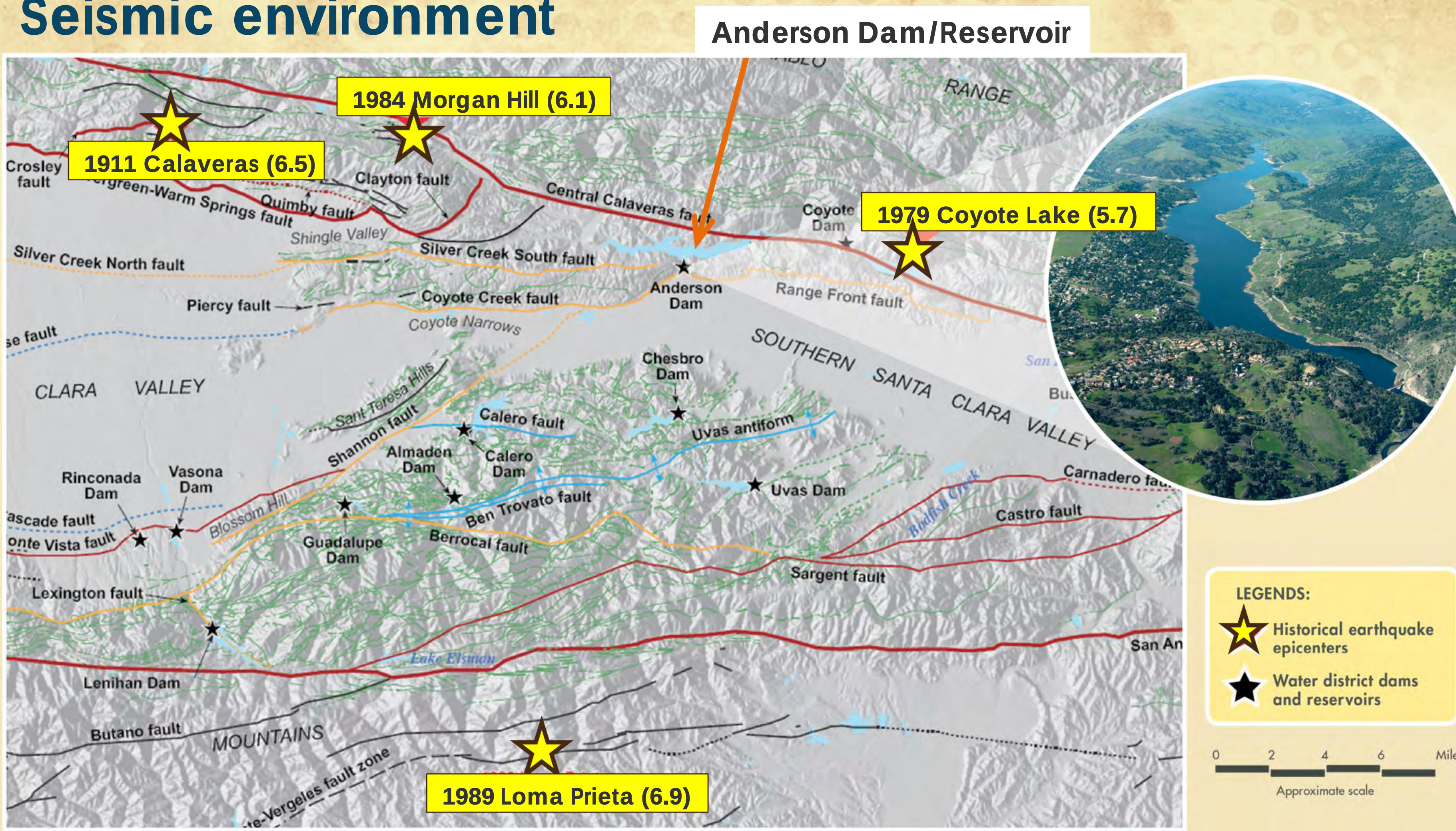

Transmitters feed data to water district engineers

Anderson Dam and Reservoir

- Located in the Coyote Creek Watershed in Morgan Hill
- Largest of 10 District reservoirs; constructed in 1950
- Approximately 90,000 acre-feet of water storage
- Water sources: Upper Coyote Creek Watershed and Central Valley Water Project

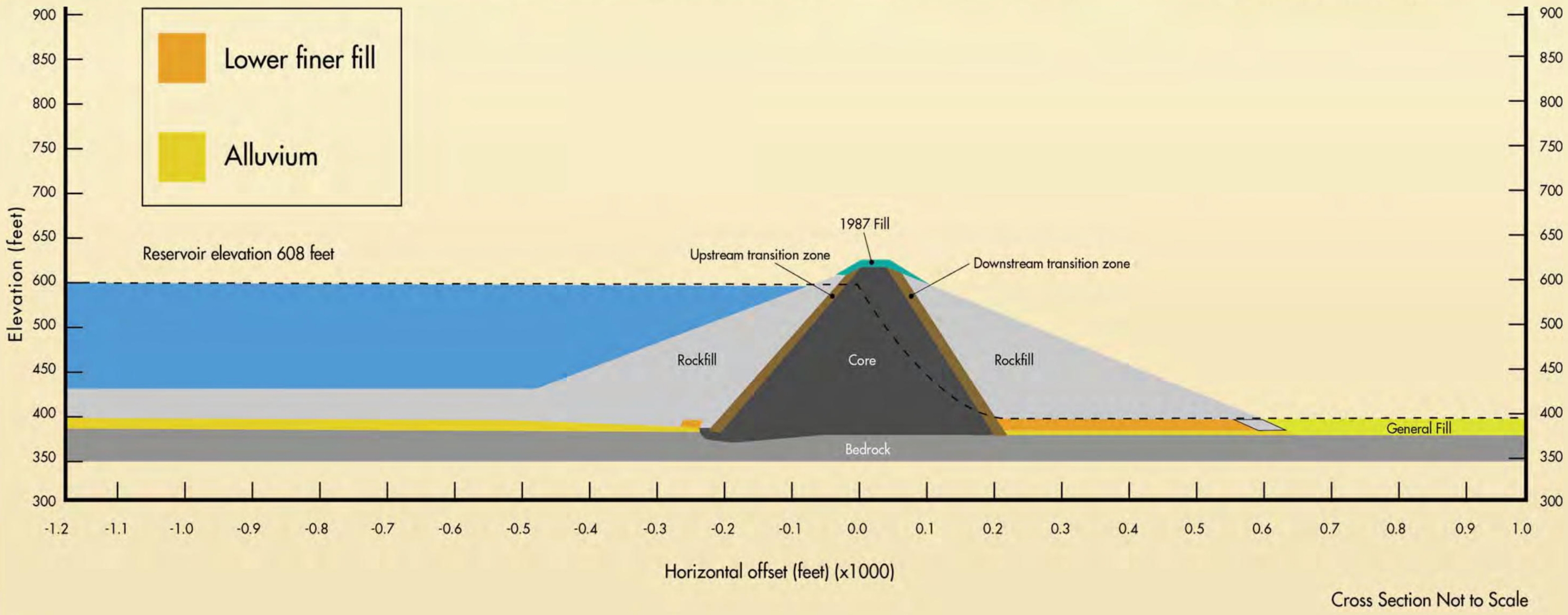
Anderson Dam deficiencies

Seismic environment



Anderson Dam deficiencies

Lower finer fill and alluvium predicted to liquefy during the maximum credible earthquake



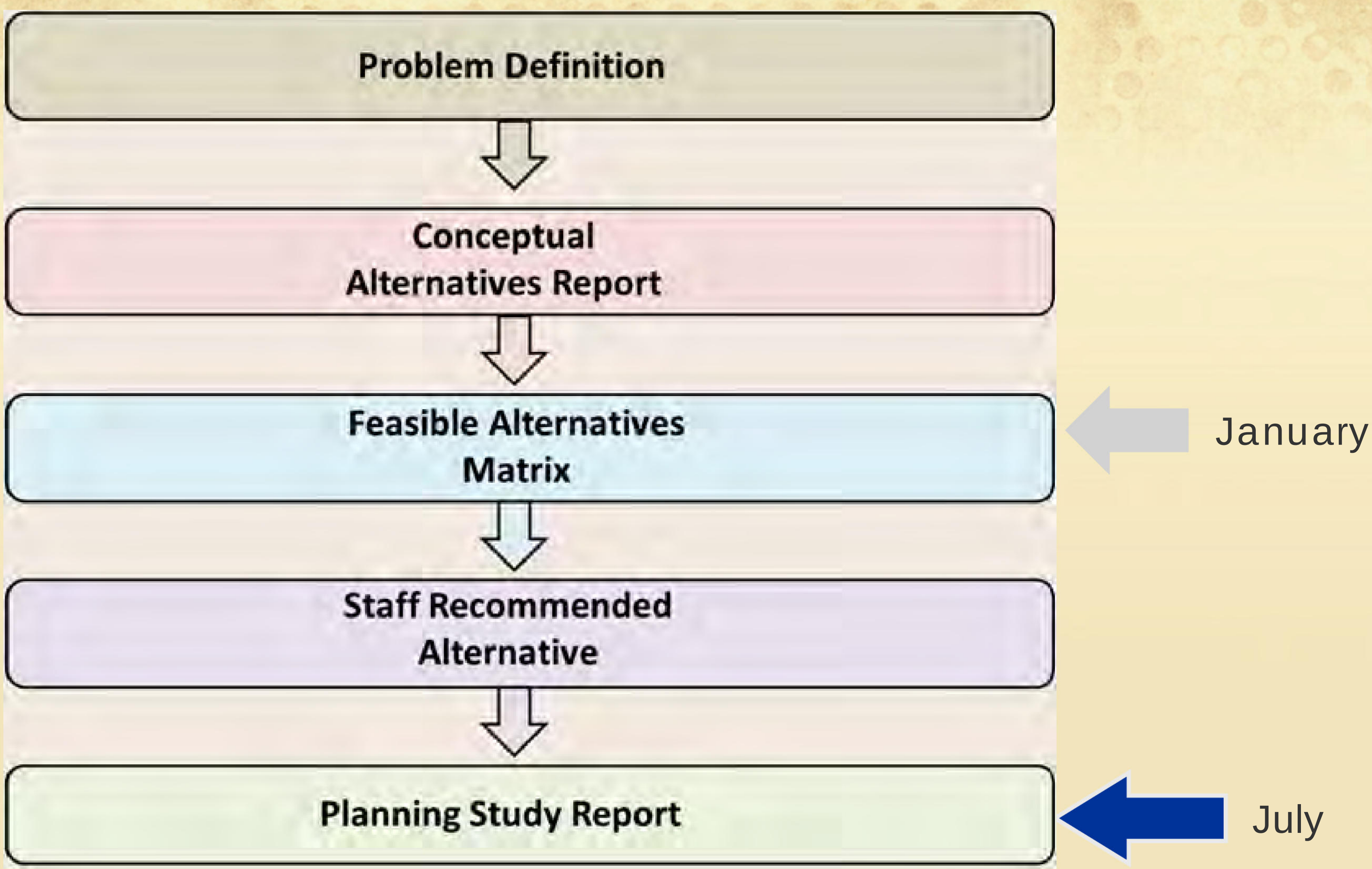
Anderson Dam deficiencies

- Magnitude 7.2 earthquake on the Calaveras Fault
  - Embankment slumps up to 25 feet due to liquefaction of lower finer fill and alluvium
  - Outlet conduit buckles due to up to four feet of "knife edge" displacement along fault traces
- Changes in regulatory requirements (Division of Safety of Dams / Federal Energy Regulatory Commission)
  - Outlet works does not meet current emergency drawdown criteria
  - Spillway undersized for Probable Maximum Flood
- Risk reduction measures in place

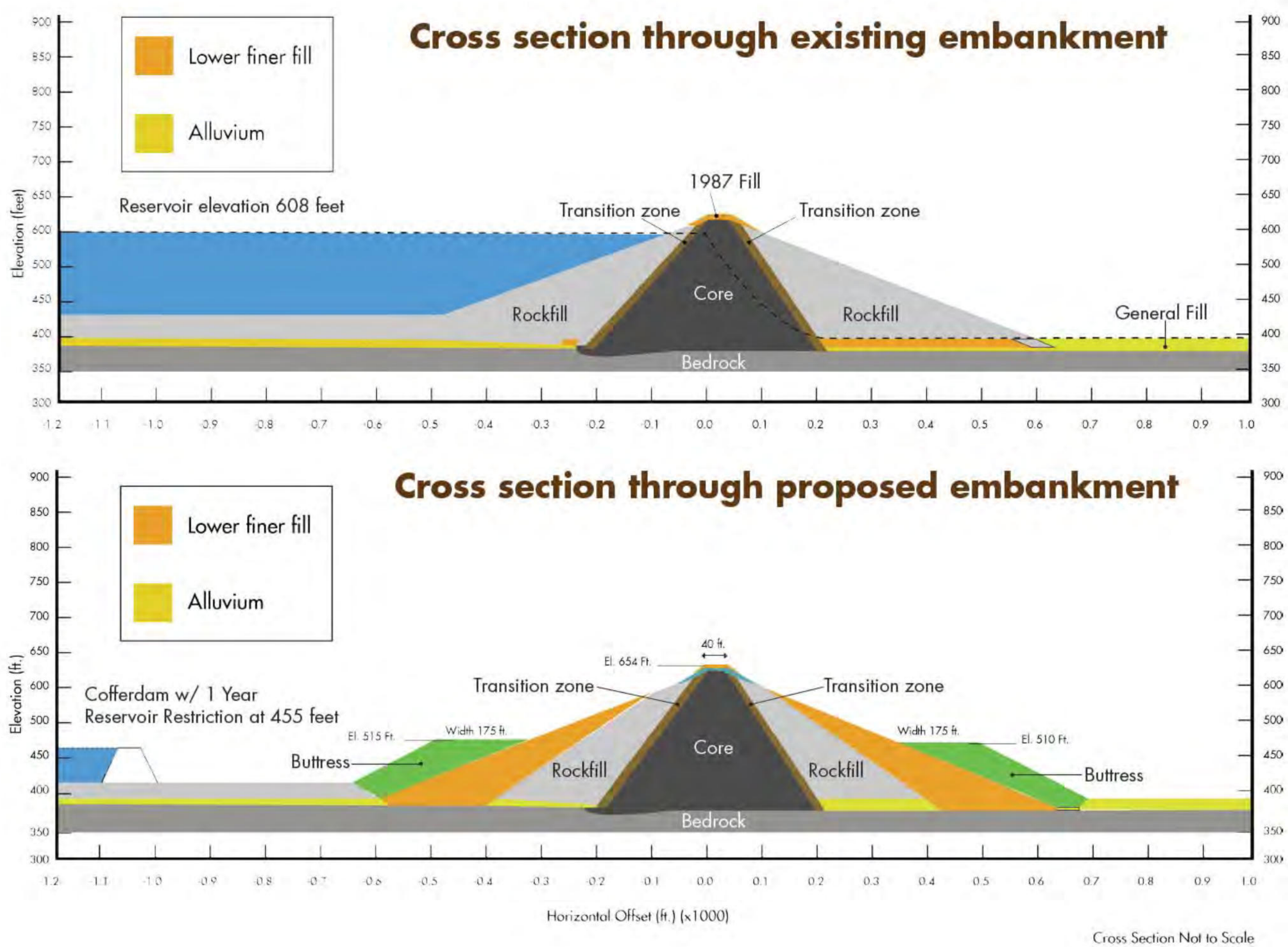
Agenda

- About the water district and Anderson Dam
- **Proposed project / Q&A**
- Environmental process
- Comments on scope of Environmental Impact Report
- Priority ranking of received comments

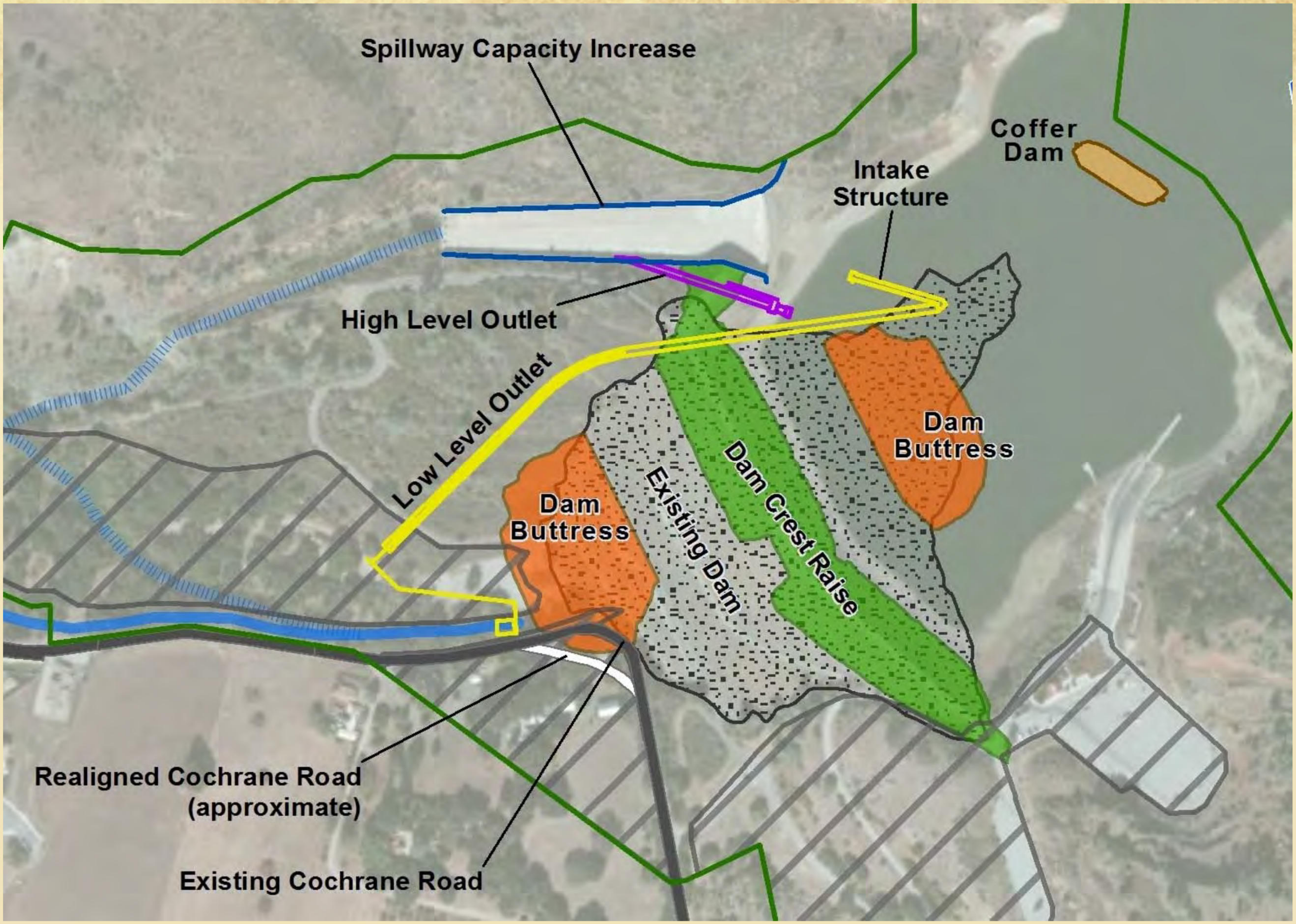
Anderson Dam project planning steps



Dam Embankment Remediation



Proposed project



Construction impacts

Potentially affected properties

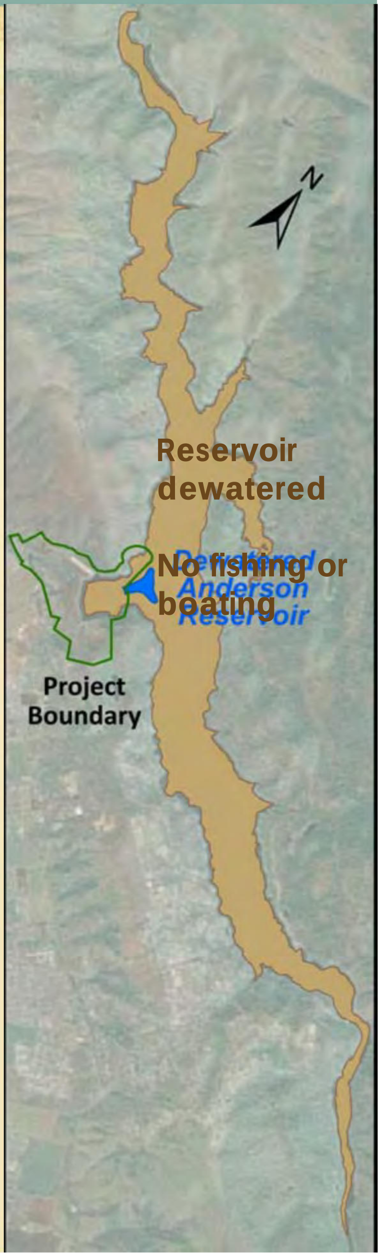
- Temporary
- Permanent

Reservoir dewatering

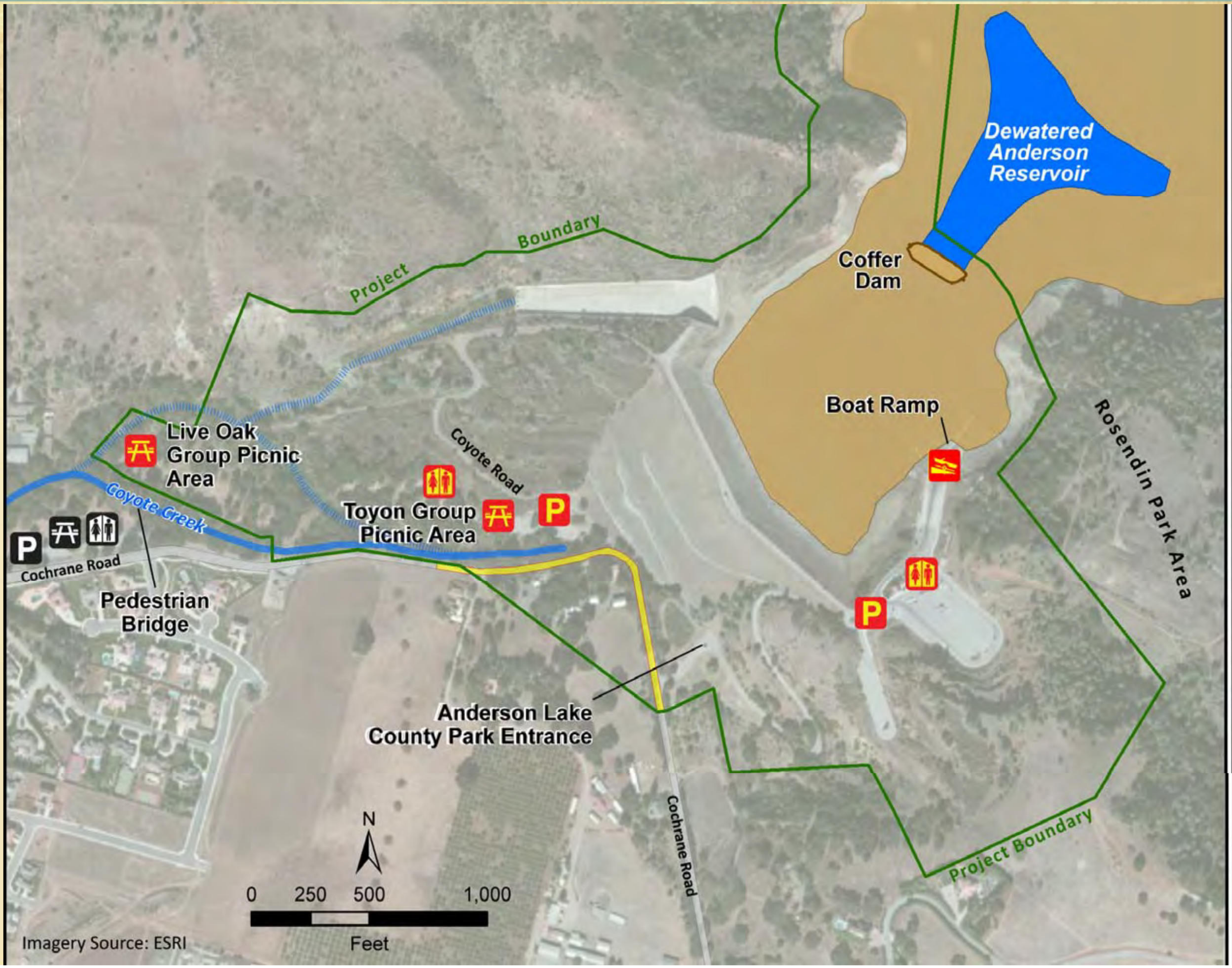
- Up to three years

Temporary closures

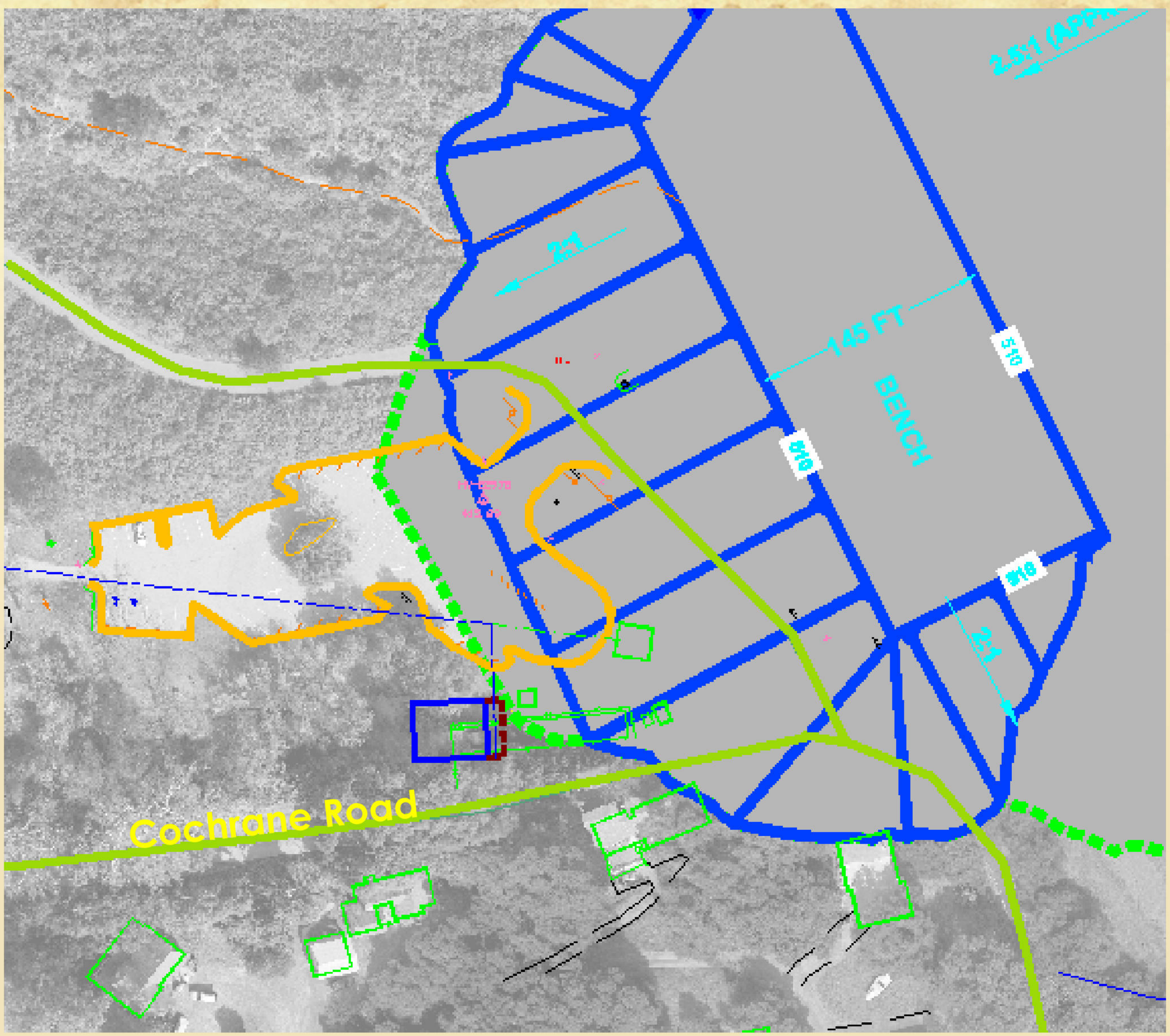
- Anderson Lake County Park
- Portion of Cochrane Road



Temporary closures during construction



Potentially affected properties near dam



Project schedule

Q&A on proposed project

Agenda

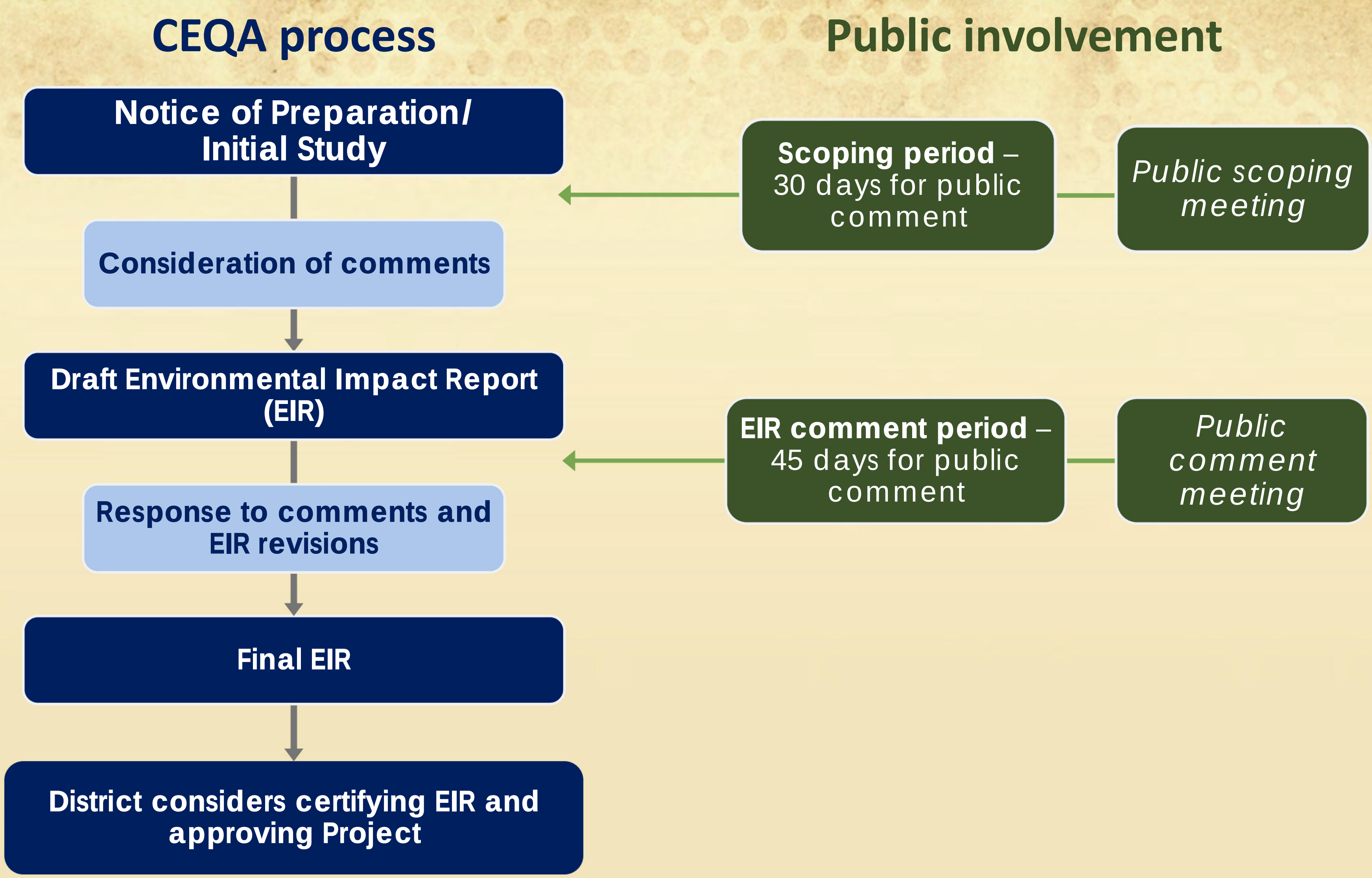
- About the water district and Anderson Dam
- Proposed project / Q&A
- **Environmental process**
- Comments on scope of Environmental Impact Report
- Priority ranking of received comments

Purpose of CEQA

CEQA requires that environmental effects are disclosed to inform the public and decision making process. *CEQA Guidelines Section 15002*

- Evaluate the significance of environmental effects
- Identify alternatives and mitigation measures to avoid and reduce project impacts
- *Initial Study* prepared to assess potential project effects and determine if an *Environmental Impact Report* (EIR) is necessary
- When a project may have significant environmental effects, an EIR is required

CEQA and public involvement process



Scoping process

CEQA Guidelines Section 15082

Scoping comments guide the impact assessment:

- Identify significant environmental issues
- Identify issues of concern to the public
- Identify range of project alternatives
- Identify mitigation measures

Environmental resources evaluated for EIR

Based on Initial Study

- Aesthetics
- Agricultural and forestry resources
- Air quality
- Biological resources
- Cultural resources
- Geology and soils
- Greenhouse gas emissions
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Noise
- Recreation
- Transportation/traffic
- Public services
- Utilities and energy
- Cumulative impacts

CEQA schedule

Milestone	Date
Notice of Preparation/ Initial Study	August 14, 2013
Scoping comment period	August 14 – September 25, 2013
Public scoping meeting	August 26, 2013
Draft EIR public comment period	Summer 2014*
Final EIR	Spring 2015*
Construction	2016 – 2018*

** Anticipated dates*

Agenda

- About the water district and Anderson Dam
- Proposed project / Q&A
- Environmental process
- **Comments on scope of Environmental Impact Report**
- Priority ranking of received comments

Scoping comment session

- Focus on environmental issues related to this Project
- Try to phrase statements as input – a comment or issue
- Priority ranking of received comments

Submitting comments

Comments are due on September 25, 2013

The Notice of Preparation and Initial Study are available at:

Santa Clara Valley Water District
5700 Almaden Expressway
San Jose, CA 95118

Or online: **www.valleywater.org/PublicReviewDocuments.aspx**

Send written comments by mail or email to:

Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Phone: (408) 630-3055
E-mail: klueneburger@valleywater.org

Anderson Dam Seismic Retrofit Project

Frequently Asked Questions

Santa Clara Valley Water District

What is going on at Anderson Dam?

The Santa Clara Valley Water District has begun a major project to retrofit and strengthen Anderson Dam so it can withstand any probable earthquake. The effort is known as the Anderson Dam Seismic Retrofit Project.

Closer look at Anderson Dam

Why are we doing this project?

The water district conducts periodic seismic (earthquake) safety evaluations of all its dams. In 2011, the water district received results from a study that concluded that Anderson Dam might not withstand a major earthquake. These studies considered what would happen if a very large earthquake (magnitude 7.25) occurred on the Calaveras Fault with an epicenter located just over a mile away. This is not a likely event, but it is not impossible.

The study indicated that a major earthquake could seriously weaken the foundation of the dam. If the foundation were weakened, the top of the dam could theoretically slump down. If the reservoir were full at the time, there could be an uncontrolled release of water. The water district is keeping the water level in the reservoir at less than 68 percent of its capacity to prevent uncontrolled release of water in such an event while the project is being implemented.

What are the risks of dam failure in the meantime?

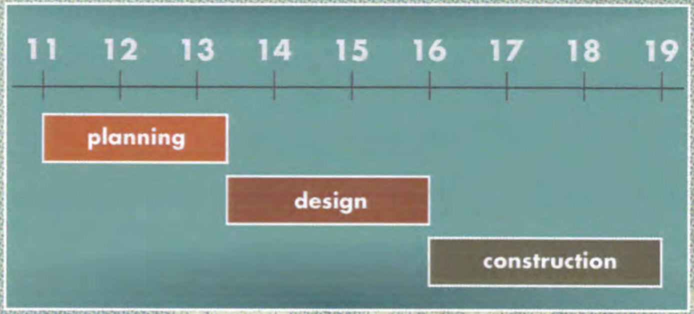
The water district has sharply reduced the amount of water that can be stored in the reservoir. This reduces the likelihood of water overtopping the dam during a large earthquake while the retrofit project to strengthen the dam is implemented. A storage restriction of over 25 feet below the spillway has been put in place to protect the public.

The dam's two regulatory agencies, the Federal Energy Regulatory Commission and the California Division of Safety of Dams (DSOD) have approved the restriction. The restriction will allow the reservoir to fill up to 68 percent of its full storage capacity. Water district staff and the regulatory agencies believe that this would prevent the uncontrolled release of water in case of a failure after a major earthquake.

Field visit with California Division of Safety of Dams and Federal Energy Regulatory Commission.

When is the proposed schedule?

This is a major effort consisting of planning, design and construction. Construction will not begin until early 2016 and will take approximately two years to complete. Here's the overall schedule:



Can I use the reservoir during construction?

It is expected that the reservoir will be available for recreational use until spring of 2015. It is anticipated that the water district will begin to lower the reservoir in support of construction that is expected to start in early 2016. We are working hard during the planning and design phases of the project to identify how the construction work will be done and what impact it will have on the level of the reservoir. Construction will not start until 2016 and there will be many discussions and public input opportunities before that time. We'll also work with Santa Clara County Parks and Recreation to minimize impacts.

What impacts are expected during work activity?

Inevitably, as there are on all major construction projects, there will be construction impacts such as noise, dust, road closures and recreational impacts. The water district will work with county parks and residents to come up with a program to minimize these impacts as much as possible.

How can I get more information?

The project web page has historic photographs of how Anderson Dam was built and numerous fact sheets and other informational materials you can download directly from your computer. The "Access Valley Water" customer information system allows you to submit questions directly to us. Visit www.valleywater.org and click on the Access Valley Water "GO" button, then select "Projects planned for my neighborhood". You can also call the Customer Relations office at (408) 630-2880.

Can you tell me more about the project?

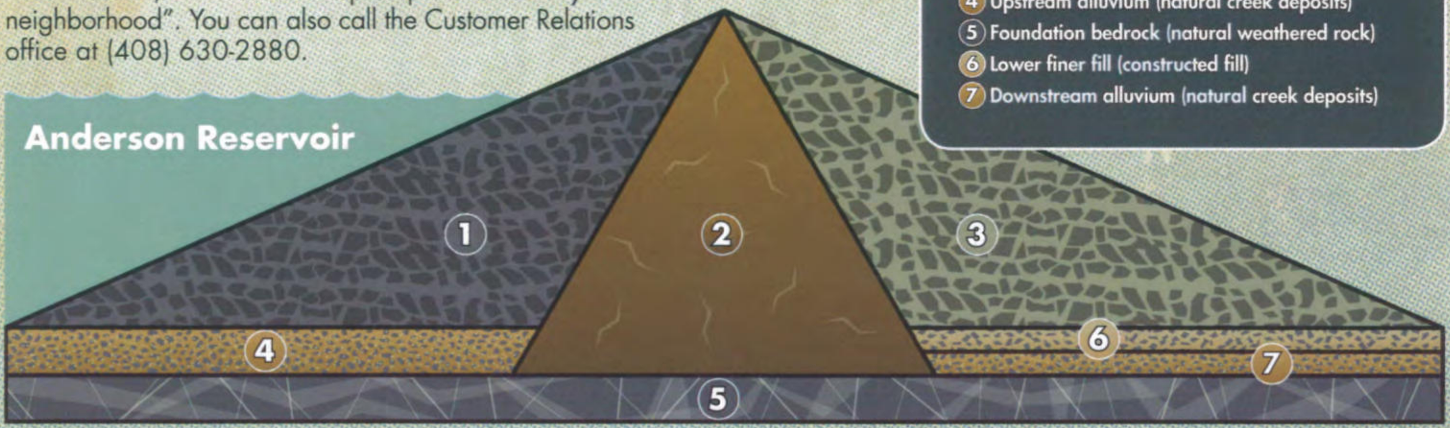
A major contributor to the change in the predicted seismic performance of the dam is the discovery of a relatively loose layer of alluvium in the foundation on both the upstream and downstream sides of the dam and a layer of poorly compacted (loose) liquefiable material in the lower rock fill shell on the downstream side. These 5 to10 feet thick layers of weak material (located beneath 15 to 70 feet of rock fill shells on both the upstream and downstream sides of the dam) are susceptible to a significant reduction in strength when subjected to severe shaking.

In addition to the nearby active Calaveras Fault, there are two other earthquake faults (the Coyote Creek Fault and the Range Front Fault) that run directly under the dam. These faults were first identified in 1949 but they were believed to be inactive. Our understanding of potential earthquakes has improved since 1950, when Anderson Dam was built, and newer studies have suggested that these faults could be active.

These faults could have a serious impact on the outlet pipe beneath the dam where it crosses the fault traces. Since the existing outlet was not originally designed to withstand the displacements that are possible from these faults, the outlet must now be replaced.

LEGEND

1. Upstream rockfill (constructed fill)
2. Upstream/downstream clay core (constructed fill)
3. Downstream rockfill (constructed fill)
4. Upstream alluvium (natural creek deposits)
5. Foundation bedrock (natural weathered rock)
6. Lower finer fill (constructed fill)
7. Downstream alluvium (natural creek deposits)



Access Valley Water

For more information, please call **Ed Morales** at **(408) 630-2880**. You may also visit our website at **www.valleywater.org**, and use our Access Valley Water customer request and information system. With three easy steps, you can use this service to submit questions, complaints and compliments directly to a staff person.

Public Meeting Notes

Santa Clara Valley Water District
Anderson Dam Seismic Retrofit Project

EIR Scoping Meeting – DRAFT Notes

Monday, August 26, 2013, 6:30pm – 8:30pm
Morgan Hill Community & Cultural Center – Hiram Morgan Hill Room
17000 Monterey Street, Morgan Hill, CA.

Question/Answer Session

What are the drinking water supply impacts of the project? Do you have a mutual aid agreement with the San Francisco Public Utilities Commission (SFPUC) in the event Hetch Hetchy becomes impacted in its ability to deliver water?

- Yes, we have been in close contact with officials at the San Francisco PUC (that's the Public Utilities Commission that operates the Hetch Hetchy Reservoir) and we are on standby. We have an intertie with the SFPUC so we can receive Hetch Hetchy water during periods of emergency that we may have, and it goes both ways. We are ready to provide them treated water from our water treatment plants if they need extra water for their customers.

The timeline for construction of the project has been said to be 3 years. At the end of 3 years, will the reservoir be full? What will the state of the reservoir be after 3 years?

- First, what we're going to do is dewater the reservoir and start work on the area of the upper embankment (the upstream embankment). How quickly we can refill the reservoir after that will depend on the weather. If we have a wet year, it will fill up right away. If it is completed during a dry year like this year, it may take a few years for the reservoir to fill up. Now whether we need to store imported water there for our own water supply operations, that could bring it up to some level, but I doubt that we would actually fill the reservoir with imported water. When we did a similar project in the 1990s, it took the reservoir several years to fill up again. We are at the mercy of Mother Nature, unfortunately.

What effect might emergency drawdown of the reservoir have with respect to flooding? Can you address maximum expected outflows in emergency conditions and flood maps?

- The spillway and the area just below the spillway are obviously going to handle the maximum expected outflow. The maximum expected outflows during emergency drawdown are projected to be in the range of 5-7,000 cfs. At this rate, there probably would be some localized flooding just downstream of the dam, in the creek channel. I believe that the channel just downstream of the spillway has a capacity of almost 14,000 cfs. So if we had to drawdown at rate of 7,000 cfs for a period of 10 days, then that channel would handle it. However, further downstream, along Coyote Creek, there are areas that have less capacity. So there may be flooding there, especially if drawdown occurs during the rainy season when there is runoff and other sources of inflow. But we're talking about a rare event, where the Division of Safety of Dams believes reservoirs must be drawn down for the safety of the valley. We don't expect that to be a regular course of events.

What impacts will drawdown have on foundations and properties in the upper part of the lake? In particular, what would the impacts be of a fast drawdown?

- We will be drawing down the reservoir at a very slow rate with those impacts in mind, so it will take many, many months. That's going to be part of the environmental impact assessment as well as the design, to look at that stability of the area around the rim of the reservoir, especially as it may impact some of the residences. We are going to be very mindful of those impacts as we move forward and we'll be providing more information to the public as we get further into design.

What is the probable maximum flood elevation associated with the new dam in feet? What will the new high water mark be in light of the proposed 7-foot raise of the dam crest?

- Basically, the reservoir would rise with the extended amount of runoff and it would just overtop the spillway and start going down the spillway. With the added 7 feet, I believe the water level could go up as high as 2 feet below the top of the crest. I believe we're required to have 2 feet of freeboard, even at the peak of that probable maximum flood.

Do we know the height of that, in terms of elevation?

- Mr. Frazier, directly with respect to your property, we had a meeting with our staff, and the property you and I have spoken about; this increased freeboard will affect the level in your property and we're doing an assessment. Our staff is working on that and they haven't reached any conclusions yet. That's one reason why I'm waiting before we can meet and discuss your specific property. We've got to determine what that upper water level will be. It will be higher than what it is today.

Do we know the elevation of the upper high level outlet?

- I believe the elevation will be 580 ft.

Will Rosendin Park be open to the public?

- I think that will be part of the design. We have to get material for this, so we're looking at various sites. One of the sites we're considering is where the existing parking lot is for the County Parks right now, in terms of the boat ramp. That was one of the initial borrow areas, so there probably will be a quarry operation there. It's possible that some parts of the park may be open. We'll just have to be very careful for everyone's safety, that we keep people out of the construction zone and nowhere near a place where they would be in danger. When we come back in another 6 to 8 months, we'll have an update on exactly where the design is headed and what parts are going to be off limits for the public.

Would they bring construction traffic in through the Holiday Lake Estates side?

- No, that is not planned.

Will any performance bonuses or penalties be issued to the construction contractors?

- We may issue performance bonuses or penalties. That's not something that we've discussed as yet, but we are certainly going to do our best to minimize the total time of construction. It's in our interest; it's in everyone's interest to get that remediation done as soon as possible. So some incentives may be provided.

Will any landmarks or houses be moved as part of the project?

- The area just adjacent to that bend in Cochrane Road has a number of residential properties and we're aware that some of those are nationally historic designations. So we're going to have to work very carefully with that process, in terms of what's going to be moved and what's going to be removed. But we are meeting directly with the property owners to discuss that. And again, the footprint of the buttress, especially in this area; this we believe is the largest extent of the buttress. As we get further into design, the size of that buttress might be refined. We don't have the clear answers for that, but there are going to be additional investigations on the geotechnical foundation characteristics of the dam as well as the proposed areas to get the rock fill. So the combination of the two may help to shrink the size of that buttress. But we can't promise that at this point. This is going to come out over the next year to year and a half as we do those additional investigations.

Have you acquired the property to realign Cochrane Road?

- We have not. And again, that's part of the California Environmental Quality Act (CEQA) process, so we need to complete the CEQA document and it has to be certified by our board of directors before any such action can take place.

The handout says that the reservoir will be closed to boating for 1 season, maybe 2, but the presentation said the reservoir may be dry for 3 years. For how long will the reservoir be closed to boating? And is the 1-2-year estimate based on average rainfall for the area?

- Once we are done with construction, we will let it start filling up. But if it doesn't rain, such as the last year that we've had where there was minimal rainfall, it may take longer to fill up that reservoir. The 1-2 years is probably how long we'll need to keep the reservoir dry. In the 3rd year, we will remove coffer dam because by then the embankment on the upstream side will be stable and complete. After that it's up to Mother Nature to refill the reservoir.

Will the reservoir definitely be closed for 2 years?

- It is very likely going to be closed for 2 years. But again, if construction can proceed quickly and if we don't hit any major roadblocks then maybe it will be closed for less time. And this is complicated construction; there are going to be a lot of moving parts. So we want to be on the conservative side. We say 1-2 years because it'll likely be 2, but if we can make it 1, by all means we will do so.

Public Comment Session

Have you considered the impacts on local wells and springs from the blasting you may be doing to get material for the project?

Who is preparing the Environmental Impact Report (EIR)? You or a third party?

For how long will Cochrane Road be closed to traffic? Cochrane to 101 is used by quite a few people who live in that Windermere area.

Reservoir Closure Period:
It seems like there is a big lack of detail in regards to schedule and variability in schedule and period of time the reservoir will be closed for. There should be planning for what's the shortest period of time and longest period of time the project could take and the public should be involved in the process of understanding schedule.

What are the geologic impacts of the project around the lake? Who is going to be responsible if there are impacts to properties around the lake?

What about the impacts to wildlife, like eagles, elk, deer, fish and geese, from draining the reservoir? Also, what about impacts to wildlife from construction equipment? Are there project alternatives that do not involve draining the lake?

The purpose of the Environmental Impact Report and Environmental Impact Statement processes under the California Environmental Quality Act and National Environmental Policy Act is to evaluate alternatives. It seems like this project has already been defined and design has already started. Are you going to evaluate project alternatives? Are you going to do an objective alternatives analysis?

Anderson Reservoir is manmade, but it is now an integral part of an ecosystem that both Santa Clara County residents and the wildlife around the dam and the reservoir depend on. Interrupting that for two or three years is going to come at a significant cost, and not just in terms of boating. The reservoir is our safety net for water in the area and if we have several years where we have drought conditions then that could be very dangerous, for people and wildlife. What about the possibility of constructing a coffer dam to protect reservoir during dam construction? It seems like that could be a beneficial and cost-effective alternative.

Finances:

- This is an expensive project and there are commonly added costs. This project is supposed to hold for 50 years and for that amount of time, it seems like the cost is high. We don't want to have to do this all over again, where the dam needs to be taken all the way down again, for us to improve whatever changes happen between now and the next "umpteen" years.
- What else can we do to strengthen the dam to lessen the time taken away from the water supply, wildlife, recreation and minimize the cost?

Steelhead fish ladder:

- Are you looking into including a fish ladder for native Steelhead in the project? Below the dam in the creek, steelhead use the entire Coyote watershed.
- Would like to see a fish ladder over Anderson Dam included in the project so steelhead can spawn above the reservoir.

Dam embankments:

- Glad that the entire dam is not being taken down.
- The 1984 earthquake was a 6.2 on Richter scale and that was the highest earthquake at that time. Homes in Holiday Lake slipped off their foundations and a small crack formed through the dam, but the dam did not sink at all. The earth dam performed just like it was supposed to. Where did the prediction in the papers of a 7.5 maximum earthquake and possible 20 feet of dam slumping and consequent overtopping come from?
- The seismic retrofit doesn't seem necessary.

Perhaps part of the project should be to dredge Anderson Reservoir? From the records, Anderson has evidently lost 4,000 acre-feet of capacity (91,000 acre-feet of original capacity down to 87,000 acre-feet). We've probably lost the equivalent of a whole medium-sized reservoir simply because we don't dredge.

Why not connect the reservoirs in the area with pipes? You have Anderson connected to Calero. Why not also connect Uvas to Coyote and Uvas Chesboro? Then you could transfer water all over the valley for safety or other purposes. There are reports that it would be possible to double the capacity of Uvas by raising the dam 10 or 20 feet.

- Would like to see more focus on improving water supply via reclamation. More water, not replacing dams that may not need to be replaced.

Who decided that 7.5 is the maximum credible earthquake?

The San Luis Reservoir is at 17% capacity and water may be brought down from the Delta. I think we need options or alternatives for this project for wet years and dry years. What about water supply for the Morgan Hill area if draining of the reservoir and construction are done in a dry year? For example, if the fire in Yosemite continues and the Hetch Hetchy Regional Water System is impacted, San Francisco would most likely be the first to get the remaining available water.

The water that we get from the Delta goes to San Luis Reservoir. Why not do the reverse, move water back to the Delta? Why not move the water currently in Anderson to San Luis for construction because San Luis is almost empty?

When will the project alternatives be available to the public for review?

You have 6 feasible alternatives; is the next step to narrow those down? What is the process to narrow the alternatives down?

Is blasting going to be mandatory in order to mine the rock?

Can you address the budget? Is it still 185 million?

For lakefront owners in Holiday Lake Estates, erosion is one of their biggest concerns. So anytime we talk about dam height elevation changes, spillway wall height elevation changes, high outlets, the fear is that the water level is going to rise. To put those fears at ease, the EIR needs to address in clear numbers the impact of the project on reservoir water level.

Drawdown impacts on biological species:

- Biological impacts are important. Right now, you have a herd of 50 Tule elk around the reservoir and that number has rebounded significantly since elk were hunted down to about 24. You've also got Bald Eagles in the area, which are the symbol of the U.S.
- What can we do to keep watering holes available to these species and not wipe out the improvements in habitat and species survival that have occurred over the last decade or so?

Anderson water supply concerns for the City of Morgan Hill

A coffer dam to protect the reservoir could be a promising alternative that could alleviate a lot of the concerns. Was this alternative eliminated due to cost?

Can we see the cost assumptions for the alternatives?

If we see a 7.2 earthquake close to the dam in the next few years, does that mean the project is off?

How would these new requirements (i.e., seismic stability) for Anderson Dam affect Coyote Dam? And what is Coyote Dam rated for?

What would happen to Anderson if Coyote failed?

The comment period of 45 days seems too short for a project this large and complicated. The document is likely to be quite long, so a longer comment period for the draft EIR, such as 60-90 days, would seem more appropriate.

Board approval process:

- If the board has not selected the alternative yet, why are you starting the scoping process?
- The planning study report has not been adopted by the board yet.
- The public would like to see what the study alternatives would be, not at the Draft EIR stage, but sooner so we can consider the alternatives.

So the project has already been decided? It seems that the alternative has already been selected.

It doesn't make sense to start on project design before the Environmental Impact Report is finished.

It seems the EIR is going before the design process, like the steps are backwards.

Noise impacts:

- The daily construction noise of the project is concerning.
- The lake is a natural amphitheatre; it's actually possible to discern songs playing on ski boats from lakefront properties.
- 120 decibels is the threshold of pain and would have a negative impact on people and wildlife.
- The EIR should address the sonic impact of the project.

If you get to a point in the CEQA process that you cannot mitigate the significant impacts, are you prepared to drop the project?

Air Quality concerns:

- The potential air quality impacts associated with the project are concerning, especially with respect to seniors living near the lake.
- Do you know what type of particulates might be emitted or released by the project from blasting and other activities?
- Are you going to do a baseline evaluation of air quality conditions? Are you going to analyze what the air conditions are likely to be in the future?
- Are you going to study what measures will have to be taken to mitigate air quality impacts?
- A number of seniors live on the waterfront properties without any means of transportation and without air conditioners. The potential health impacts on this population is concerning.

- How are you going to set an expectation so that they can plan ahead? What are you going to do if you find something you don't expect? What measures will be taken to protect lakefront residents' health?

Will tests be conducted before blasting? Like what's underneath it?

The project study and design has taken 5 years so far. How many more years will it take? Is there any way to reduce the amount of time these projects take? Why can't you use studies of other dams in the state to cut down on time?

Santa Clara Valley Water District
Anderson Dam Seismic Retrofit Project

Public Scoping Meeting – DRAFT Comment Summary

Monday, August 26, 2013, 6:30pm – 8:30pm
Morgan Hill Community & Cultural Center – Hiram Morgan Hill Room
17000 Monterey Street, Morgan Hill, CA.

Verbal comments received during the public meeting were written on posters along the walls of the meeting room. Meeting attendees were given five sticker dots to place next to the comments they felt most strongly about. The table below lists the comments in order of popularity based on the number of dots placed next to the comment.

Question/Comment	Number of Dots
Noise impacts of construction. Lake is natural amphitheater. Sonic impacts of project?	19
What can we do to protect species, such as elk, bald eagles, etc.?	18
Air quality downwind of dam. Baseline? Impact on seniors?	18
How long will Cochrane Road be closed?	14
Potential erosion at lakefront estates?	13
Could a coffer dam be built that would protect the active reservoir? What cost for coffer dam?	12
What happens if the maximum feasible earthquake happens and the dam holds up. Would the retrofit still occur?	10
Impact of blasting on local wells/springs	8
Are there options where the lake is not drained/impacts of drawdown on biological species	8
Expensive project - Risk that additional work will be needed - can we make it stronger now?	7
Is this really necessary? 1984 quake was supposedly the max. Small crack on dam, but no slumpage. Question assumptions.	7
Dredging of Anderson?	7
Native steelhead/fish passage/ladder	6
Impact to Anderson Dam if Coyote fails?	6
Are there landmarks that will be moved?	6
Will there be performance bonuses/penalties to speed construction?	5
Will the historic Gincola property be preserved?	5
Dewatering - use/waste of water (pump back to San Luis)	4
Impacts (geologic) of water drawdown on foundations of Holiday Lake Estates homes?	4
Alternatives for both wet and dry years will construction go ahead in all circumstances. Water supply risk?	3
Water supply to City of Morgan Hill	3

Public Scoping Meeting – DRAFT Comment Summary

Monday, August 26, 2013, 6:30pm – 8:30pm

Morgan Hill Community & Cultural Center – Hiram Morgan Hill Room

17000 Monterey Street, Morgan Hill, CA.

Alternatives evaluation? Is it objective when an alternative is already recommended?	3
Length of construction/detailed schedule - ability to accelerate?	3
Is blasting mandatory?	2
Coyote Dam impacts (seismic stability)	2
Will Rosendin Park be closed during construction?	2
Can all District dams be connected for integrated management?	2
Higher water at Holiday Lakes	1
45 day comment period too short for EIR	1
Testing of materials prior to blasting?	1
Length of time reservoir closed to boating	1
Alternatives available to the public? Sooner than at Draft EIR preferred.	0
When will we get from 6 alternatives to one alternative?	0
Impact of dewatering on water supply	0
Who will develop the EIR?	0
If you are unable to avoid/mitigate impacts, will you drop project?	0

Agency Meeting Notes

AGENDA

Special Agency Scoping Meeting

Anderson Dam Seismic Retrofit Project

Date: September 5, 2013 **Facilitator:** Kurt Lueneburger

Time: 9:30 -11:30 a.m.

Location: Santa Clara Valley Water District, Room A-143
5700 Almaden Expressway, San Jose

Purpose: To identify the significant environmental issues and reasonable alternatives and mitigation measures that responsible and trustee agencies will need to have explored in the draft Environmental Impact Report.

Agenda:

A. - 9:30 a.m. - Introduction (K. Lueneburger)

B. - 9:35 - Project Description (K. Oven)

C. - 9:50 - Questions and Answers
(please limit questions to technical clarification about project details)

D. - 10:20 - Environmental Process (K. Lueneburger)

E. - 10:30 - Agency Comments on Scope of EIR (Agency Staff)

F. - 11:30 - Adjourn

Santa Clara Valley Water District
Anderson Dam Seismic Retrofit Project

Special Agency Scoping Meeting – DRAFT Notes

Thursday, September 5, 2013, 9:30am – 11:30am
District Headquarters – Conference Room No. A-143
5700 Almaden Expressway, San Jose, CA.

Question/Answer Session

Is the high level outlet a pumped or gravity driven system?

How much higher will the flowline of the high level outlet be compared to the current spillway?

Is the high level outlet the precurser to the spillway?

What will this do to the floodplain downstream?

Has the hydrology and hydraulics work started to address regulatory issues of the floodway downstream?

Are these analyses on the District's schedule?

This being a regulatory floodway, the County will have to process a conditional map revision based on the hydrology that will result of this project.

The high level outlet will change the hydrology and hydraulics of the flow downstream. The County is not in agreement with FEMA on this issue. There needs to be further coordination with other flood districts on how this will affect the floodway downstream.

Will the high level outlet only be used in an emergency situation?

As a representative of the floodplain administration downstream, we support this project but there are larger regulatory issues.

In regards to the low level outlet, where will it daylight? Under Coyote Road?

Coyote Road will need to be realigned along the new embankment, including a 7 feet drop from the raised dam crest.

Was the District aware of an EIR for that section of the realigned Cochrane Road? It's not the Borelo property. A draft EIR was issued last year for that corner property along Cochrane Road. The project involved a medium-low density development, 60-lot development. They proposed to keep the road in the existing alignment. No notices were released since then.

That Gincola property didn't sell?

Will there be an increase in capacity at the low level outlet?

Will there be fill necessary for the spillway modifications?

Please confirm that the boat ramp not be altered, but would be used for equipment access.

Would construction companies use the existing park facilities, including bathrooms?

Will the reservoir be usable for recreation?

Right now the boat ramp is not usable when the reservoir is less than 50% full. It would be nice to extend the ramp.

The Rosendin property would be open and accessible, as indicated in the NOP. Most people access that property through the boat ramp parking lot.

There is no public access to the Rosendin area without membership with Holiday Lakes Estates. There is ongoing discussion between the County Parks Department and City of Morgan Hill and Holiday Lakes Estates to resolve this.

One of the borrow areas extends onto County property. This was not disclosed in the NOP.

The dam crest access road will be steep on both sides of the dam crest.
The remaining access roads will remain largely the same.

Agency Comment on Scope of EIR

Written comments submitted already from the County (via email) and will be considered for the EIR.

Recreational concerns during construction and long term under project operation. We understand that project operations will occur as under existing conditions.
Our concerns are the closure of recreational access for the 3 year time. Trail users, day use, lake users. We would like recreational accommodation for our recreational users. Use of other parks is not acceptable due to this long period of time.

What trails will be closed? Our rangers will need to know this.

What will the trail detours be?

It will be challenging to keep people out of the park area during project construction. In our experience is that people go around the closure signs.

The pedestrian bridge (Live Oak Bridge) has a 5 ton capacity.

We would like to work together on the park closure plan, public access, detours, during the construction period.

Will there be blasting for construction?

- Noise ordinance concerns.
- Containment of blasting material.

- Clean water issue due to flying debris.
- Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) requirements, in particular, will be a big issue. There needs to be an extensive discussion with SCVURPPP on their Monitoring and Reporting Program (MRP). You will need to clarify what will happen with the project. The SCVRPPP permit will be changing.

Where is the Coyote Ceanothus?

How far back at Basalt Hill will be excavated? There may be impacts on private property and access.

It's not "Rosendin Park" it's "Rosendin Area" – not a separate park, it is combined with Anderson Park.

Have you had any discussions with the State Mines agencies or County Mines – SMARA – Gary Rudeholm (retiring soon), Nash Gonzales is the County Planning Director (formerly was a state mining expert).
Clarify compliance with mining regulations with the County, then disclose in the EIR.

The county owns property northeast of the proposed Silica Carbonate Hill borrow area, with picnic tables that are less frequently used.

Address unsafe recreational use by people climbing Silica Carbonate Hill area (caves, broken collar bones). The area is publicly accessible.

What is the order of preference for the borrow areas?

Blasting may occur twice a week.
- Noise ordinance is maintained through the County department of health.
- Similar process for Lenihan Dam where residences were closer.

How much volume will be recovered from Chert Hill?
You will need to know that for the environmental analysis (traffic, water issues).

Will you need to build a road to get to these borrow sites?

How will the area be remediated after the blasting?
- SMARA remediation plan will address this.

Estimated project cost?

When the reservoir is down, will there be an opportunity to remove exposed items?
- Last time the reservoir was drained they found a plane and bodies

Will air quality issues be evaluated?
- Air quality impacts on neighbors and trail users.
- Particulates may fly a mile to a mile and a half away from the site.

Address impacts to Coyote Creek trail users.

Groundwater well users in the area, including two wells at the Boys Ranch (well 2 and 3) located down Burnett Road.

- Talk with Steve Golden at the City of Morgan Hill to get a copy of their well map showing the well locations in the project area.
- Nitrate problems in Boys 2 and 3 wells. Shallow wells, used for blending with other water supplies.
- Evaluate project impacts on their wells.

The City of Morgan Hill runs water distribution systems through Holiday Lakes Estates. Pump stations and storage tanks are located near Dunne Ave.

The old launch ramp at Holiday Lakes Estates is owned by the County. Is there an opportunity for the public to use that ramp during construction?

- The County used to operate a concession area at that ramp, but the lease rent out and the Holiday Lakes Estates community refused to let the public use their roads to access the ramp.

Include a description of the park areas remaining open during construction.

Evaluate impacts to bald eagles and osprey. There are 2 nesting bald eagles at the reservoir right now. Bald eagle nests are at Packwood Creek and on the ridge northwest of the Silica Carbonate Hill borrow area.

Elk currently hang out on the Jackson Ranch property. Have been seen going up Dunne Ave.

Evaluate dewatering impacts on Coyote Creek park and creek downstream of the reservoir.

When would water be stopped from entering Anderson Reservoir? The District is currently adding San Luis water into the reservoir to keep the level up to manage taste/odor issues at Anderson.

For the foreseeable future, will the water levels be maintained? The water levels effects lake recreation. When the water level is too low, lake recreation is closed. When the water levels come back up, lake recreation can continue.

How will the District handle water in Coyote Creek inflows during the winter?

Consider building a second coffer dam on the upper, north end of the reservoir to protect wildlife during construction. There are natural springs on the creeks up there.

The figure showing the dewatered reservoir should not be light and dark blue, it should be brown to indicate that no water will be there.

Dinosaur fossils are present in the northwest portion of the reservoir.

FEMA and CLOMR issue.
- If changing anything upstream, you have to show that on the CLOMR.
- May take 1-2 years to update the CLOMR.
- County wants to use the District's hydraulic analysis to evaluate the floodplain effects.
- Wants to start this evaluation as soon as possible.

Construction phasing plan, incorporate limited trail access when dam components are finished. Phase trail access along with construction phasing. Consider limiting to pedestrian access only (such as for local neighbors only). Safety issues with public access.

District Questions to County

Do you have park use data for trails, picnic areas, and reservoir use?
- There's a lot of local use from residences and high school running teams.

What mitigation suggestions does the County have to offset impacts?
- Haven't come up with solution yet, but the county will need to accommodate increased use at Coyote Reservoir. Such as keeping Coyote Reservoir open during the winter (commonly closed during the winter for quagga mussel). Calero Reservoir is open year round. Work with District to keep water level up at the reservoirs.
- The other reservoirs are small, too small for water skiing.
- The reservoirs are used by fisherman and water-skiers in the winter.
- Establish reservation system on Coyote Reservoir for boating, similar to the current morning reservation system on Anderson Reservoir.
- Boating capacity is really driven by water level.
- District will coordinate with County to develop mitigation measures.

Does the County want to increase boating capacity?
- It's a safety issue and traffic enforcement issue.
- There are only 2 other boating reservoirs. These will be more constrained during the project.
- Get the word out early. People come from other counties to boat at Anderson. Lots of people don't make reservations. There were over 200 boats this past Sunday.
- 2pm on is our busiest time.
- Boating noise from speakers mounted on boats.

Do a lot of people use the Woodchopper area?
- Yes, and we would like to expand the parking and picnic area.

Are there any plans for future county construction at Anderson?
- Extend the boat launch ramp
- Woodchopper flat improvements (parking and picnic area)
- No active master plan for this park (last one started in the late 1990's but was never finished) future master planning is desired but not on the immediate schedule. The old one is too old to use for this analysis.
- The trails and day use areas are the most used.

Public Comments Received

From:	Andrea Claros
To:	Kurt Lueneburger
Cc:	Jennifer Ambler
Subject:	Re: Notice of Preparation - Anderson Dam Seismic Retrofit Project
Date:	Friday, September 13, 2013 7:22:46 AM

Hello Kurt,

We have reviewed your Notice of Preparation and have the following comments or questions we would like to see addressed in the EIR. If you have any questions please don't hesitate to contact me.

1. On page 16 of the NOP, there is a description of project operation. Please provide more detailed information regarding how the project is operated for groundwater recharge, flood control, water supply, power generation, aquatic habitat, maintenance and emergencies. How and where is water released for these purposes? Please provide information on how the project is operated in conjunction with the hydroelectric facility, including the timing and amount of flows. Please describe where flow from the outlets (current and proposed), the hydroelectric facility, and the Anderson Force Main are released and how much is released. Please describe the purpose and function of the Force Main.

2. Please provide a more detailed description and diagram of the cofferdam placement, area of dewatering, and it's relationship to the bathymetry of the reservoir. The figures are a little unclear as to why the cofferdam would be placed where it is, how it blocks/diverts inflow, and allows access to work on the dam.

3. The NOP states that the reservoir will be allowed to refill naturally. Please provide information as to how long this is anticipated to take, and any anticipated environmental effects or mitigation needed. Will there be monitoring for water quality, erosion, turbidity, landslides, etc? How will you address public safety during refill? How do you propose to keep the public notified of the status of the refill?

4. For anticipated consultations on the potential action, do you intend to consult with the FWS under Section 7 of the ESA? On page 16, you mention incidental take provisions under a HCP (ESA Section 10). It is unclear what kind of consultation you intend to have with the FWS regarding this potential action and how the Valley Habitat Plan that is mentioned relates to the potential action.

--
Andrea Claros
Ecologist
Federal Energy Regulatory Commission
Division of Hydropower Administration and Compliance
202-502-8171
fax 202-219-2732

On Fri, Aug 16, 2013 at 10:38 PM, Kurt Lueneburger <KLueneburger@valleywater.org> wrote:

> The Santa Clara Valley Water District (District) is pleased to announce the completion of a Notice of Preparation (NOP) of a draft Environmental Impact Report (EIR) for the Anderson Dam Seismic Retrofit Project. In compliance with the California Environmental Quality Act (CEQA), an official copy of the NOP has been mailed to anticipated responsible and trustee agencies. The District would like to know the views of your agency

as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project.

To facilitate review of the NOP, an electronic copy of the notice is attached for your consideration. Consistent with CEQA guidelines, responses at a minimum should identify the significant environmental issues and reasonable alternatives and mitigation measures that the responsible or trustee agency will need to have explored in the draft EIR, and whether the agency will be a responsible agency or trustee agency for the project.

The District will hold a public scoping meeting to provide an additional opportunity for input on the scope and content of the information to be addressed in the draft EIR. All are welcome to attend and participate in the public scoping meeting that will be held at 6:30 pm on August 26, 2013 in the Morgan Hill Community and Cultural Center located at 17000 Monterey Road, Morgan Hill. Additionally, as various agency staff have already expressed interest in the project, the District is also planning to hold a special scoping meeting solely for agency staff. The special agency scoping meeting is tentatively scheduled to occur during normal business hours at District headquarters (5700 Almaden Expressway, San Jose) on September 5, 2013. More details about the agency scoping meeting will follow in a separate email.

We look forward to working with you on this exciting project. If you have any questions, please do not hesitate to call.

Sincerely,

Kurt Lueneburger

Environmental Planner

Santa Clara Valley Water District

5750 Almaden Expressway

San Jose, CA 95118-3614

phone: 408.630.3055

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404-4731

September 18, 2013

Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Dear Mr. Lueneburger:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) of a draft Environmental Impact Report (EIR) and Initial Study (IS) for the Santa Clara Valley Water District's (District) Anderson Dam Seismic Retrofit Project (Project). The District proposes to make improvements to Anderson Dam to address several safety deficiencies associated with seismic shaking, fault offset, flood capacity, and emergency drawdown capabilities. NOAA's National Marine Fisheries Service (NMFS) received the NOP on August 19, 2013, and NMFS offers the following comments on the proposed scope and content of the Project's EIR.

As discussed in the IS, Coyote Creek supports a population of threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss)* and the stream is designated critical habitat for this species. Through the CCC steelhead recovery planning process, NMFS has identified steelhead in Coyote Creek as an important population necessary to support the viability of the Interior San Francisco Bay stratum and assist in the recovery of the broader CCC steelhead distinct population segment. NMFS appreciates the District's collaborative partnership as a voluntary signatory to the Statement of Understanding for development of the CCC Steelhead Recovery Program. Although the current population of steelhead below Anderson Dam appears to be a small remnant of the historical population (Leidy *et. al* 2005), the watershed area of Coyote Creek encompasses over 320 square miles and much of the upper watershed is protected in parks and open space (*i.e*., Henry W. Coe State Park). NMFS believes the watershed has excellent potential for steelhead restoration with improved stream flows from Anderson Dam, instream habitat and channel restoration in Coyote Creek, and remediation of fish barriers. Anderson Dam is also a very good candidate for fish passage due to the existence of high quality habitat in tributary streams above Anderson and Coyote dams.

The IS discusses water quality, stream flow rates, and fish movement as "potentially significant issues" associated with project construction. It is essential the Project develop adequate measures to avoid and minimize these potential impacts to the stream and steelhead below the dam during construction. The IS states stream flow releases to Coyote Creek below the dam "would be treated consistent with basin plan (RWQCB 2011) requirements". Although the San

Francisco Bay Basin Plan establishes water quality standards applicable to waters of the Region, the Plan does not contain any specific instream flow requirements for Coyote Creek, and it is unclear how the Basin Plan requirements would be applied by this project to protect CCC steelhead and designated critical habitat in Coyote Creek.

The IS indicates that the proposed project is designed to comply with Federal Energy Regulatory Commission (FERC) dam safety criteria at the spillway of Anderson Dam, and FERC will serve as the NEPA federal lead agency. As the NEPA federal lead agency, FERC is the appropriate agency to conduct the Endangered Species Act (ESA) section 7 consultation with NMFS. NMFS recommends FERC initiate coordination with NMFS staff as soon as possible to identify listed fish concerns and develop the information required for the initiation of section 7 consultation. Measures and mitigation to address the effects of project construction should be developed in coordination with NMFS to ensure CCC steelhead and designated critical habitat are adequately considered.

Regarding the future operation of Anderson Dam, the IS states "[n]o permanent operational changes are expected to result from this project". The IS also indicates the District's future Three Creeks Habitat Conservation Plan (HCP) is intended to provide ESA compliance for water supply operation impacts on federally-listed fish species. However, the District's current schedule for completing the Three Creeks HCP is December 31, 2015, and the ESA section 7 consultation for the Anderson Dam Seismic Retrofit Project must also be completed in 2015 if the District intends to initiate construction in 2016. These overlapping schedules are particularly confounding because the HCP's conservation measures for steelhead in Coyote Creek are expected to result in operational changes at Anderson Dam. Given this, and understanding that the HCP will not yet be completed, it will be necessary for the biological assessment and section 7 consultation between NMFS and FERC for the Project to include an assessment of the effects of the future operations of Anderson Dam on CCC steelhead and critical habitat. Federal regulations implementing section 7 of the ESA require the biological opinion to provide a detailed discussion of the effects of the action on listed species or critical habitat (§402.14(h)(2)). Guidance regarding the treatment of ongoing water projects in a section 7 consultation is available in the NMFS/U.S. Fish and Wildlife Service Section 7 Consultation Handbook, which states: " .... future direct and indirect impacts of the operation over the new license or contract period, including effects of any interrelated and interdependent activities, and any reasonably certain future non-Federal activities (cumulative effects), are added to determine the total effect on listed species and their habitat" (Section 7 Handbook, Chapter 4, March 1998).

Some fisheries work has been conducted in Coyote Creek below Anderson Dam to assess the relationship between stream flow and anadromous salmonid habitat. In particular, an instream flow prescription for steelhead and Chinook salmon below Anderson Dam was developed in 2001 and incorporated into the May 2003 draft Settlement Agreement for the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE). This FAHCE flow schedule and the associated Anderson Reservoir rule curve for the protection of anadromous salmonids have not been implemented by the District, but should be considered in the Project's EIR and section 7 consultation biological assessment. Additional instream flow studies may also be warranted to update the 2001 FAHCE reservoir rule curve for Anderson Reservoir and refine the Coyote Creek flow prescription for the protection of anadromous salmonids. Over ten years of water temperature data has been collected since 2001 which can be used to verify FAHCE modeling and assumptions. The EIR and the biological assessment prepared for the ESA section 7 consultation should consider the effects of reservoir releases and stream flow conditions anticipated to occur below Anderson Dam post-construction under various water year types.

The Project also provides an opportunity to incorporate structural features at the dam which would contribute significantly to the future protection and restoration of CCC steelhead in Coyote Creek. Specifically, the District should consider the following structural features for Anderson Dam:

(1) upstream and downstream passage of adult and juvenile anadromous salmonids;

(2) outlet works with the ability to release a range of flows for the various life history stages of anadromous salmonids (*i.e.,* migration, spawning, egg incubation, and juvenile rearing) downstream of the site, and that allow for the release of high flows for channel maintenance and geomorphic functions; and

(3) outlet works with the capability for selective withdrawal from various elevations in the reservoir for the purpose of controlling water temperature in Coyote Creek downstream of the dam.

We look forward to working with the District and FERC on this important project. If you have questions concerning these comments, please contact Gary Stern at 707-575-6060, or Darren Howe at 707-575-3152.

Sincerely,

Dick Butler
North Central Coast Office Supervisor
Protected Resources Division

cc: Lisa Mangione, Corps of Engineers, San Francisco
Steve Hocking, FERC, Washington, DC
Andrea Claros, FERC, Washington, DC
Tami Shane, California Department of Fish and Wildlife, Yountville
Margaret Beth, San Francisco Bay Regional Water Quality Control Board, Oakland
Luisa Valiela, EPA, San Francisco
Debra Caldon, SCVWD, San Jose
Copy to file ARN #151422SWR2013SR00251

Literature Cited

Leidy, R. A., G. S. Becker, and B. N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (*Oncorhynchus mykiss*) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, California.

From:	Borack, Alexandra@DOC
To:	Kurt Lueneburger
Cc:	Anderson, Heather@DOC
Subject:	Anderson Dam Seismic Retrofit Project NOP
Date:	Friday, August 23, 2013 12:20:50 PM

Hello Mr. Lueneburger,

The Department of Conservation, Division of Land Resource Protection would like to provide clarifying information for the upcoming Draft EIR for the Anderson Dam Seismic Retrofit project (SCH # 2013082052). Per the 2010 Important Farmland Map for Santa Clara County, produced by the Farmland Mapping and Monitoring Program (FMMP), the proposed staging areas appear to be designated as a combination of Grazing Land and Farmland of Local Potential. The Notice of Preparation improperly designated those areas as Prime Farmland. Therefore, the Division recommends that the Draft EIR correct this designation and evaluate the appropriate potential agricultural resource impacts for the temporary (and some small permanent) conversion of Grazing Land/Farmland of Local Potential.

For future reference, Important Farmland Maps with the most current designations can be found at :

http://maps.conservation.ca.gov/ciff/ciff.html

Alexandra Borack
Office of Governmental & Environmental Relations
Department of Conservation
Phone: 916-445-8735

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

SEP 10 2013

Mr. Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118-3614

SCH #2013082052, Notice of Preparation of a Draft Environmental Impact Report for Leroy Anderson Dam
Kern County

Dear Mr. Lueneburger:

We have reviewed the Notice of Preparation of a Draft Environmental Impact Report for Anderson Dam Seismic Retrofit Project. The document details excavating and reconstructing Anderson Dam embankments, mining rock from nearby borrow areas, raising the dam crest and spillway by about seven feet, constructing a new intake structure in the reservoir, and constructing new outlet facilities to the spillway and creek below the dam.

Leroy Anderson Dam, No. 72-9, is currently under our jurisdiction for dam safety. We are aware of the project and have communicated with Santa Clara Valley Water District the importance the Environmental Impact Report will have on the project. We also have informed the District that a repair application, together with plans and specifications, must be filed with the Division of Safety of Dams. All dam safety related issues must be resolved prior to the approval of the application, and the work must be performed under the supervision of a civil engineer registered in California.

If you have any questions or need additional information, you may contact Design Engineer Christopher Dorsey at (916) 227-4137 or Project Engineer Daniel Meyersohn at (916) 227-4624.

Sincerely,

Sharon K. Tapia

for David A. Gutierrez, Chief
Division of Safety of Dams

cc: (See attached list.)

cc: Ms. Nadell Gayou, Resources Agency Project Coordinator
Environmental Review Section
Division of Statewide Integrated Water Management
Department of Water Resources
901 P Street
Sacramento, California 95814

Governor's Office of Planning and Research
State Clearinghouse
Post Office Box 3044
Sacramento, California 95812-3044

County of Santa Clara

Department of Planning and Development
Planning Office

County Government Center, East Wing, 7th Floor
70 West Hedding Street
San Jose, California 95110-1705
(408) 299-5770 FAX (408) 288-9198
www.sccplanning.org

September 18, 2013

Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

RE: Comments regarding Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Anderson Dam Seismic Retrofit Project

Dear Mr. Lueneburger:

This letter is written in response to the Notice of Preparation of a Draft Environmental Impact Report for the Anderson Dam Seismic Retrofit Project.

SMARA EXEMPTION

Please contact Gary Rudholm at (408) 299-5794, Gary.Rudholm@pln.sccgov.org regarding the following:

Staff of the Department of Planning & Development has determined the Anderson Dam Seismic Retrofit Project is exempt from the California Surface Mine and Reclamation Act (SMARA). Exemptions to SMARA are identified in Public Resources Code, Division 2, Chapter 9, Section 2714, which reads in part (emphasis added):

> § 2714. "This chapter does not apply to any of the following activities: (a) Excavations or grading conducted for farming or the immediate excavation or grading of lands affected by a flood or natural disaster for the purpose of restoring those lands to their prior condition. (b) Onsite excavation and onsite earthmoving activities that are an integral and necessary part of a ***construction project*** and that are undertaken to prepare a site for construction of structures, landscaping, or other land improvements associated with those structures, including the related excavation, grading, compaction, or the creation of fills, road cuts, and embankments, whether or not surplus materials are exported from the site. . . . "

The California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1 (CCR) includes definitions applicable to SMARA. Under CCR § 3501, "Excavations for On-Site Construction" are defined as follows (emphasis added):

> Excavations for On-Site Construction. Earth material moving activities that are required to prepare a site for construction of structures, landscaping, or other land improvements

(such as excavation, grading, compaction, and the creation of fills and embankments), or that in and of themselves constitute engineered works (**such as dams**, road cuts, fills, and catchment basins).(Emphasis added.)

We understand that the State Division of Safety of Dams (DSOD) is the permitting agency for this project. Because a State agency is involved, staff also recommends that the DSOD formally request a determination from the State Mining and Geology Board (SMGB) regarding exemption of the project from SMARA.. The person to contact on behalf of the SMGB is its Executive Officer, Stephen Testa. He may be reached at (916) 322-1082, or via email at Stephen.Testa@conservation.ca.gov.

HISTORICAL
Please contact Priya Cherukuru at (408) 299-5787, Priya.Cherukuru@pln.sccgov.org regarding the following:

Issue 1: Reference to Section 5.5: Potentially Affected Properties:

The proposed project is partially located in Unincorporated Santa Clara County. Reference under *Section 5.5: Potentially Affected Properties- Table 2* (page 13 of 72) of the Initial Study lists some properties incorrectly under the **Land Use Authority** column.

The following properties are within the land use authority of unincorporated Santa Clara County for proposed improvements.

APN / Address / Ownership

728-34-010 / 2290 Cochrane Road / Private
728-34-011/ 2390 Cochrane Road/ Private
728-34-017/ (Santa Clara Valley Water District)
728-34-018 / Santa Clara Valley Water District
729-46-010 / Santa Clara Valley Water District
729-48-004 / County of Santa Clara, Parks and Recreation

In addition, the following properties seem to be within the jurisdiction of the City of San Jose.

729-48-001/ Santa Clara Valley Water District (please verify).

Issue 2: Reference to Section 7.0: Environmental Review and Permitting Requirements:

In addition, under *Section 7.0 Environmental Review and Permitting Requirements* (Table 3: Proposed Project Regulatory Permits, Approvals and Consultations) under **Local Agencies: County of Santa Clara (Page 17 of 72),** please note that a Landmark Alteration Permit will be required pursuant to County Ordinance Code Division C17, for proposed work within a County designated Landmark property. Property at 2290 Cochrane Road (APN 728-34-010) is a historic resource listed in the National Register Historic Places on April 13, 2013, (See attached

Correspondence from Office of Historic Preservation), is listed in the California Register of Historical Resources and is a designated Santa Clara County Landmark (CL11-001).

In reference to Table 2: Property Details, Page 13 of 72) of the Initial Study; the "Project Use" is described as "Temporary Right of Entry for staging, portion potentially acquired for realignment of Cochrane Road." This indicates that there may be a potential impact to the existing historic resources on the property. A formal historic/architectural evaluation should be prepared to identify the Area of Potential Effect (APE) and to identify impacts to the historic resource due to the proposed alteration.

The County Ordinance Code under Division C17 – Historic Preservation defines *Alteration* as:

> *Alteration* means any work, other than demolition or preventative maintenance, affecting the exterior appearance of significant historical or architectural features, or the historic context of a designated landmark, including, but not limited to, exterior changes, additions, new construction, grading and relocation.

Issue 3: Review under Cultural Resources:

The EIR should evaluate all possible alternatives to the project to avoid a substantial adverse impact as a Historic Resource as defined under Section 5020.1, and to the integrity of the historic resources (as defined under the *National Register Bulletin: Guidelines for Evaluating and Documenting Historic Aids to Navigation to the National Register of Historic Places*).

Please note that a project can be mitigated to a level of insignificance (Section 21080) if it meets the Secretary of Interior's Standards for Rehabilitation and local historic preservation regulations, and such that it will not adversely affect the resource.

OTHER CEQA ISSUES

Please contact Colleen Oda at (408) 299-5797, Colleen.Oda@pln.sccgov.org regarding the following:

Agriculture

Page 24 of the Initial Study notes that the project would affect prime farmland. Private parcels would be used for temporary staging of equipment and materials; and would be returned to pre-project conditions for agricultural production after construction is completed. 2290 and 2390 Cochrane Road (County unincorporated parcels) are proposed to be converted to non-agricultural use by dam embankment construction and realignment of Cochrane Road.

The DEIR should assess the prime farmland loss impacts of the project. Under the County thresholds; a loss of 10 acres or more of prime farmland is considered to be a potentially significant impact. From the description in the Initial Study; it is unclear how much acreage will be impacted. If the prime farmland loss is a potentially significant impact, mitigation measures to mitigate the prime farmland loss should be identified in the DEIR.

Tree Removal
Page 33 of the Initial Study notes that the project could result in the permanent loss of ordinance –sized trees. It is unclear how many trees are impacted, what type (species) and where the trees are located. The DEIR should provide specific tree removal information in detail, and include mitigation measures for ordinance sized trees loss (tree replacement). The removal of trees on unincorporated parcels of land are subject to Tree Removal Permits. An ordinance sized tree is defined as native species at least 12" or more in diameter at 4 ½ feet above ground level. See attached Tree Replacement Guidelines and Tree Removal Permit form. Dead or diseased trees are allowed to be removed as a matter of right without any permit approval.

Noise
Page 54 of the Initial Study notes that the project involves construction activities that would generate noise from operation of heavy equipment and supporting stationary equipment, and noise from blasting. The project is subject to the County Noise Ordinance requirements. The DEIR should assess the construction and blasting activities conformance to applicable County Noise Ordinance standards. See attached County Code Section B11-152 to 159 for further details.

Thanks for the opportunity to comment on Santa Clara Valley Water District's NOP. We look forward to reviewing the Draft Environmental Impact Report (DEIR) when it becomes available.

Sincerely,

Ignacio Gonzalez
Director of Planning & Development

cc: Planning – Priya Cherukuru, Rob Eastwood, Colleen Oda, Gary Rudholm

Attachments:

(1) Office of Historic Preservation letter
(2) County Tree Replacement Guidelines
(3) County Tree Removal Permit form
(4) County Code Section B11-152 to 159 (County Noise Ordinance)

BD. SUP. '13JUN17PM 2:25

STATE OF CALIFORNIA - THE NATURAL RESOURCES AGENCY
EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov

B/S Chair ____
BD of Supv. ✓
Clerk ____

June 14, 2014

Santa Clara County Board of Supervisors
70 West Hedding Street, 10th Floor, East Wing
San Jose, California 95110

RE: Rhoades Ranch Listing on the
National Register of Historic Places

Dear Board of Supervisors:

I am pleased to notify you that on 4/17/13, the above-named property was placed on the National Register of Historic Places (National Register). As a result of being placed on the National Register, this property has also been listed in the California Register of Historical Resources, pursuant to Section 4851(a)(2) of the Public Resources Code.

Placement on the National Register affords a property the honor of inclusion in the nation's official list of cultural resources worthy of preservation and provides a degree of protection from adverse effects resulting from federally funded or licensed projects. Registration provides a number of incentives for preservation of historic properties, including special building codes to facilitate the restoration of historic structures, and certain tax advantages.

There are no restrictions placed upon a private property owner with regard to normal use, maintenance, or sale of a property listed in the National Register. However, a project that may cause substantial adverse changes in the significance of a registered property may require compliance with local ordinances or the California Environmental Quality Act. In addition, registered properties damaged due to a natural disaster may be subject to the provisions of Section 5028 of the Public Resources Code regarding demolition or significant alterations, if imminent threat to life safety does not exist.

If you have any questions or require further information, please contact the Registration Unit at (916) 445-7008.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi
State Historic Preservation Officer

cc: all Supervisor, N. Gonzales, S. Carvalho, K. Forrester

Enclosure: National Register Notification of Listing

SANTA CLARA COUNTY
GUIDELINES FOR TREE PROTECTION AND PRESERVATION FOR LAND USE APPLICATIONS

PREAMBLE

These Guidelines for Tree Protection and Preservation are used by the Planning Office to evaluate how trees are protected, preserved, removed and replaced, as part of Planning review for Land Use approvals. In accordance with the County General Plan, County Tree Preservation and Protection Ordinance and other State statutes (California Environmental Quality Act (CEQA) and California Public Resources Code §21083.4, for Oak Woodland), tree protection and preservation is desired for the following purposes:

A. Preserve and protect the habitat for Wildlife Species (birds and animals)

B. Climate Control including:
- Mitigation against Global Warming.
- Dissipation of heat through shading
- Improving Air Quality by absorbing air pollutants
- Wind breaks, and regulation of local wind circulation.

C. Erosion Control and Protection against the risks of landslides and flash floods.

D. Enhancement of aesthetic and scenic beauty of the neighborhood and the County.

E. Protection of Property Values.

F. Protection of Heritage Tree Resources.

REGULATIONS GOVERNING TREE PRESERVATION

Trees removal and preservation is enforced under the following types of regulatory action:

a) Tree Removal Permit

Division C16 of the County Ordinance Code requires an Administrative Permit (Tree Removal Permits) and mitigation measures for removal of any protected tree, on any private or public property in designated areas of the County, including but not limited to "Hillsides"(parcels three acres or less), –d (Design Review) combining district, and any tree within the "-h1" Historic Preservation zoning district for New Almaden.

b) California Environmental Quality Act (CEQA)

Land Development that requires discretionary approvals by the Planning Office and requires review through the California Environmental Quality Act (CEQA), requires tree preservation measures and/or replacement ratios, for trees either proposed for removal or impacted by the development.

c) Oak Woodlands

California Public Resources Code §21083.4, effective January 1, 2005, requires Counties to evaluate impacts to Oak Woodlands as part of the environmental analysis conducted in compliance with the California Environmental Quality Act (CEQA). *The Santa Clara County Planning Office Guide to Evaluating Oak Woodlands Impacts* provides more information on the guidelines and requirements for oak trees proposed for removal (*See attachment*).

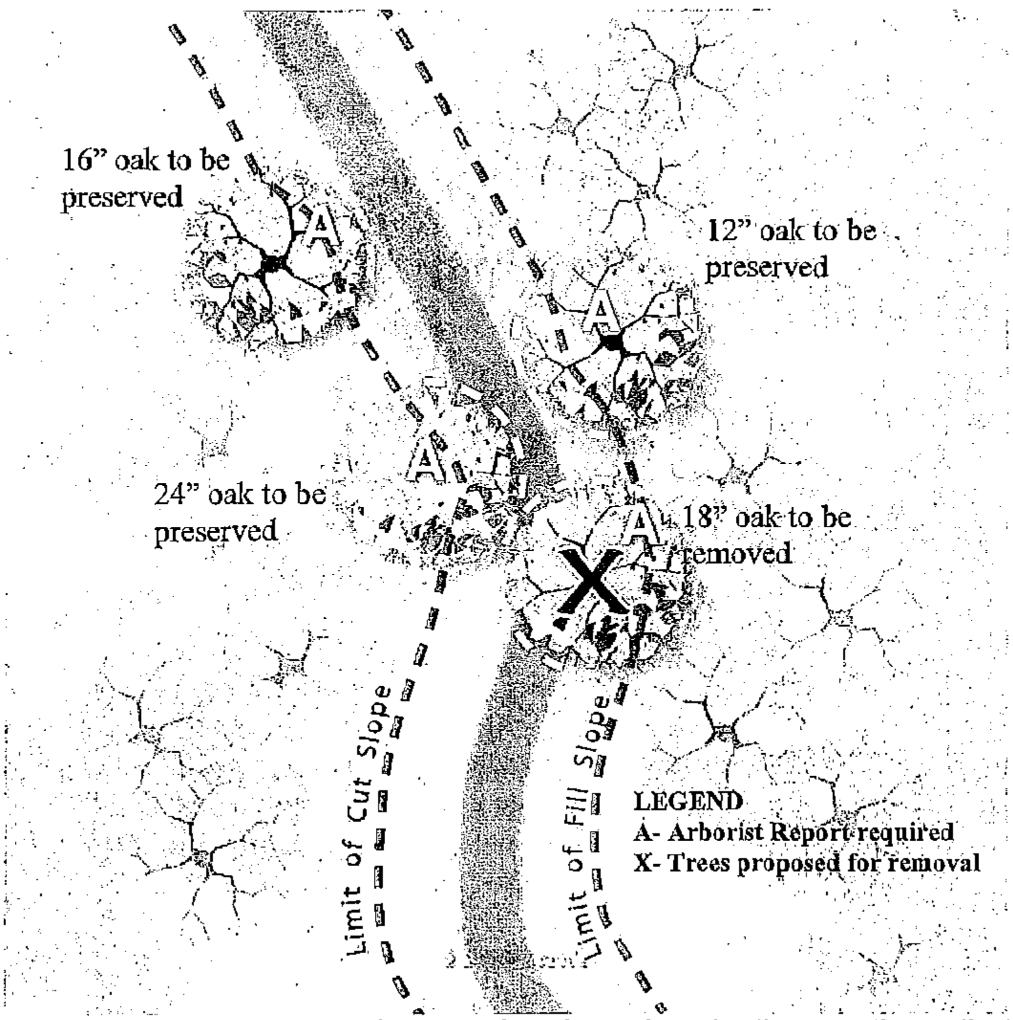
SITE PLAN REQUIREMENTS

A land use approval that proposes removal of, or potential impact to existing tree(s) on site, shall provide the following information on the site plan.

a) **Urban Districts** R1, R1E, R2, A1 (in Urban Service Area) R3, RHS, R1S (Stanford) and R1S (Multifamily):

Show on the site plan, and in a tabular format, the location, size and species of trees having a main trunk or stem measuring 37.7 inches or greater in circumference (12 inches or more in diameter) at a height of 4.5 feet above ground level, or in the case of multi-trunk trees a total of 75.4 inches in circumference (24 inches or more of the diameter) of all trunks to be removed or impacted by the development.

b) Rural **Districts** A, A1, RR, AR, HS, RS, OS/F (Stanford):
Show on the site plan and in a tabular format, the location, size and species of all trees having a main trunk or stem measuring 15.7 inches or greater in circumference (5 inches or greater in diameter) that are at least 4.5 feet above ground, that are either proposed to be removed and/or with canopy within the development area that may be impacted by the project. (*See Graphic 1 below*).



Graphic 1: Trees that are impacted and need evaluation are those that are proposed for removal and/or where the canopy interfaces with proposed grading improvements.

NOTES:

1. Consistent with County Ordinance Code ***Division C16 - Tree Preservation and Removal,*** *any Land Use application that proposes removal of trees as part of the scope of work shall provide a* ***justification statement*** *of the reasons for removal of the tree or trees.*

2. If any trees are proposed for removal per the Wildland /Urban Interface (WUI) guidelines adopted by the Fire Marshal Office, then show the location and size of all trees impacted by the guidelines.

ARBORIST REPORT

An arborist report shall be required under the following circumstances:

a) When a project is determined to have significant impact to either the health or maintenance of an identified tree (or trees), then an arborist report shall be required. (*See Graphic 1 above for a typical example).*

b) When a parcel has oak woodland on the property, then an arborist report shall be required to determine if the proposed project will cause significant impact to the oak woodland. (See attachment '*The Santa Clara County Planning Office Guide to Evaluating Oak Woodlands*' for more information).

A typical arborist report shall be prepared by a I.S.A Certified Arborist ("Arborist") and must include the following specific information:

- location, type, species (shown in a tabular format and on the site plan) of all trees proposed for removal and trees with canopies within the development area.
- health, of the tree(s) impacted by the development.
- potential impacts of development, and
- recommended actions and mitigation measures regarding the tree or trees impacted by the development.

NOTE: An accurate representation of the canopy cover of trees greater than 15.7 inches in circumference (5 inches in diameter) must be represented in the site plans. Information presented in the arborist report shall match the nomenclature and notations in the site plans.

An arborist report should provide recommendations or mitigation measures for tree protection and preservation. In addition to adopting the recommendations of the arborist, the following measures should be adhered to.

PRESERVATION OF TREES/ MITIGATION MEASURES

In order to preserve and protect trees, where a proposed development includes grading and/or construction activities within the canopy of tree or trees, certain preservation and mitigation measures shall be required. These guidelines will address impacts and preservation measures from pre-construction and demolition, through post-construction.

I. Pre-Construction:

An Arborist shall review final grading / demolition / construction plans and make recommendations regarding preservation of all trees potentially impacted by the proposed project, which are designated for preservation.

If the Arborist concludes, with concurrence from the Planning Office, that the proposed improvements will result in damage and subsequent irreversible loss of additional trees on site, replacement mitigation shall be required.

Final grading / construction plans shall clearly identify the size and species of all trees proposed for removal, consistent with the arborist plan review report. For each tree designated for removal, replacement shall occur at the replacement ratios stated below.

II. Tree Protection

a) *Fencing:*
All trees to be retained shall be protected with chain link fencing or other rigid fence enclosure acceptable by the Planning Office.

Fenced enclosures for trees to be protected shall be erected at the dripline of trees or as established by the Arborist to establish the Tree Protective Zone (TPZ) in which no soil disturbance is permitted and activities are restricted.

All trees to be preserved shall be protected with minimum 5-foot high fences. Fences are to be mounted on 2-inch diameter galvanized iron posts, driven into the ground to a depth of at least 2 feet, at no more than 10-foot spacing (See detail, available at www.sccplanning.org). This detail shall appear on grading, demolition and building permit plans.

Tree fencing shall be erected before any demolition, grading or construction begins and remain in place until the Final Inspection.

b) *"Warning" Signs*
A warning sign shall be prominently displayed on each tree protective fence per the requirements of development pursuant to the Santa Clara County Planning Office. (*See attached Example*). The signs are available at the Planning and Building Inspection Offices or at www.sccplanning.org.

c) *Irrigation Program*
Irrigate to wet the soil within the TPZ during the dry season as specified by the Project Arborist.

d) *Dust Control Program*
During periods of extended drought, or grading, spray trunk, limbs and foliage to remove accumulated construction dust.

e) Soil Compaction Damage/ Mulching

Compaction of the soil causes a significant impact to trees during construction. If compaction to the upper 12-inch soil within the TPZ has occurred or is proposed, then one or more of the following mitigation measures shall be implemented as recommended by the Arborist or the County Planning Office.

A. Four-inches of chip bark mulching shall be placed on top of the TPZ and enclosed with the tree protective fencing as prescribed in the County protective fencing measures.

B. If compaction of the root system, may result in possible suffocation of the root system, a soil aeration system shall be installed as designed and specified by an Arborist.

C. Paving/Hardscape and other soil compacting material that encroaches within the TPZ, should include an aeration system designed by an Arborist.

III. During construction

All tree protection measures as recommended by a certified Arborist shall be shown on the final grading/ construction or landscape plans and adhered to during construction. The Arborist shall monitor construction activity to ensure that the tree protection measures are implemented, and submit a Construction Observation Letter to the Planning Office for approval, prior to final inspection, summarizing the results of the monitoring activity and resulting health of trees designated for preservation onsite.

IV. Post-Construction Monitoring

The following may be required based on project specific circumstances:

An Arborist shall submit to the Planning Office two (2) copies of a monitoring report annually from the date of final inspection. The report shall show compliance with the tree protection conditions of approval and verification that all trees are in good health.

<u>REPLACEMENT OF TREES</u>

The following guidelines shall be imposed as conditions when a proposed development entails removal of trees or may significantly impact the health and vigor of trees within the development area of the proposed project.

All healthy native trees 12 inches in diameter or more (at 4.5 feet above the ground) proposed for removal shall be replaced.

- Replacement trees should be native, and like for like. (*See Appendix D Santa Clara County native/ naturalized trees list attached*).

- Oak trees shall be replaced with oak trees (no exceptions taken).

- No tree removal shall be permitted until such grading or building permit has been issued by the County as indicated on approved plans. The number of trees cut may not exceed the minimum number necessary to carry out the permitted action.

Additional conditions may need to be established for scheduled arborist reports, and stipulations on replanting replacement trees in the case that the original replacement trees die.

Tree Replanting Ratios
Generally, the following are the replacement ratios:

For the removal of one small tree (5- 18 inches):
(3) 15 gallon trees, or (2) 24-inch box trees.

For the removal of one medium tree (18 – 24 inches):
(4) 15 gallon trees or (3) 24-inch box trees.

For the removal of a tree larger than 24 inches
(5) 15 gallon trees or (4) 24-inch box trees.

NOTE: Based on the following variability of factors, tree replacement ratios may vary for each project. Tree replacement can be dependant upon the size of the canopy of removed trees, number of trees, size of trees, type of trees, and steepness of slope of trees to be removed; or amount of room available on a parcel in which trees can be planted. On properties where there is limited room to plant replacement trees, fewer replacement trees may be authorized.

NOTE: If the project has the potential to cause significant impact to Oak Woodland as stated in *The Santa Clara County Planning Office Guide to Evaluating Oak Woodlands Impacts*, then additional mitigation measures will be required. (*See attachment for more information).*

COUNTY OF SANTA CLARA — PLANNING OFFICE
70 W. HEDDING ST., SAN JOSE, CA 95110
(408) 299-5770 www.sccplanning.org

Site Plan Requirements for Tree Removal Permits

On the site plan show :

- all trees to be removed and replanted on the property
- the size of all trees to be removed (as measured 4.5' above grade), the species of each tree, approximate height of each tree, and age (if known)
- the number of trees that will remain on the property upon completion of the cutting
- the dimensions from property lines and existing structures (on site and closest neighbor) and show names of streets fronting the property, the edge of the any County road right-of-way
- any other pertinent information which may be useful to staff in reviewing your application

TREE REMOVAL REGULATIONS FOR SANTA CLARA COUNTY

WHY ARE TREES IMPORTANT?

The County of Santa Clara recognizes the substantial economic, environmental and aesthetic importance of its tree population and that the preservation of certain trees on private and public property is necessary to establish and maintain the optimum amount of tree cover on public and private lands in the county. Trees help to preserve and protect aesthetic and scenic beauty; prevent erosion of topsoil; protect against flood hazards and the risk of landslides; counteract the pollutants in the air; protect against high winds; maintain the climatic balance and provide shade; provide privacy; provide habitat to a variety of wildlife species; and protect valuable historical and community assets. In addition, studies have shown that trees increase commercial and residential property values.[1]

WHEN IS A TREE REMOVAL PERMIT REQUIRED FROM THE COUNTY?

A protected tree on any private or public property shall consist of any of the following:

- Any tree having a main trunk or stem measuring 37.7 inches or greater in circumference (12 inches or more in diameter) at a height of four and one-half feet above ground level, or in the case of multi-trunk trees a total of 75.4 inches in circumference (24 inches or more of the diameter) of all trunks in the following areas of the County:

    (1) parcels zoned "Hillsides" (3 acres or less)
    (2) parcels within a "-d" (Design Review) combining zoning district
    (3) parcels within the Los Gatos Specific Plan Area.

- Any heritage tree, as that term is defined in §C16-2 of the Tree Preservatiou Ordinance.
- Any tree required to be planted as a replacement for an unlawfully removed tree, pursuant to §C16-17(e) of the Tree Preservatioin Ordinance.
- Any tree that was required to be planted or retained by the conditions of approval for auy Use Permit, Building Site Approval, Grading Permit, Architectural & Site Approval (ASA), Design Review, Special Permit or Subdivision.
- On any property owned or leased by the County of Santa Clara, any tree which measures over 37.7 inches in circumference (12 inches or more in diameter) measured 4.5 feet above the ground, or which exceeds 20 feet in height.
- Any tree, regardless of size, within road rights-of-way and easements of the County, whether within or without the unincorporated territory of the County.

EXCEPTIONS TO TREE REMOVAL PERMIT REQUIREMENTS

Except in the case of heritage trees, no permit shall be required from the Planning Office for the cutting, removal, destruction, or pruning of a tree in the followiug circumstances:

- The tree is (1) irreversibly diseased, is dead, or is dyiug; or (2) the tree is substantially damaged from natural causes (a determination by a liceused arborist, tree surgeon, or forester may be required).
- Tree cutting to remove a hazard to life and personal property as determined by the Planning Director, or his or her designee. It shall be the responsibility of the property owner or other person responsible for removing the tree to demonstrate that any tree removed without a permit was irreversibly diseased, substantially damaged, or presented an immineut dauger to human life or safety or to property.
- Trees planted, growu and/or held for sale by licensed nurseries and/or tree farms.
- Trees in the active productiou of agriculture or orchard production, where there is no active plan to convert the property to auother use.

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[1] Enviro News/Lousiana Gateway 2000. Spring/Summer 1993, Vol IV

- Tree removal necessary to carry out bnilding site approval or other land nse application approved by the County. No removal shall be permitted until such grading or building permit has been issued by the County as indicated on approved plans. The number of trees cut may not exceed the minimum number necessary to carry out the permitted action.
- Maintenance work within pubic ntility easements.
- Trees removed or pruned as part of maintenance of County Parks under established policies and procedures of the Parks & Recreation Department.
- Trees removed or pruned as part of maintenance of County right-of-way under established policies and procedures of the Department of Roads & Airports.
- Trees removed on properties with a comprehensive Vegetative Management Program approved by the county;

TREE REMOVAL IN AR (AGRICULTURAL RANCHLANDS) & HS (HILLSIDE) ZONING DISTRICTS
Tree removal allowed as a matter of right, Special Permit and Use Permit in the AR & HS (parcels greater than 3 acres) zoning districts are governed by §C16-5 & §C16-6 of the County Ordinance Code.

IS A FEE REQUIRED FOR A TREE REMOVAL PERMIT?
No fee shall be assessed for an Administrative Permit for tree removal. The application for a Special Permit or Use Permit for tree removal shall be accompanied by a fee, as set by ordinance by the Board of Supervisors.

HOW DO I APPLY FOR A TREE REMOVAL PERMIT?
Any person desiring to remove any tree under an Administrative Permit shall file an application with the County Planning Office not less than 10 days prior to the date of such planned removal. Removal of any tree, regardless of size, located within a County road right-of-way shall require an Encroachment Permit from the Department of Roads & Airports not less than 60 days prior to planned removal.

The following information shall be included in applications for tree removal:

- A brief statement of the reasons for removal of the tree..
- A photograph of the tree(s) proposed for removal.
- A tree survey (map) with the accurate location, number, species, size (diameter measured four and one-half feet above ground, approximate height, and approximate canopy diameter), general health, and approximate age, if known.
- Location of property lines, names of the streets fronting the property and edge of any street right-of-way.
- A replanting and/or revegetation plan for all trees to be removed. Replacement trees shall be of a like kind and species of tree removed, if native and feasible, or of a kind and species to be determined by the Planning Department. Replacement tree planting shall utilize at least five (5) gallon size stock.

WHO APPROVES THE PERMIT?
The Planning Ofice staff or, in the case of appeals, the Planning Commission.

WHAT CRITERIA DETERMINE WHETHER MY REQUEST WILL BE APPROVED?
Criteria set forth in the Tree Preservation Ordinance include, but are not limited to, the following:

- whether the tree is diseased; poses a risk to property, health, or safety; interferes with vital public utilities; or will be replaced by approved plantings;
- the topography of the land and the effect of the proposed tree removal upon erosion, soil retention, and the diversion or increased flow of sediment;
- the number, species, size, and location of existing trees in the area, and the effect the proposed removal wonld have upon shade, privacy impact, scenic beauty,

property values, and potential impacts upon adjacent trees (i.e. increased windthrow);

- the historical significance of the tree to the community;
- the tree has caused repeated sewer/sidewalk damage and created a sewer/sidewalk problem that cannot be resolved by any other means;
- removal of the tree would benefit roadway usage, i.e. road widening, sidewalk installation, etc. as determined by Department of Roads & Airports staff.

DISPLAY OF PERMIT/NOTICE TO NEIGHBORS

The approved tree removal permit shall be posted on the site a minimum of seven (7) calendar days prior to actual tree removal operations and shall be available to any person for inspection. The issued permit shall be posted in a conspicuous place at eye level at a point near the closest street or roadway. It shall be the property owners responsibility to see that adjoining property owners also receive a copy of said tree removal permit a minimum of seven (7) calendar days prior to actual tree removal operations. Removal of the subject tree(s) shall be allowed to take place at the end of the 7 day noticing period if no written objection to the issuance of the permit has been received by Planning staff.

Note: a copy of the entire Tree Preservation Ordinance can be obtained at the Planning Office front counter.

pm 2/11/96

Sec. B11-152. Exterior noise limits.

(a) *Maximum permissible sound levels by receiving land use.*

(1) The noise standards for the various receiving land use categories as presented in Table B11-152 will apply to all property within any zoning district.

(2) No person may operate or cause to be operated any source of sound at any location within the unincorporated territory of the County or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by the person, which causes the noise level when measured on any other property either incorporated or unincorporated, to exceed:

a. The noise standard for that land use as specified in Table B11-152 for a cumulative period of more than 30 minutes in any hour; or

b. The noise standard plus five dB for a cumulative period of more than 15 minutes in any hour; or

c. The noise standard plus ten dB for a cumulative period of more than five minutes in any hour; or

d. The noise standard plus 15 dB for a cumulative period of more than one minute in any hour; or

e. The noise standard plus 20 dB or the maximum measured ambient, for any period of time.

(3) If the measured ambient level exceeds that permissible within any of the first four noise limit categories above, the allowable noise exposure standard will be increased in five dB increments in each category as appropriate to encompass or reflect the ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under the category will be increased to reflect the maximum ambient noise level.

(4) If the noise measurement occurs on a property adjoining a different land use category, the noise level limit applicable to the lower land use category, plus five dB, will apply.

(5) If for any reason the alleged offending noise source cannot be shutdown, the ambient noise must be estimated by performing a measurement in the same general area of the source but at a sufficient distance that the noise from the source is at least ten dB below the ambient in order that only the ambient level be measured. If the difference between the ambient and the noise source is five to ten dB, then the level of the ambient itself can be reasonably determined by subtracting a one-decibel correction to account for the contribution of the source.

(b) *Correction for character of sound.* In the event the alleged offensive noise contains a steady, audible tone such as a whine, screech or hum, or contains music or speech conveying informational content, the standard limits set forth in Table B11-152 will be reduced by five dB.

TABLE B11-152

Exterior Noise Limits
(Levels not to be exceeded more than 30 minutes in any hour)

Receiving Land Use Category	Time Period	Noise Level (dBA)
One- and Two-Family Residential	10:00 p.m.—7:00 a.m. 7:00 a.m.—10:00 p.m.	45 55
Multiple-Family Dwelling	10:00 p.m.—7:00 a.m.	50
Residential Public Space	7:00 a.m.—10:00 p.m.	55
Commercial	10:00 p.m.—7:00 a.m.	60
	7:00 a.m.—10:00 p.m.	65
Light Industrial	Any Time	70
Heavy Industrial	Any Time	75

(Ord. No. NS-517.72, § 2, 4-15-03)

Sec. B11-153. Interior noise standards.

(a) *Maximum permissible dwelling interior sound levels:*

(1) The interior noise standards for multifamily residential dwellings as presented in Table B11-153 will apply, unless otherwise specifically indicated, within all dwellings.

TABLE B11-153

Type of Land Use	Time Interval	Allowable Interior Noise Level (dBA)
Multifamily dwelling	10:00 p.m.—7:00 a.m.	35
	7:00 a.m.—10:00 p.m.	45

(2) No person will operate or cause to be operated within a dwelling unit any source of sound or allow creation of any noise which causes the noise level when measured inside a neighboring receiving dwelling unit to exceed:

a. The noise standard as specified in Table B11-153 for a cumulative period of more than five minutes in any hour; or

b. The noise standard plus five dB for a cumulative period of more than one minute in any hour; or

c. The noise standard plus ten dB or the maximum measured ambient, for any period of time.

(3) If the measured ambient level exceeds that permissible within any of the noise limit categories above, the allowable noise exposure standard will be increased in five-dB increments in each category as appropriate to reflect the ambient noise level.

(b) *Correction for character of sound.* In the event the alleged offensive noise contains a steady, audible tone such as a whine, screech or hum, or contains music or speech conveying information content, the standard limits set forth in Table B11-153 will be reduced by five dB.

(Ord. No. NS-517.72, § 2, 4-15-03)

Sec. B11-154. Prohibited acts.

(a) *Noise disturbances prohibited.* No person may willfully or negligently make, continue or cause to be made or continued any sound which:

(1) Endangers or injures the safety or health of human beings or animals; or

(2) Annoys or disturbs a person of normal sensitivities; or

(3) Endangers or injures personal or real properties.

(b) *Specific prohibitions.* The following acts, and the causing or permitting thereof, are declared to be in violation of this chapter:

(1) *Radios, television sets, musical instruments and similar devices.* Operating, playing or permitting the operation or playing of any radio, television set, phonograph, drum, musical instrument, or similar device which produces or reproduces sound:

a. Between the hours of 10:00 p.m. and 7:00 a.m. the following day in a manner as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of Section B11-152 or B11-153 except for activities for which a variance has been issued.

b. In the manner as to exceed the levels set forth for public space in Table B11-152, measured at a distance of at least 50 feet (15 meters) from the device operating on a public right-of-way or public space.

(2) *Loudspeakers (amplified sound).*

a. Using or operating for any commercial purposes any loudspeaker system or similar device between the hours of 10:00 p.m. and 7:00 a.m. the following day, that the sound there from creates a noise disturbance across a residential real property line, or at any time violates the provisions of Section B11-153.

b. Using or operating for any noncommercial purposes any loudspeaker, public address system or similar device between the hours of 10:00 p.m. and 7:00 a.m. the following day, that the sound there from creates a noise disturbance across a residential real property boundary or at any time violates the provisions of Section B11-152.

(3) *Street sales.* Offering for sale, selling anything, or advertising by shouting, outcry or use of a noise-making device within any residential or commercial area of the County as to cause a noise disturbance. The provisions of this section will not be construed to prohibit the selling by outcry of merchandise, food and beverage at licensed sporting events, parades, fairs, circuses or other similar licensed public entertainment events.

(4) *Animals and birds.* Owning, possessing or harboring any animal or bird which howls, barks, meows, squawks or makes other noises continuously and/or incessantly for a period of ten minutes or intermittently for one-half hour or more which creates a noise disturbance across a residential or commercial real property line. For the purpose of this section, the animal or bird noise will not be deemed a disturbance if a person is trespassing or threatening to trespass upon private property in or upon which the animal or bird is situated or for any other legitimate cause which teased or provoked the animal or bird.

(5) *Loading and unloading.* Loading, unloading, opening, closing or handling of boxes, crates, containers, building materials, garbage cans or similar objects between the hours of 10:00 p.m. and 7:00 a.m. the following day in a manner as to cause a noise disturbance across a residential real property line or at any time to violate the provisions of Section B11-152.

(6) *Construction/demolition.*

a. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekdays and Saturday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance. This section will not apply to the use of domestic power tools as specified in Subsection 11.

b. Where technically and economically feasible, construction activities will be conducted in a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedule:

i. *Mobile equipment.* Maximum noise levels for nonscheduled, intermittent, short-term operation (less than ten days) of mobile equipment:

	Single- and Two-Family Dwelling Residential Area	Multifamily Dwelling Residential Area	Commercial Area
Daily, except Sundays and legal holidays 7:00 a.m.—7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	50 dBA

ii. *Stationary equipment.* Maximum noise levels for repetitively scheduled and relatively long-term operation (periods of ten days or more) of stationary equipment are as follows:

	Single- and Two-Family Dwelling Residential Area	Multifamily Dwelling Residential Area	Commercial Area
Daily, except Sundays and legal holidays 7:00 a.m.—7:00 p.m.	50 dBA	85 dBA	85 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	50 dBA

(7) *Vibration.* Operating or permitting the operation of any device that creates a vibrating or quivering effect that:

a. Endangers or injures the safety or health of human beings or animals; or

b. Annoys or disturbs a person of normal sensitivities; or

c. Endangers or injures personal or real properties.

(8) *Powered model vehicles.* Operating or permitting the operation of powered model vehicles:

a. Between the hours of 7:00 p.m. and 7:00 a.m. the following day so as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of Section B11-152.

b.

In a manner as to exceed the levels set forth for public space land use in Table B11-152, measured at a distance of not less than 100 feet (30 meters) from any point on the path of a vehicle operating on public space or public right-of-way.

(9) *Stationary non-emergency signaling devices.* Sounding or permitting the sounding of any electronically amplified signal from any stationary bell, chime, siren, whistle or similar device, intended primarily for non-emergency purposes, from any place, for more than ten seconds in any hourly period.

(10) *Emergency signaling devices.*

a. The intentional sounding or permitting the sounding outdoors of any fire, burglar or civil defense alarm, siren, whistle or similar stationary emergency signaling device, except for emergency purposes or for testing, as provided in Subsection b.

b. Testing.

i. Testing of a stationary emergency signaling device must not occur before 7:00 a.m. or after 7:00 p.m. Any testing will use only the minimum cycle test time. In no case will the test time exceed 60 seconds.

ii. Testing of the complete emergency signaling system, including the functioning of the signaling device, and the personnel response to the signaling device, will not occur more than once in each calendar month. The testing will not occur before 7:00 a.m. nor after 10:00 p.m. The time limit specified in Subsection (i) will not apply to the complete system testing.

c. Sounding or permitting the sounding of any exterior burglar or fire alarm or any motor vehicle burglar alarm unless the alarm is terminated within 15 minutes of activation.

(11) *Domestic power tools.*

a. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between 10:00 p.m. and 7:00 a.m. the following day so as to create a noise disturbance across a residential or commercial real property line.

b. Any motor, machinery or pump will be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with Section B11-152.

(12) *Air-conditioning or air-handling equipment.* Operating or permitting the operation of any air-conditioning or air-handling equipment in a manner as to exceed any of the following sound levels without a variance:

Measurement Location; dB(A)

Any point on neighboring property line, five feet above grade level, no closer than three feet from any wall 50

Center of neighboring patio, five feet above grade level, no closer than three feet from any wall 45

Outside the neighboring living area window nearest the equipment location, not more than three feet from the window opening, but at least three feet from any other surface 45

(13) *Swimming pool motors and equipment.* Operating or permitting the operation of any swimming pool motor or swimming pool equipment that the sound therefrom creates a

noise disturbance across a residential real property line or at any time violates the provisions of Section B11-152.

(14) *Helicopters.* Operating or permitting to be operated any helicopter which violates nighttime provisions of Section B11-152 or which causes a noise that exceeds 80 dBA during the day in residential or commercial areas without a variance. Military and government-operated helicopters are exempted from provisions of this section.

(15) *Fixed noise source location.* Installation or permitting the installation of any fixed noise source in the side yards of any residence without a variance.

(Ord. No. NS-517.72, § 2, 4-15-03)

Sec. B11-155. Motor vehicle noise limits.

(a) *Refuse collection vehicles.*

(1) No person will collect refuse with a refuse collection vehicle between the hours of 6:00 p.m. and 6:00 a.m. the following day in a residential area or adjacent to residential area.

(2) No person authorized to engage in waste disposal service or garbage collection will operate any truck-mounted waste or garbage loading and/or compacting equipment or similar device in any manner so as to create any noise exceeding the following levels, measured at a distance of 50 feet from the equipment in an open area:

a. Existing equipment purchased or leased on or after a date six months from the effective date of this chapter: 81 dBA.

b. New equipment purchased or leased after October 1, 1982: 73 dBA.

c. New equipment purchased or leased after July 1, 1984: 70 dBA.

(b) *Vehicle, motorboat or aircraft repair and testing.* Repairing, rebuilding, modifying or testing any motor vehicle, motor boat or aircraft in a manner as to create a noise disturbance across a residential real property line, or at any time violate the provisions of Section B11-152.

(c) *Standing motor vehicles.* No person will operate or permit the operation of any motor vehicle with a gross vehicle weight rating (GVWR) in excess of 10,000 pounds, or any auxiliary equipment attached to a vehicle, for a period longer than 15 minutes in any hour while the vehicle is stationary, for reasons other than traffic congestion, on a public right-of-way or public space within 150 feet (46 meters) of a residential area between the hours of 10:00 p.m. and 7:00 a.m. the following day.

(d) *Motorized recreational vehicles operating off public right-of-way.* No person will operate or cause to be operated any motorized recreational vehicle off a public right-of-way in a manner that the sound levels emitted will violate the provisions of Section B11-152. This section will apply to all motorized recreational vehicles, whether or not duly licensed and registered, including but not limited to commercial or noncommercial racing vehicles, motorcycles, go-carts, amphibious craft, campers, dune buggies and motorboats.

(Ord. No. NS-517.72, § 2, 4-15-03)

Sec. B11-156. Special provisions.

(a) *Emergency exceptions.* The provisions of this chapter will not apply to:

(1) The emission of sound for the purpose of alerting persons to the existence of an emergency; or

(2) The emission of sound in the performance of emergency work.

(b)

Warning devices. Warning devices necessary for the protection of public safety, including but not limited to police, fire and ambulance sirens, and train horns, are exempt from the provisions of this chapter.

(c) *Outdoor activities.* The provisions of this chapter will not apply to occasional outdoor gatherings, public dances, shows, and sporting and entertainment events, provided the events are conducted pursuant to a permit or license issued by the County relative to the staging of the events.

(d) *Exemption from exterior noise standards.* The provisions of Section B11-152 will not apply to activities covered by the following sections:

(1) B11-154(3), street sales;

(2) B11-154(4), animals and birds;

(3) B11-154(6), construction/demolition;

(4) B11-154(9), stationary non-emergency signaling devices;

(5) B11-154(10), emergency signaling devices;

(6) B11-154(11), domestic power tools;

(7) B11-154(12), air-conditioning or air-handling equipment;

(8) B11-155(a), refuse collection vehicles.

(e) *Agricultural operations.* The provisions of this chapter will not apply to mechanical devices, apparatus or equipment associated with agricultural operations conducted on agricultural property.

(f) *Federal or state preempted activities.* Any activity to the extent regulation has been preempted by state or federal law is exempt from the provisions of this chapter.

(g) *County expressway system.* The entirety of the County expressway system, including existing and proposed facilities, is exempt from the provisions of Section B11-152.

(Ord. No. NS-517.72, § 2, 4-15-03)

Sec. B11-157. Variance permit procedure.

(a) *Purpose.* The Director is authorized to grant a variance from any provision of this chapter by a variance permit.

(b) *Application and fees.* Any person seeking a variance pursuant to this section must file an application with the Department. The application must be accompanied by a fee in an amount established by the Board of Supervisors. A separate application must be filed for each noise source; however, several mobile sources under common ownership or several fixed sources on a single property may be combined into one application.

(c) *Standards for issuance of variance.* The purpose advanced by variance and disturbance created by the variance must not create a nuisance and will not be detrimental to the public health and safety. Variances will not be granted for a term exceeding 120 days, except that upon application and hearing as provided for in this chapter a variance may be renewed.

(d) *Time and place of hearing.* Upon the filing of a sufficient and proper application and the payment of filing fee, the Director will fix a time and place for a public hearing.

(e) *Notice of hearing.* The Director will ensure that a notice of the hearing is mailed to the owners of all property within 300 feet of the property affected by the application at their last-known addresses as are shown in the most recent records of the County Assessor. The notice must be mailed at least five days before the date of the public hearing. A similar notice must be mailed to the applicant.

(f)

Conditions. In approving a variance permit, the Director may include the conditions that are reasonable and necessary under the circumstances to protect the public health, safety and welfare from adverse effects caused by the noise emanating therefrom and may limit the term of the permit.

(g) *Findings and decision.* The Director, on the basis of the evidence submitted at the hearing, may grant a variance permit with any conditions deemed necessary and reasonable.

(h) *Notice of grant.* Upon the grant of an application for a variance permit, the Director will prepare and deliver to the applicant a formal statement that states the facts and conditions of the grant. No decision is final regarding an application for a variance permit until the appeal deadline has elapsed.

(i) *Appeals to Board of Supervisors.*

(1) Any person dissatisfied with the decision of the Director may file an appeal with the Board of Supervisors within 15 calendar days after the decision. The Director will transmit to the Board of Supervisors all maps, records, papers and files that constitute the record in the action from which the appeal was taken. At the time of the filing of the appeal, the appellant must pay a filing fee in an amount established by resolution of the Board of Supervisors.

(2) The Board of Supervisors will, within 30 days of the filing of the appeal, set the time and place for the appeal to be heard by the Board of Supervisors and will ensure that notice of the hearing is given, five days before the date of the hearing. The Board of Supervisors will hear the matter de novo and may approve, disapprove or conditionally approve the application. The decision of the Board of Supervisors is final.

(j) *Revocation of variance.*

(1) The Director may hold a hearing for modifying or revoking any permit or variance that has been granted pursuant to the provisions of this chapter. Public hearings will be held and notice given in accordance with the provisions of this section. Written notice of the hearing will also be served upon any persons making use of or relying upon any permit or variance to be modified or revoked not less than five days prior to the date of the hearing.

(2) After a public hearing, the Director may revoke or modify a permit on one or more of the following grounds:

a. That the approval was obtained by fraud; or

b. That any person making use of or relying upon the permit or variance is violating or has violated any conditions of the permit or variance, or that the use of the permit or variance was granted is being or has been exercised contrary to the terms or conditions of the approval; or

c. That the use of the approval is detrimental to the public health or safety, or is a nuisance.

(Ord. No. NS-517.72, § 2, 4-15-03)

Sec. B11-158. Enforcement.

(a) *Prima facie violations.* Any noise exceeding the noise level limits specified in Sections B11-152 and B11-153 or the prohibited actions as specified in Section B11-154 of this chapter will be deemed to be prima facie evidence of a violation of this chapter and prima facie evidence of irreparable harm.

(b) *Violations; remedies; injunctions.*

(1)

As a remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provision of this chapter that causes or creates sound levels or vibrations exceeding the allowable limits as specified in this chapter is hereby declared to be a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction. Additionally, no provision of this chapter will be construed to impair any common law or statutory cause of action, or legal remedy of any person for injury or damage arising from any violation of this chapter or from other law.

(2) Any person who knowingly and willfully violates an injunctive order obtained pursuant to the authority of this section will be deemed guilty of a misdemeanor and upon conviction will be sentenced to a term of imprisonment not to exceed five days or a fine not to exceed $500.00, or both.

(c) *Citizen suits.* Any person may commence a civil action against any other person who is alleged to be in violation of any provision of this chapter. Any person commencing civil action under this chapter will serve a copy of any complaint upon County Counsel.

(Ord. No. NS-517.72, § 2, 4-15-03)

Sec. B11-159. Reserved.

County of Santa Clara

Department of Planning and Development
County Government Center, East Wing
70 West Hedding Street, 7th Floor
San Jose, California 95110

	Administration	Development Services	Fire Marshal	Planning
Phone:	(408) 299-6740	(408) 299-5700	(408) 299-5760	(408) 299-5770
Fax:	(408) 299-6757	(408) 279-8537	(408) 287-9308	(408) 288-9198

Via USPS

September 16, 2013

Mr. Kurt Lueneburger
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: Santa Clara County's review comments for the Santa Clara Valley Water District's Notice of Preparation Of a Draft Environmental Impact Report for the Anderson Dam Seismic Retrofit Project

Dear Mr. Lueneburger:

This letter is in response to your "*Notice of Preparation of a Draft Environmental Impact Report*" (NOP), prepared by the Santa Clara Valley Water District (SCVWD), and dated August 13, 2013. This letter discusses floodplain issues only. Other letters from Santa Clara County may be forthcoming.

The NOP does not speak to Federal Emergency Management Agency's (FEMA) floodplain issues on Coyote Creek downstream of the Anderson Dam Facilities. These facilities have been identified in the current Federal Insurance Study (FIS) as a regulatory floodway and floodplain of known base flood elevation and are located in the unincorporated Santa Clara County. This proposal raises the walls in the spillway, and introduces a high level outlet. The NOP needs to address whether or not these improvements will affect the flood carrying capacity of Coyote Creek through that portion of the unincorporated County will require the submittal and issuance of a Floodplain Development Permit through the Building Office.

As the floodplain areas downstream of the outlets are designated as regulatory floodways, federal regulation requires that the permit application will demonstrate through a Conditional Letter of Map Revision (CLOMR), prepared to the FEMA requirements and approval by FEMA staff prior to commencement of construction, that the base flood elevations will or will not change as a result of this project. If the above CLOMR demonstrates that the base flood elevations will change as a result of this project, the permit application will also require a Letter of Map Revision (LOMR) be prepared to the FEMA requirements and approval by FEMA staff after the completion of construction.

When you submit plans for CLOMR or LOMR Review, please make sure you submit the following information:

- Improvement plans including erosion control.
- Clearance Letters or copies of permits as applicable from Army Corp (404 permit), Regional Board (401), NOAA Fisheries, Fish & Wildlife, Fish & Game, and any other state, local or federal agencies. Per FEMA requirements of the local agencies, the County will review the plans and check for conformance with the local, state, and federal agencies requirements.
- A signed and stamped No Rise Certificate prepared by a Registered Civil Engineer.
- No Adverse Impact Certificate / Statement prepared by a Registered Civil Engineer.

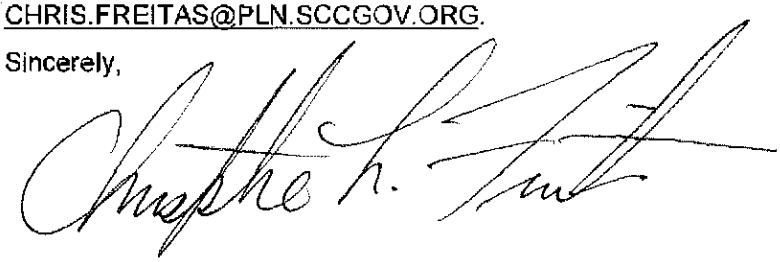
- A No Impact to Structures Statement prepared by a Registered Civil Engineer. The SCVWD can use the FEMA example No Rise language on SCVWD letterhead. No Impact to Structures statement should state that there are no structures located in areas which could be impacted by the proposed development and/or be affected by the increased BFE (unless they have been purchased for relocation or demolition).

- The District can also include the following statements on the same letter to address the No Adverse Impact and No Impact to Structures. The No Adverse Impact statement should state that the proposed project does not:

    1. Increase the flow velocities of "Permanente Creek",
    2. Expand or change the limits of the floodplain,
    3. Alter or change the physical characteristics of the floodplain, and
    4. Decrease the flood storage capacity.

If you have any questions and/or when you are ready to submit, please contact me at (408) 299-5732 or CHRIS.FREITAS@PLN.SCCGOV.ORG.

Sincerely,



Christopher Freitas, P.E.
Senior Civil Engineer,
County of Santa Clara

cc:	Michael Harrison	-	Floodplain Administrator, Building Department
	Darrell Wong	-	Principal Civil Engineer, LDE
	Colleen Oda	-	Planner III, Planning Office
	Sarah Owen	-	FEMA – by E-mail Sarah.Owens@dhs.gov
	Eric Simmons	-	FEMA – by E-mail Eric.Simmons@dhs.gov
	Ray Lee	-	California State Department of Water Resources — by E-mail Ralee@water.ca.gov

County of Santa Clara

Parks and Recreation Department

298 Garden Hill Drive
Los Gatos, California 95032-7669
(408) 355-2200 FAX 355-2290
Reservations (408) 355-2201
www.parkhere.org

September 13, 2013

Kurt Lueneburger
Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

SUBJECT: Notice of Preparation of a draft Environmental Impact Report (DEIR) for the Anderson Dam Seismic Retrofit Project, Santa Clara County

Dear Mr. Lueneburger:

The County of Santa Clara, Parks and Recreation Department ("Parks Department") and Roads and Airport Department ("Roads Department") are in receipt of a Notice of Preparation (NOP) and Initial Study (IS) for preparation of a draft Environmental Impact Report (DEIR) for the Anderson Dam Seismic Retrofit Project ("Project").

As a Responsible Agency under the California Environmental Quality Act, the County would consider the findings of the IS and DEIR prior to the approval and issuance of any permits or agreements. County departments, such as the Parks Department and Roads Department, are charged with reviewing and assessing projects which may impact properties and facilities operated, maintained and/or managed by the respective departments and would evaluate the findings of the DEIR for the Board of Supervisors' consideration prior to the Board's approval and issuance of specific permits, licenses to enter and/or agreements. The Parks Department and Roads Department are submitting a joint letter in regards to our respective comments on the proposed Project's effects that will be evaluated in the DEIR.

The Parks Department's review of the NOP of the DEIR is focused on potential impacts related to land use, recreation, natural resources in our regional park, trails and public access. Since the project is located within Anderson Lake County Park which is operated and managed by the Parks Department, our comments focus on the potential short term and long term impacts that the project may have with the use of public parkland, proposed temporary closure of the park facilities, and limited public access to recreational and trail facilities that include countywide trail routes identified in the Board-approved *Santa Clara County Countywide Trails Master Plan Update* ("Countywide Trails Master Plan"). The Roads Department's review of the NOP is focused on County-owned and maintained roads that are used as ingress and egress to Anderson Dam and Anderson Lake County Park, which includes Cochrane Road and Coyote Road.

The Parks Department and Roads Department provide the following comments and recommend that the SCVWD consider our comments and following information in the DEIR analysis, preparation, and development of mitigation measures for the DEIR.

General comments

In general, the Parks Department and Roads Department are focused on concerns regarding the project's potentially significant impacts on recreation (land-based and water-based) including temporary park closure, reservoir restriction on boating uses, noise impacts and construction impacts on recreational uses and facilities; impacts of the dewatering of the reservoir on the hydrological functions of Coyote Creek and Anderson Lake; and impacts on transportation/traffic with the proposed realignment of Cochrane Road and Coyote Road.

Recreation

The DEIR should consider and discuss potential impacts to all recreational uses and facilities in Anderson Lake County Park. While it is understood that some of the recreational uses in the project area, such as fishing, boating, and use of certain trails, restrooms, parking, and day use areas, will be halted during Project construction, the DEIR should consider short term impacts, such as noise, odors/dust, access, to recreational uses which remain open during project construction, for example most of the internal trails will remain open during construction.

Environmental Setting should include additional description and discussion of existing park facilities, regional and internal park trails, and recreational uses which may be impacted by the Project including those that are not within the immediate project area. The Parks Department suggests revisions that include the following recreational facilities:

> Anderson Lake County Parks encompasses the reservoir and includes recreational amenities which include internal and regional trails, the Jackson Ranch Historic Site, Rosendin Park Area, Burnett Park Area, Live Oak Day Use Area, Toyon Day Use Area, Woodchoppers Flat picnic area, Boat Launch, Boat Launch parking area, and the Anderson Lake County Park Visitor Center and Park Office and Anderson Lake County Park Maintenance facility.

Park areas which would be impacted by the Project include the Live Oak and Toyon day use areas, and the Rosendin area which includes day use areas, boat launch facilities, and regional and internal park trails. Facilities located in these areas also include but are not limited to paved and un-paved parking lots, access roads, restrooms, picnic areas, utilities such as water and irrigation lines, and the Live Oak Bridge. Facilities located within the immediate vicinity of the project area include internal park and regional trails such as the Lake Trail which is adjacent to the boat launch area and segments of the Bay Area Ridge Trail, Woodchoppers Flat area, and the Anderson Lake County Park Visitor Center facility. The recently-built Park Visitor Center includes the park office and maintenance shop, which is located approximately one-half mile from the project site on Malaguerra Avenue. The project site is also connected to nearby regional trails and facilities that include Coyote Creek Parkway County Park and segments of Coyote Creek Trail which would bring trail users to Anderson County Park.

The Rosendin area of Anderson Lake County Park located east and south east of the Project site contains numerous park trails including Gray Pine, Rosendin, Cochrane, Rancho Laguna Seca, and Lake View trails. Trails on the western side of the reservoir and those within the Live Oak and Toyon areas include the Live Oak Trail, Serpentine Trail and a segment of the Bay Area Ridge Trail (see also *Santa Clara County Countywide Trails Master Plan Update)*, and small un-named trails accessed from the Bay Area Ridge Trail. In addition, some of the park trails connect to City of Morgan Hill trails including a citywide trail along Cochrane Road. The District should contact the City of Morgan Hill with regards to their citywide trails.

Under the Explanations for Land-Based Recreation, the IS states, "it is expected that some park users would seek recreation at neighboring facilities," and that this will be further examined in the EIR. The proposed three-year temporary closure of the Anderson County Park facilities poses a significant impact on the current park users, trail users and nearby residents who use this park for hiking, bicycling, horseback riding, picnicking, boating, fishing and other water-based recreational uses. In effect, public access will be restricted to the park and all of these current uses will not be able to take place during the project construction period.

Alternate recreational facilities would need to be identified and the potential impacts to these nearby recreational facilities (i.e. Coyote Creek Parkway County Park, Calero County Park, Coyote Lake-Harvey Bear Ranch County Park, etc.) would need to be evaluated and mitigated as park and trail users would be displaced from Anderson County Park.

Under the Explanations for Water-Based Recreation, the IS states, "during the temporary reservoir closure, there is potential for nearby reservoirs to receive increased recreational usage…it is anticipated the balance of open water recreational areas in the region would accommodate the demand for boating throughout the reservoir restriction. The potential for adverse effects to the physical environment resulting from increased usage of other boating destinations will be examined in the EIR." As part of the SCVWD's evaluation of the potential impacts and consideration of mitigation measures, the anticipated increased usage of other reservoir parks for boating/fishing activities will need to be addressed because the number of additional boats may be restricted at the other lakes due to the allowed boating capacity at the other reservoirs.

The Live Oak Area, which is identified as a staging area in the NOP, can only be accessed via a pedestrian bridge which has a load capacity of five tons (which has been discussed earlier under the *Construction Impacts section*) and, therefore access by construction vehicles or equipment is very restricted. The Parks Department would prefer that the Live Oak area not be used as a staging area and remain open for park users during project construction. It should also be noted that the Live Oak area is on County owned property, where use of this area for staging would require a permit/agreement from the County.

The DEIR should also consider and discuss the potential long-term or permanent impacts to public parklands and recreational facilities, such as ingress and egress roads, or alterations which result in restricted recreational use area, and mitigate for these impacts. For example, the extension of the dam embankment and intake and outlet works would result in long-term permanent impacts to the Toyon area such that will there will be a decrease in public park use area, loss of parking, and loss of access (see comments on *Section 4.1 Dam Embankment*

Remediation and *Section 4.3 Intake and Outlet Works).*

The IS states that all park facilities, including parking spaces and access, would be restored to their previous condition, and that the present quantity and quality of recreation facilities would be restored and therefore project impacts would be less than significant impact. Given the current design of the dam embankment and outlet works, and proposed reconfiguration of Cochrane Road, restoration of recreation facilities to pre-construction condition does not seem feasible and should be considered a potentially significant impact and mitigations be proposed.

As the SCVWD continues to develop the scope of the Anderson Dam Seismic Retrofit project, the Parks Department requests that there be processes in place to understand the full extent of the project impacts on Anderson County Park and for the involved agencies to work cooperatively on the development of the potential mitigation measures for the preliminary DEIR. Related to the use of parkland, the SCVWD would need to include a process for addressing the taking of parkland per the Park Abandonment Act. Areas that are currently used for public recreational purposes will need to be evaluated in terms of the taking of parkland for non-public park purpose and appropriate compensations developed.

Transportation and Traffic

Access and Circulation

The portion of Cochrane Road beginning from 0.25 miles north of Half Road and ending at 0.34 miles from the start point is County-owned and maintained. This segment is within the Anderson Dam project and provides the main vehicular access to a majority of the park facilities and recreational uses near the Project area, including the Live Oak and Toyon day use areas, and the boat launch area.

The NOP/IS identifies the realignment of Cochrane Road as a mitigation measure to address the impact to the current road alignment with the extension of the dam buttress from the existing toe of Anderson Dam. We understand that SCVWD is considering options to the proposed relocation to reduce project impacts on adjacent properties. The Roads Department is not opposed to at least considering other options, but these options should provide equivalent access for property owners including the Parks Department, and agencies, and should be included in the environmental review, public input process and environmental clearance for the project. The SCVWD should coordinate with the Roads Department and Parks Department for design review and approval of the realignment plans.

Construction Impacts

Due to the nature of the heavy excavation and construction activities occurring on Cochrane Road, Coyote Road and other local County Roads surrounding Anderson Lake County Park, and on internal park roads, parking areas, or other park facilities (e.g. boat launch), the DEIR should consider and discuss these potential impacts and include discussion for mitigation monitoring of before-and-after conditions. The pavement damage to haul roads (e.g., Cochrane Road, Coyote Road, and other local County roads, internal park roads), park parking lots or other park facilities should be restored to pre-construction conditions or better to meet County Roads Department and/or Parks Department standards. These standards and restoration plans would be subject to review and approval by the Roads Department and Parks Department.

The NOP indicates that the Live Oak area may be used for temporary construction staging (see Access and Site Staging section comments). The only access to the Live Oak area is via the Live Oak bridge which connects the parking lot to the Live Oak area. The Live Oak bridge was constructed in 2012 and has a capacity of five tons, and as such, is not suitable for sustaining the weight of construction equipment/vehicles. At the September 5, 2013 public agency scoping meeting, the SCVWD confirmed that Live Oak bridge would not be used for the transport of construction equipment and vehicles. It was discussed that a closure plan would need to be developed to address the limited and/or restricted public use of this bridge and the Live Oak/ Toyon areas during project construction. The Parks Department requests to be involved in the SCVWD's development of a closure plan for this area. In the event that the Project utilizes this bridge for construction activities, potential impacts to the bridge and the Live Oak area should be considered in the DEIR.

Comments to specific sections of the NOP and IS

Section 2.0 Goals and Objectives -

Project Objectives – The NOP states a project objective is to minimize short-term and long-term impacts to the environment, reservoir and water operations, and recreational use of the reservoir. The Parks Department suggests that the objective be revised to also include the minimization of impacts on recreational uses of the surrounding parkland and park facilities.

Section 3.0 Project Setting –

The NOP describes the proposed project site as being located "on land owned either by the District, County of Santa Clara, or private parties." The project setting should state that the project site is located within Anderson Lake County Park.

Section 4.1 Dam Embankment Remediation and Section 4.2 Dam Crest Raise and Spillway Capacity Increase -

The NOP indicates that the Project would result in a new elevation for the crest of the dam, which is anticipated to be seven feet higher than its current elevation. This increased elevation will result in grade issues with the existing parking area, ingress and egress roads for the boat launch area and with the segment of the Bay Area Ridge Trail which crosses the dam. The project would also result in the elimination of the egress road known as Coyote Road from the boat launch area.

The expanded downstream embankment would result in the elimination of Coyote Road to the Toyon area and its adjoining parking lot. It is anticipated that the size and capacity of the parking lot would be substantially reduced after the project is completed. Current access to the Toyon area does not involve crossing Coyote Creek, and any modifications to the egress road may impact the creek.

The DEIR should consider and discuss the potentially significant impacts to the egress and ingress roads, access, and use of both the Toyon and boat launch areas and the segment of the regional trail. The DEIR should provide mitigation for the ingress and egress to these facilities and for the loss of parking in the Toyon area.

Section 4.3 Intake and Outlet Works-

The proposed low level outlet that will be constructed for discharge into Coyote Creek as shown in Figure 2 would extend through the Toyon Area. The Parks Department's concern is that construction of this structure could potentially impact or damage existing park facilities including recent water system improvements which were completed in 2012. The water system improvements included replacement of an existing degraded water line with a new larger water line from an existing water main service to the existing Toyon restroom facility, and new water lines for potable water and irrigation. A portion of the new water line runs under the bed of the un-named lagoon identified as "backwater pool" on Figure 2.

The new outlet and spillway capacity may facilitate larger volumes of water releases at faster speeds which would potentially impact the creek banks downstream and impact the new Live Oak bridge abutments, and possibly result in loss of parkland/orchards downstream of Anderson Dam.

The DEIR should consider and discuss these potential impacts and include mitigations of existing facilities and park infrastructure should they be damaged during Project construction.

Section 4.4 Borrow Area Mining -
The NOP indicates that the Basalt Hill quarry/borrow area is adjacent to the boat launch and boat launch parking lot, and the floor of the quarry is occupied by the boat launch parking lot. Use of the Basalt Hill quarry may result in short term and long term impacts to adjacent park facilities particularly to the boat launch and adjoining parking lot and to the Rosendin area including long term erosion and run off. The DEIR should consider and discuss the potential impacts from borrow area mining and provide post construction mitigations including compaction/stabilization of the borrow areas, remediation/repairs to the parking lot and boat launch or other park facilities, measures to prevent destabilization of the parking lot and/or boat launch, and re-vegetation of all disturbed areas to prevent erosion and run-off.

Section 4.5 Spoils Disposal -
The DEIR should consider potential long term impacts such as stability of the disposal sites particularly the disposal site at the boat launch ramp and provide mitigations to prevent or remediate post construction impacts.

Section 5.0 Project Construction –
The DEIR should include a Traffic Control Plan, where the preparation and implementation of the plan should include coordination with the Roads Department and Parks Department staff and should include advanced notification of road closures, and the timing, location and duration of construction activities. The Parks Department's Public Information Officer and Park Ranger Operations staff would be able to assist with public notifications for these construction activities.

Traffic Circulation during Construction
The DEIR should analyze traffic circulation during the three year construction window, and address maintenance and repairs to Cochrane Road, Coyote Road and local County roads during the construction period. The Roads Department suggests that the SCVWD enter into an agreement with the County to maintain these roads during the three year construction window as a possible mitigation measure for impacts related to the project's use of the County roadways.

Section 5.3 Reservoir Dewatering –
Drawdown of the reservoir could potentially result in both pre and post construction impacts to

park facilities. Pre-construction release of water via the existing outlet may impact the creek channel that passes through the Live Oak day use area and may erode the abutments of the new Live Oak Bridge. The DEIR should consider the potential impacts of the releases and remediate for any resulting damages or impacts to park facilities including the Live Oak Bridge. In addition, the SCVWD should coordinate with Parks Department and notify Parks Department staff on the timing/scheduling of the releases.

The new outlet and spillway capacity may facilitate larger volumes of water releases at faster speeds which would potentially impact creek banks downstream and impact the new Live Oak bridge abutments, and possibly result in loss of land/orchards downstream. The DEIR should consider and discuss these impacts and provide mitigations to avoid or reduce these impacts.

Section 5.4 Access and Site staging
The NOP states that staging areas may include the Toyon and Live Oak areas as well as the boat launch area. The Live Oak area is on County property and use of this area would require a permit or license to enter from the Parks Department. In addition, the Parks Department would prefer that the Live Oak area remain open for park visitors during Project construction. However, if temporary closure is warranted, the Parks Department requests that the SCVWD work with the department on a closure plan and communications/outreach tools.

Section 5.5, Table 2 – Property Details
Table 2 incorrectly identifies APN 729-48-004 zoning as single-family residential. This parcel is part of Anderson Lake County Park and is zoned as "Open Space"; *Existing Land Use* should also be revised to include *Open Space/Anderson Lake County Park.*

The "*Land Use Authority*" column title notes the County parcel under the jurisdiction of the "City of San Jose," however, the Parks Department is not subject to the City's land use policies and approvals. One suggestion is to title the column as "City Limits/Sphere of Influence". As mentioned in the general comments, Anderson Lake County Park is operated and managed by the Parks Department and as such the County Board of Supervisor would be the land use authority for Project activities which occur within the park.

Section 5.5, Figure 6 – Park Closures
The map in Figure 6 identifies a light blue color for the reservoir area outside of the coffer dam and limit of the water level depicting the state of the dewatered Anderson Reservoir during the project construction period. This light blue color should be corrected to another color (i.e. brown, grey, etc.) which would not be misunderstood as water levels remaining at its current levels in the reservoir when dewatered.

Environmental Checklist (IS)
Aesthetics
The IS states that "Upon completion of construction activities the Reservoir would be returned to normal operations, and views of the Reservoir would be restored." The DEIR should consider and address the visual and aesthetic impacts to the entire project area and mitigate to restore the visual and aesthetic quality of the entire Project area.

Air Quality
The IS states that construction of the proposed project would create objectionable odors which may significantly adversely affect single family residences immediately adjacent to the reservoir and project site. This impact may also affect park visitors and trail users since park facilities and trails outside the project area will remain open and in use during project construction (i.e. Coyote Creek trail and Coyote Creek Parkway County Park). This impact should be noted in the IS and considered in the DEIR.

Biological Resources
The IS (page 30) states that the Project will result in permanent impacts on a small portion of Coyote Creek specifically construction of the outlet structure and new downstream buttress which would fill a portion of Coyote Creek extending 100 feet from the existing dam. This would also result in a permanent loss of a portion of the Toyon Area parking area and the access road. (see comment to Section 4.1)

The IS (page 33) states that impacts to ordinance trees are a potentially significant issue and Project impacts may result in removal of trees in the project area. The County Planning Office administers the County's Tree Preservation and Removal Ordinance and should be contacted regarding the requirements as well as any permits which may be required. In addition, since these trees are located within Anderson Lake County Park, the Parks Department would require that SCVWD coordinate with Park Department staff to identify the type and number of trees proposed for removal well in advance of the removals.

The Parks Department also requests that a copy of the survey and map of the ordinance sized trees be provided to the Parks Department. The DEIR should include mitigations to replace these trees, and while it is understood that the replacement ratio of native trees would be determined by the regulatory agencies, the Parks Department would request consultation regarding replacement of non-native trees and tree replacements that may occur in the same area where they were removed.

Geology/Soils
Please see comments on *Section 4.4 Borrow Area Mining and Section 4.5 Spoils Disposal.*

The IS states that site restoration measures would be implemented to minimize soil erosion after completion of construction activities. The DEIR, as mitigation, should implement site restoration measures, including re-vegetation of disturbed areas, in the entire project area after completion of the Project and for a period following completion to ensure soil erosion and run-off is minimized.

Hydrology/ Water Quality
It should be noted that reservoir dewatering and post construction water releases would potentially impact the hydrology and water quality downstream as well as creek banks downstream, park facilities including internal park trails and regional trails, Coyote Creek Parkway County Park and possibly result in loss of land/orchards downstream. The DEIR should consider and discuss these impacts.

See also comments on *Section 4.2 Dam Crest Raise and Spillway Capacity Increase; Section 4.3 Intake and Outlet Works; Section 5.3 Reservoir Dewatering; and Section 5.4 Access and Site* *staging* as they are applicable to hydrology and Water quality issues.

Land Use and Planning

Santa Clara County Countywide Trails Master Plan Update

The DEIR should acknowledge the policies and guidelines of the *Santa Clara County Countywide Trails Master Plan Update ("Countywide Trails Master Plan")*, which the County Board of Supervisors approved in November 1995, as part of the Parks and Recreation Element of the County of Santa Clara General Plan (1995-2010). The Parks Department has identified the following Countywide Trails Master Plan routes which would be impacted as a result of the Project.

- ***Bay Area Ridge Trail: Diablo Range*** (R5-B) and ***El Sombroso*** (R5-D) – designated as a trail route within other public lands for hiking, off-road cycling and equestrian use. Within the park, this trail route runs along the western side of the reservoir, crosses the top of the dam, and then passes through the Toyon and Live Oak areas along Coyote Creek. The DEIR should acknowledge that the park includes segments of the Bay Area Ridge Trail and discuss potential impacts, including temporary closure and future re-route, to this regional trail.

The DEIR should consider and discuss any long term maintenance and operations impacts on recreational trail uses and/or park facilities on adjoining park property. In addition, the SCVWD should coordinate with the Parks Department on long-term monitoring of replacement trees or re-vegetated areas, or resource management activities that are required to fulfill the Habitat Plan permit conditions related to the covered species in the Habitat Plan.

Noise

The environmental setting description is incorrect and should be revised as follows. Also see the comment pertaining to *environmental setting* in the General Comment section.

"Surrounding land uses include single-family residential, agricultural, a juvenile correction facility, *parkland*, and recreational uses." The Project area does not border Anderson Lake County Park it is located within the park.

There should be a discussion of noise impacts to the nearby recreational trails along the southwestern bank of the reservoir and in the south area of the dam are within Anderson Lake County Park and include internal park trails and regional trail routes. See earlier description under the *Santa Clara County Countywide Trails Master Plan Update* for a description of the trails and recreational uses in the project area.

The DEIR should include a discussion of noise impacts to the park visitors, parks staff, and recreational use of the areas outside of the project area but within the surrounding area including those areas that will remain open during Project activities. This would include trail users, park staff, and visitors to the Anderson Lake County Park Visitor Center, Park Office, and Maintenance yard, and Coyote Creek Parkway County Park. The Parks Department suggests that the Anderson County Park Ranger Operations staff be kept apprised of blasting schedules and any other construction activities such as mobilization of heavy equipment, which would result in increased noise levels so that parks staff can provide advance notifications of these activities to park visitors and staff.

Recreation
See earlier comments discussed under General Comments on page 2.

Transportation and Traffic
See earlier comments discussed under *Roads -Access and Circulation* and *Section 5- Traffic Circulation during Construction.*

The Parks Department and Roads Department are supportive of the goals and objectives of the Project and appreciate the collaborative approach undertaken by the Santa Clara Valley Water District (SCVWD) for the Project. During the conceptual design phase, the SCVWD has engaged the Parks Department in evaluating and providing input on the design alternatives and development of a preferred alternative. We hope to continue this collaborative work with the SCVWD regarding the project scope development and construction activities that may impact Anderson County Park, the public recreational uses, and access to and from the park via County roadways.

The Parks Department and Roads Department appreciate the opportunity to review and respond to this NOP, and look forward to reviewing the DEIR when it becomes available. If you have any questions about these comments please contact Julie Mark or Dan Collen.

Sincerely,

Julie Mark, Deputy Director
Parks and Recreation Department
Julie.Mark@prk.sccgov.org
(408) 355-2219

Dan Collen, Deputy Director
Roads and Airports Department
Dan.Collen@rda.sccgov.org
(408) 573-2492

Cc: Jane Mark, Senior Planner
Mark Frederick, Capital Program Manager
Antoinette Romeo, Planner III
Tim Heffington, Senior Real Estate Agent
Julie Cooper, Senior Park Ranger, Anderson Park Unit
Dawn Cameron, Transportation Planner
Ivana Yeung, Junior Transportation Planner

SANTA CLARA
Valley Transportation Authority

September 13, 2013

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Attention: Kurt Lueneburger

Subject: Anderson Dam Seismic Retrofit

Dear Mr. Lueneburger:

Santa Clara Valley Transportation Authority (VTA) staff have reviewed the NOP for a seismic retrofit project on Anderson Dam at the east end of Cochrane Road. We have the following comments.

Pedestrian and Bicycle Access During Construction
The NOP notes that "Public bicycle and pedestrian traffic would not be permitted to travel on the temporarily closed segment of Cochrane Road. Alternative bicycle and pedestrian routes would be provided as part of the construction traffic management plan. Bicycle and pedestrian traffic would likely shift to Peet Road and Half Road" (pg. 61). The pedestrian/bicycle route closure should be posted 30 days in advance and the detour routes should be designed in conformance with the VTA Bicycle Technical Guidelines (BTG). VTA's Bicycle Technical Guidelines may be downloaded from http://www.vta.org/bike_information/bicycle_technical_guidelines.html.

Thank you for the opportunity to review this project. If you have any questions, please call me at (408) 321-5784.

Sincerely,

Roy Molseed
Senior Environmental Planner

SCVWD1302

From:	Gene Beley
To:	Kurt Lueneburger
Subject:	Question on Anderson Dam Seismic Retrofit Project
Date:	Sunday, August 25, 2013 6:27:20 PM

I saw the ad in the San Jose Mercury about the Seismic Retrofit Project. I have some questions.

1. Will the level of the water in the dam be lowered to do the project? If so, how much?

2. Will homeowners be subjected to noise?

3. What will be the construction hours?

4. Why wasn't this done when the work done when similar work was done on the dam just several years back (if my memory serves me somewhat correctly!)?

I am unable to attend the meeting Monday night, so would like to hear from you, and maybe get some feedback about the meeting, especially if residents asked questions about the project.

Gene Beley

From:	Sheila Giancola
To:	Kurt Lueneburger
Subject:	Anderson Dam/Rhoades Ranch
Date:	Wednesday, August 28, 2013 10:37:20 AM

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Dear Kurt Lueneburger,

We were at the scoping meeting on Monday, August 26th and would like to take this opportunity to share our concerns and make a few comments that we did not express at the meeting. We live at 2290 Cochrane Road (the property adjacent to the dam) in Morgan Hill. Our property is a County, State and National Historic Resource. This is a very important part of history and we are very concerned it is going to be compromised. It is our hope that the agency designing the retrofit would take into consideration the significance of our property and the many impacts it will have if encroached upon. We would also like to make sure all of the proper agencies are notified and given a chance to comment on the Notice of Preparation and the Environmental Impact Report.

On the NOP I noticed that the only agency to be notified regarding our property is the State Office of Historic Preservation. Please be sure to include Santa Clara County Historical Heritage Commission, The National Park Service Department of the Interior, The Secretary of Interior and the Morgan Hill Historical Society.
We understand the importance of the retrofit to Anderson Dam but again we are asking that you look at all alternatives so that the Rhoades Ranch not be compromised. We have many concerns regarding the Anderson Dam Retrofit Project and the following are just a few of our concerns at this time.

* The loss of property and homes that may cause substantial adverse changes in the significance and or damage to the historical buildings and property.

* The loss of our tenants and rental income.
* The change in air quality causing potential health problems.
* The levels of noise from machinery, blasting etc.

* The vibrations and movement to the land causing harm to the historical homes and buildings on site.
* The vibrations and movement to our domestic well that is approximately 100 years old and our only source of water.

* Very concerned about substantially depleting groundwater supplies lowering the production rate and drop to a level which would not support our needs. As stated above this is our only source of drinking water.
* The loss and or damage of historical Oak trees.
* Slow down time of emergency vehicles during construction.
* The amount of time it will take to complete the retrofit.
* The potential loss of future development and or farming.
* The potential loss of District surface water currently supplied by Santa Clara Valley Water District.
* The loss of wildlife on or near our property.
* Permanent loss of surrounding historic agricultural context and setting.

Thank you for taking the time to listen to the publics views and comments.

Sincerely,

Joe and Sheila Giancola

From: Martinez, Harvey
To: Kurt Lueneburger
Subject: Anderson Dam Seismic Retrofit Project
Date: Wednesday, August 28, 2013 9:11:28 AM

Our house is located at 18285 Coyote Rd. Morgan Hill..Listed are questions / comments that I would like to capture in regards to the meeting that was held this week on Monday August 26th.
Our Concern - The quality of life from heavy equipment noise , blasting, Cochrane road closure , dust , dirt will be greatly effected Specially if construction takes several yrs.

- Since I live fairly close to the entrance of Anderson dam , Will my home be impacted during construction and blasting from dust, dirt , shifting of concrete walkways , patios, foundations, Windows etc..? If damage occurs during construction who pays for repairs ?

- Will Irrigation water still be available to myself and my other (2) neighbors during construction ? Currently we are on the Coyote Rd. Main line for irrigation water.

- What effects will the ground water have when the dam is drawn down ? I'm on well water , my concern is that the aquifer table will be less ?

- I own the boat storage at Anderson dam, I'm certain that revenue will be lost during the remediation phase, is there a possibility of lost revenue compensation ?

- Would there be a possibility of replacing the old 16" main line that runs along Coyote Rd and install a smaller water supply line ?

- What would be the possibility of having Morgan Hill City water piped to accommodate residences on Coyote Rd. ?

Regards , Harvey Martinez

Harvey Martinez
Sunnyvale Facility Lead
Spansion Inc.
915 DeGuigne Drive, MS 130
P.O. Box 3453

Sunnyvale, CA 94088-3453
harvey.martinez@spansion.com
T (408) 616-6760
C (408) 718-6978
F (408) 616-8152

From:	Katherine Perez
To:	Kurt Lueneburger
Subject:	Re: Notice of Preparation - Anderson Dam Seismic Retrofit Project
Date:	Monday, August 26, 2013 9:48:12 AM

o concerns at this time.

From: Kurt Lueneburger <KLueneburger@valleywater.org>
To: "canutes@verizon.net" <canutes@verizon.net>
Sent: Tuesday, August 20, 2013 8:42 AM
Subject: Notice of Preparation - Anderson Dam Seismic Retrofit Project

The Santa Clara Valley Water District (District) is pleased to announce the completion of a Notice of Preparation (NOP) of a draft Environmental Impact Report (EIR) for the Anderson Dam Seismic Retrofit Project. In compliance with the California Environmental Quality Act (CEQA), an official copy of the NOP has been mailed to anticipated responsible and trustee agencies. The District would like to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project.

To facilitate review of the NOP, an electronic copy of the notice is attached for your consideration. Consistent with CEQA guidelines, responses at a minimum should identify the significant environmental issues and reasonable alternatives and mitigation measures that the responsible or trustee agency will need to have explored in the draft EIR, and whether the agency will be a responsible agency or trustee agency for the project.

The District will hold a public scoping meeting to provide an additional opportunity for input on the scope and content of the information to be addressed in the draft EIR. All are welcome to attend and participate in the public scoping meeting that will be held at 6:30 pm on August 26, 2013 in the Morgan Hill Community and Cultural Center located at 17000 Monterey Road, Morgan Hill. Additionally, as various agency staff have already expressed interest in the project, the District is also planning to hold a special scoping meeting solely for agency staff. The special agency scoping meeting is tentatively scheduled to occur during normal business hours at District headquarters (5700 Almaden Expressway, San Jose) on September 5, 2013. More details about the agency scoping meeting will follow in a separate email.

We look forward to working with you on this exciting project. If you have any questions, please do not hesitate to call.

Sincerely,

Kurt Lueneburger
Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614
phone: 408.630.3055

Anderson Dam Seismic Retrofit Project

Scoping meeting survey

Santa Clara Valley Water District

Aug. 26, 2013

Please take a moment to complete this survey. Your input is important to us and will help us serve you better in the future. Thank you in advance for your time.

1. Prior to the community meeting, how would you rate the job done by the water district to:

	Excellent	Good	Fair	Poor	n/a
Provide timely notification for the meeting?	☐	☒	☐	☐	☐
Explain the purpose of the meeting?	☐	☒	☐	☐	☐
Provide a staff contact for questions or concerns?	☐	☐	☐	☐	☐
Choose a convenient venue for the meeting?	☒	☐	☐	☐	☐
Choose a convenient time for the meeting?	☒	☐	☐	☐	☐

How did you hear about the meeting? ☒ Newspaper ☐ Internet ☐ Mailing ☒ Other SCWD BOARD

Additional comments: ______

2. During the meeting, how would you rate the job performed by the water district to:

	Excellent	Good	Fair	Poor	n/a
Present the information clearly and concisely?	☐	☒	☐	☐	☐
Use a courteous and professional manner?	☒	☐	☐	☐	☐
Offer opportunities to be involved in the project?	☐	☐	☐	☐	☐
Address your concerns or provide an acceptable explanation?	☐	☐	☒	☐	☐
Provide informative breakout stations/tables	☐	☐	☐	☐	☐

Additional comments: SCOPING PROCESS AS QUESTION ONLY BUT NO ANSWERS MAY MAKE PROCESS SENSE BUT IS UNSATISFYING TO ATTENDEES

Continued on back »

3. How would you rate the handouts provided and exhibits displayed, if applicable?

- [ ] Excellent
- [ ] Good
- [x] Fair
- [ ] Poor
- [ ] n/a

4. How would you rate the overall open house performed by the water district?

- [ ] Excellent
- [x] Good
- [ ] Fair
- [ ] Poor
- [ ] n/a

If you have additional questions or concerns regarding the **proposed project or Environmental Impact Report** use the space provided below:

WOULD HAVE BEEN INTERESTING TO ASK HOW MANY PEOPLE READ THE NOP/IS PRIOR TO THE MEETING

WOULD LIKE TO SEE LIST OF REGULATORY CHANGES MENTIONED BY FRANK M.

IS HYDRO CAPACITY WORTH BEING UNDER CONTROL OF FERC.

In order for water district staff to personally respond to issues/questions you have raised, your contact information is needed. Please provide (please write legibly):

Name: DOUG MUIRHEAD

Address:

Phone:

E-mail: DOUG.MUIRHEAD@STANFORDALUMNI.ORG

If you have questions about this survey, please contact Customer Relations at **(408) 630-2881.**

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix C

Stakeholder Engagement

Stakeholder Engagement Appendix

Stakeholder engagement processes for the Project and the Project EIR are described in EIR Section 1.7 (Agency Coordination, Public Involvement Process, and CEQA Proces). This appendix presents a stakeholder meeting log for many key meetings held with stakeholders dating back to 2013, when the EIR Notice of Preparation (NOP) was issued.

Stakeholder	Date	Meeting Type
Community		
Morgan Hill residents and public	August 26, 2013	Public scoping meeting.
Morgan Hill residents and public	March 22, 2017	ADSRP community update.
San Jose residents and public	April 28, 2017	ADSRP community update.
Morgan Hill residents and public	September 13, 2017	ADSRP community update.
Morgan Hill residents and public	June 4, 2018	ADSRP community update.
Morgan Hill residents and public	October 24, 2018	ADSRP community update.
Morgan Hill residents and public	April 10, 2019	ADSRP community update.
Morgan Hill residents and general public	May 28, 2020	ADSRP community update (virtual).
Golden Wheel, Riverbend, and South Bay mobile home park communities	June 10, 2020	Update on FOCP Coyote Creek flood management measures.
Bevin Brook, Nordale, and Rock Springs communities	June 11, 2020	Update on FOCP Coyote Creek flood management measures.
Downtown San Jose communities	June 17, 2020	Update on FOCP Coyote Creek flood management measures.
Holiday Lake Estates residents	September 9, 2020	ADSRP community update and discuss FOCP impacts (virtual)
Morgan Hill residents and public	September 17, 2020	Anderson Reservoir Dewatering and Tunnel Project community update (virtual)
Borello Ranch Estates and Alicante Neighborhood residents	February 18, 2021	ADTP community update.
Morgan Hill residents and public	May 19, 2021	ADTP pre-construction community update (virtual).
Morgan Hill residents and public	May 24, 2023	ADSRP community update.
Morgan Hill residents and public	May 31, 2023	Ogier Ponds-Coyote Creek Separation Project community update.
Morgan Hill residents and public	October 4, 2023	Public information meeting on the DEIR.
Morgan Hill residents and public	September 18, 2024	Public scoping meeting on the proposed FERC license surrender for ADSRP. Hosted by FERC.
Morgan Hill residents and public	September 19, 2024	Public scoping meeting on the proposed FERC license surrender for ADSRP. Hosted by FERC.
Tribal Representatives		
The Ohlone Indian Tribe	June 20, 2018	Site visit with Mr. Andrew Galvan
Amah Mutsun Tribal Band	July 5, 2018	Site visit with Chairperson Lopez
Tamien Nation	September 20, 2023	Project update and consultation.
Tamien Nation	November 29, 2023	Project update and consultation.

Stakeholder	Date	Meeting Type
Tamien Nation	January 23, 2024	Project tour.
Tamien Nation	November 5, 2024	Discuss ADSRP. USACE and FERC DHAC also in attendance.
Federal		
FERC DHAC	October 17, 2013	Project update.
FERC DHAC	December 9, 2013	Project update.
FERC DHAC	January 16, 2014	Project update.
FERC DHAC	September 15, 2014	Project update.
FERC DHAC	January 20, 2015	Project update.
FERC	October 5, 2015	Project update.
FERC DHAC	January 20, 2016	Project update.
FERC	March 3, 2016	Discuss fragility curve analyses.
FERC	September 7, 2016	Project update.
NMFS	January 25, 2017	Project update.
NMFS	April 18, 2019	Review FAHCE data and model development; review work plan.
NMFS	May 1, 2019	Review FAHCE data and model development; review work plan.
FERC DHAC	July 10, 2019	Review NEPA process, consultation, permitting.
USACE	July 16, 2019	Site visit for permitting coordination.
FERC DHAC	August 7, 2019	Monthly coordination meeting.
FERC DHAC	September 17, 2019	Monthly coordination meeting.
FERC DHAC	October 16, 2019	Monthly coordination meeting.
NMFS	November 12, 2019	Project meeting w/NMFS leadership at NMFS headquarters.
FERC DHAC	November 13, 2019	Project meeting and IRRMs.
NMFS	November 25, 2019	Coordination meeting.
Congressional delegates; executive staff from NMFS, USFWS, FERC, and USACE	December 4, 2019	Project progress and coordination meeting.
FERC DHAC	December 18, 2019	Monthly coordination meeting.
FERC DHAC	January 15, 2020	Monthly coordination meeting.
FERC DHAC	March 18, 2020	Monthly coordination meeting.
Congressional delegates; executive staff from NMFS, USFWS, FERC, and USACE	March 31, 2020	Project progress and coordination meeting.
FERC	April 2, 2020	Discuss March 2020 filing details and next steps.
FERC DHAC	April 15, 2020	Monthly coordination meeting.
FERC	May 6, 2020	Review information needs request.
FERC DHAC	May 14, 2020	Monthly coordination meeting.
FERC	May 20, 2020	TWG and project updates.

Stakeholder	Date	Meeting Type
FERC	June 15, 2020	Project updates and develop FOCP permitting milestones.
FERC DHAC	June 17, 2020	Monthly coordination meeting.
USACE	July 9, 2020	Discuss permitting for FOCP and geotechnical studies.
FERC DHAC	July 15, 2020	Monthly coordination meeting.
USACE	July 15, 2020	Prepare for Congressional meeting and discuss permitting.
Congressional delegates; executive staff from NMFS, USFWS, FERC, and USACE	July 17, 2020	Project progress and coordination meeting.
FERC, USACE	July 22, 2020	FOCP permitting requirements and expectations.
FERC, USFWS	August 4, 2020	Coordinate expectations for FOCP emergency consultation procedures.
FERC, NMFS	August 5, 2020	Coordinate expectations for FOCP emergency consultation procedures.
USACE	August 6, 2020	Jurisdictional waters determination site visit.
NMFS	August 10, 2020	Review and discuss upcoming fish rescue activities.
FERC	August 19, 2020	Monthly coordination meeting.
NMFS	September 18, 2020	Recap Sept. 15, 2020, TWG meeting, discuss NMFS filing on the Effects Analysis, prepare future TWG agendas.
NMFS	September 23, 2020	Recap Sept. 15, 2020, TWG meeting, discuss NMFS filing on the Effects Analysis, prepare future TWG agendas.
NMFS	October 7, 2020	Recap Sept. 15, 2020, TWG meeting, discuss NMFS filing on the Effects Analysis, prepare future TWG agendas.
USACE	October 1, 2020	Discuss development of CWA 4040 alternatives analysis and FOCP permitting.
FERC	October 19, 2020	Monthly coordination meeting.
FERC	October 21, 2020	Continue discussion of October 1, 2020, order and concerns regarding the supplemental EA.
FERC	October 28, 2020	Recap interagency meeting.
USACE	October 29, 2020	Recap interagency meeting.
USACE	November 12, 2020	FOCP permitting and NEPA needs.
FERC	November 18, 2020	ADTP authorization needs.
USACE	November 19, 2020	Recap interagency meeting, discuss permitting.
FERC	November 20, 2020	Review and clarify November 18, 2020, information request.
USACE	December 3, 2020	Recap interagency meeting, discuss permitting.
USACE	December 10, 2020	Recap interagency meeting, discuss permitting.
NMFS	December 11, 2020	Coyote Percolation Dam commitments.

Stakeholder	Date	Meeting Type
Congressional delegates; executive staff from NMFS, USFWS, FERC, and USACE; local officials from City of Morgan Hill, City of San Jose, Santa Clara County	December 14, 2020	Project progress and coordination meeting.
USACE	January 21, 2021	Discuss permitting needs for the FOCP.
USACE	January 28, 2021	Permitting needs for the FOCP, discuss NMFS technical recommendations on Coyote Creek bladder dam.
FERC	February 3, 2021	Discuss Valley Water's board approval of the surrender of the hydropower plant as part of the ADSRP and the surrender application requirements.
USACE	February 4, 2021	Supplemental EA, recent FOCP order, NMFS technical recommendations for Coyote Creek bladder dam.
USACE, NMFS	February 24, 2021	Discuss Coyote Percolation Dam improvements
FERC	March 5, 2021	Project updates.
USACE	March 11, 2021	FOCP permitting.
FERC DHAC	March 17, 2021	Monthly coordination meeting.
USACE	March 18, 2021	Discuss FOCP permitting and SHPO consultation.
NMFS	March 25, 2021	Discuss FESA environmental baseline and NMFS comments on draft BA.
USACE	March 25, 2021	Project update on bladder dam description and Section 106 compliance.
USACE	April 1, 2021	Project updates and FOCP permitting.
USACE	April 8, 2021	Project updates and FOCP permitting.
Congressional delegates; executive staff from NMFS, USFWS, FERC, and USACE	April 12, 2021	Project progress and coordination meeting.
FERC DHAC	April 21, 2021	Monthly coordination meeting.
USACE	April 15, 2021	FOCP permitting.
USACE	April 22, 2021	FOCP permitting, project updates.
USACE	April 29, 2021	FOCP permitting, project updates.
USACE	May 13, 2021	Discuss CVP extension project description and footprint.
USACE	May 13, 2021	FOCP permitting, project updates.
FERC DHAC	May 14, 2021	FOCP permitting, project updates.
FERC DHAC	May 19, 2021	Monthly coordination meeting.
USACE	May 20, 2021	FOCP permitting, project updates.
USACE	May 27, 2021	FOCP permitting, project updates.
USACE	June 3, 2021	FOCP permitting, project updates.
USACE	June 11, 2021	FOCP permitting, project updates.

Stakeholder	Date	Meeting Type
FERC DHAC	June 16, 201	Monthly coordination meeting.
USACE	June 17, 2021	FOCP permitting, discuss potential mitigation options.
USACE	June 24, 2021	FOCP permitting, discuss potential mitigation options.
USACE	July 1, 2021	FOCP permitting, discuss potential mitigation options.
USACE	July 8, 2021	FOCP permitting, discuss potential mitigation options.
USACE	July 15, 2021	FOCP permitting, discuss potential mitigation options.
FERC DHAC	July 21, 2021	Monthly coordination meeting.
USACE	July 22, 2021	CWA Section 404 permitting progress update.
USACE	July 29, 2021	CWA Section 404 permitting progress update.
NMFS	August 3, 2021	HMMP progress update.
USACE	August 5, 2021	CWA Section 404 permitting progress update.
USACE	August 12, 2021	CWA Section 404 permitting progress update.
FERC DHAC	August 18, 2021	Monthly coordination meeting.
USACE	August 23, 2021	CWA Section 404 permitting progress update.
USACE	August 25, 2021	CWA Section 404 permitting progress update.
FERC DHAC	September 15, 2021	Monthly coordination meeting.
Congressional delegates; executive staff from NMFS, USFWS, FERC, and USACE	September 16, 2021	Project progress and coordination meeting.
FERC, USBR	September 28, 2021	Discuss distinction between Santa Clara Conduit Inspection and Rehabilitation Project and Coyote Creek Chillers Project, regulatory compliance.
FERC DHAC	October 20, 2021	Monthly coordination meeting.
FERC, USBR	December 21, 2021	Discuss CVPE and Coyote Creek Chillers Project.
NMFS	January 5, 2022	Review fisheries impacts, conservation measure package, discuss NMFS post-construction operations suggestions.
FERC DHAC	March 2, 2022	Coyote Creek Chillers Project timeline and approval process.
USBR	March 14, 2022	Permitting process and status updates for Coyote Creek Chillers Project.
FERC, USBR	March 16, 2022	Discuss schedule and approval process for Coyote Creek Chillers Project.
FERC DHAC	April 27, 2022	Coyote Creek Chillers Project timeline and approval process.
FERC DHAC	May 18, 2022	Discuss federal oversight and NEPA compliance.
FERC DHAC	June 15, 2022	ADSRP schedule, Condition 3 Plan, Condition 4/5 Plan, HMMP.
USBR	June 15, 2022	Condition 3 Plan discussion.

Stakeholder	Date	Meeting Type
USACE	June 30, 2022	FOCP permit amendment.
FERC DHAC	August 17, 2022	Monthly coordination meeting.
FERC DHAC	September 21, 2022	Pre-surrender application consultation advancement.
USACE	September 29, 2022	Discuss Ogier Ponds alternatives, NEPA coordination.
FERC DHAC, USACE	October 19, 2022	NEPA coordination and federal oversight of ADSRP.
FERC DHAC	February 15, 2023	Monthly coordination meeting.
FERC DHAC	March 15, 2023	Monthly coordination meeting.
FERC DHAC	April 19, 2023	Monthly coordination meeting.
FERC DHAC	May 17, 2023	Monthly coordination meeting.
Congressional delegates; executive staff from NMFS, USFWS, FERC, and USACE	May 19, 2023	Project progress and coordination meeting.
FERC DHAC	June 21, 2023	Monthly coordination meeting.
FERC DHAC	July 19, 2023	Monthly coordination meeting.
FERC DHAC	September 20, 2023	Monthly coordination meeting.
USACE	December 7, 2023	Discuss HMMP.
FERC DHAC	December 20, 2023	Progress and coordination meeting.
FERC DHAC	April 25,2024	Progress and coordination meeting.
USACE	May 1, 2024	Discuss the permitting process and schedule for the CWA Section 404 permit, NEPA, and habitat mitigation and monitoring plan.
FERC DHAC	May 15,2024	Progress and coordination meeting.
FERC DHAC	June 25, 2024	Progress and coordination meeting.
FERC DHAC	July 17, 2024	Progress and coordination meeting.
FERC DHAC	July 25, 2024	FERC site visit coordination.
FERC DHAC	July 30, 2024	FERC site visit coordination.
FERC DHAC	August 6, 2024	FERC site visit coordination.
FERC DHAC	August 15, 2024	FERC site visit coordination.
FERC DHAC	August 21, 2024	FERC site visit coordination.
USACE	August 27, 2024	Discuss mitigation for FOCP and ADSRP.
FERC DHAC	September 17, 2024	Public tour of the ADSRP site.
USACE	September 18, 2024	Discuss status of the CWA 404 permit application package.
FERC DHAC	October 16, 2024	Progress and coordination meeting.
USACE	October 17, 2024	Discuss FOCP HMMP.
USFWS	November 26, 2024	Provide ADSRP updates.
State		
DWR DSOD	November 14, 2013	Project update and design phase review.
DWR DSOD	January 13, 2014	Project update and design phase review.

Stakeholder	Date	Meeting Type
DWR DSOD	March 13, 2014	Project update.
DWR DSOD	July 16, 2014	Project update.
DWR DSOD	February 6, 2015	Project update.
DWR DSOD	August 21, 2015	Project update.
DWR DSOD	September 26, 2016	Project update.
DWR DSOD	January 12, 2017	Project update.
DWR DSOD	March 30, 2017	Project update.
CDFW	April 29, 2019	Discuss permitting strategy.
SWRCB	March 20, 2020	Permitting meeting.
SWRCB, RWQCB	April 6, 2020	Discuss RWQCB concerns re: perchlorate.
CDFW	September 23, 2020	Discuss additional information needed to complete the LSAA application, advance FOCP permitting.
SWRCB, RWQCB	October 13, 2020	Discuss basis of design and alternatives analysis for FOCP.
RWQCB	October 30, 2020	Discuss 401 certification for FOCP.
CalFire	November 2, 2020	Discuss Anderson Reservoir drawdown
CDFW	February 3, 2021	Discuss FOCP permitting.
SWRCB	February 8, 2021	Discuss water quality certification conditioned plans.
CDFW	February 24, 2021	Discuss FOCP permitting.
SWRCB, RWQCB	February 24, 2021	Discuss ADTP approvals.
SWRCB, RWQCB	March 22, 2021	Discuss the Sediment Monitoring Plan.
CDFW	March 30, 2021	Discuss Hall’s bush mallow impacts in ADTP footprint.
CDFW	April 2, 2021	Discuss ADTP approval process.
SWRCB, RWQCB	April 2, 2021	Discuss ADTP approval process, FERC’s request for concurrence, Condition 2 Plan.
Governor Newsom’s office, RWQCB, SWRCB, CDFW	April 5, 2021	Discuss ADTP approval process, FERC’s request for concurrence.
CDFW	April 21, 2021	FOCP permit progress.
CDFW	April 27, 2021	FOCP permit progress.
DSOD	April 30, 2021	Discuss DSOD comments on Phase 2.
RWQCB	May 14, 2021	Discuss comments re: Condition 2 Plan.
RWQCB	May 19, 2021	Discuss response to comments re: Condition plans.
CDFW	May 20, 2021	Discuss draft LSAA.
SWRCB, RWQCB	July 23, 2021	FOCP mitigation and monitoring meeting.
SWRCB, RWQCB	July 26, 2021	FOCP mitigation and monitoring meeting.
SWRCB, RWQCB	August 3, 2021	Sediment monitoring and ADTP approval timelines.
SWRCB, RWQCB	August 13, 2021	Condition 2 Plan, QAPP, HMMP.

Stakeholder	Date	Meeting Type
SWRCB, RWQCB	August 25, 2021	Condition 2 Plan, Condition 8, QAPP, HMMP.
SWRCB, RWQCB	September 7, 2021	Condition 2 Plan.
SWRCB, RWQCB	April 28, 2022	Review Condition 3 Plan comments.
SWRCB	May 26, 2022	Discuss comments on Condition 2 Plan and Condition 4/5 Plan.
SWRCB, RWQCB	June 3, 2022	Review Condition 3 Plan questions and comments.
CDFW	June 7, 2022	Discuss Coyote Percolation Pond Dam draft LSAA, future LSAA for Anderson Diversion.
SWRCB, RWQCB	December 6, 2022	FOCP approvals progress and pre-application consultation for ADSRP.
SWRCB, RWQCB	January 10, 2023	FOCP approvals progress and pre-application consultation for ADSRP.
SWRCB, RWQCB	February 7, 2023	FOCP approvals progress and pre-application consultation for ADSRP.
SWRCB, RWQCB	December 5, 2023	Discuss DEIR and FERC surrender application.
SWRCB, RWQCB	January 9, 2024	Discuss FOCP permitting.
SWRCB, RWQCB	February 6, 2024	Discuss ADSRP permitting.
SWRCB, RWQCB	March 15, 2024	Discuss draft EIR comments and ADSRP permitting.
SWRCB, RWQCB	March 18, 2024	Discuss Sediment Monitoring Plan and ADSRP permitting.
CDFW	March 27, 2024	Permitting process and timeline for the Lake and Streambed Alteration Agreement and Incidental Take Permit.
SWRCB, RWQCB	May 20, 2024	Pre-application meeting.
SWRCB, RWQCB	May 23, 2024	Discuss the Excavated Materials Management Plan.
CDFW	July 9, 2024	ADSRP and FOCP coordination.
CDFW	July 11, 2024	Discuss status of the LSAA application package.
SWRCB	July 11, 2024	Review 401 certification fee calculations.
CDFW	August 1, 2024	Discuss status of the LSAA application package.
SWRCB, RWQCB	September 4, 2024	Discuss the status of the 401 certification application.
CDFW	September 25, 2024	FOCP and ADSRP updates.
SWRCB, RWQCB	October 2, 2024	Discuss the status of the 401 certification application.
SWRCB, RWQCB	October 28, 2024	Discuss the 401 certification application.
SWRCB, RWQCB	November 26, 2024	ADSRP updates and progress.
CDFW	November 26, 2024	ADSRP updates and progress.
SWRCB, RWQCB	December 4, 2024	Discuss the status of the 401 certification application.
CDFW	November 26, 2024	Discuss status of the LSAA application package.

Stakeholder	Date	Meeting Type
Santa Clara County		
County Parks, Department of Planning and Development	September 5, 2013	Regulatory scoping meeting
Santa Clara County Department of Parks and Recreation (County Parks)	January 9, 2014	Geotechnical Investigations with Impact to County Park Traffic (March – June 2014)
County Parks	March 6, 2014	Geotechnical Investigations Phase 1A discussion
County Parks	June 8, 2017	Discussion of stockpiles, historic structures, haul roads, trails, water lines,
County Parks	February 8, 2018	Draft MOU, Coyote Road concept drawings, geotechnical and cultural investigations
County Parks	March 8, 2018	Stockpiles, geotechnical and cultural investigations
County Parks	April 12, 2018	Current geotechnical investigations; license agreement for upcoming cultural investigation
County Parks	April 20, 2018	Restoration Meeting: Toyon Group Area, Live Oak Picnic Area, Upper Parking Lot
County Parks	May 10, 2018	Current geotechnical investigations; license agreement for upcoming cultural investigation
County Parks	June 14, 2018	Post-construction restoration, ongoing geotechnical investigations, license agreement for upcoming cultural investigation; stockpile MOU
County Parks	September 13, 2018	Cultural and geotechnical investigations - draft license agreement, post construction restoration
County Parks	October 10, 2018	Request for Right of Entry to perform surveys and investigations; special provisions; timeline; MLA containing Scope and CEQA compliance
County Parks	October 16, 2018	Right of Entry Site Visit
County Parks	November 8, 2018	License Agreement application status, park impacts and restoration, County's project request list
County Parks	March 14, 2019	License Agreement application – Categorical Exemption, conveyor alignment, County's project request list
County Parks	March 21, 2019	Conveyor alignment alternatives, noise impacts, dust control, ingress and egress, stream flow, changes in fire behavior
County Parks	March 28, 2019	Standard GIS approach for four license agreement requests: Principles, Master Partnership, Master License Agreement, Long-Term Land Management
County Parks	April 11, 2019	License Agreement application status, GIS documentation standards
County Parks	April 26, 2019	Review of draft Mapbook for License Agreement Figures, dated April 22, 2019
County Parks	May 9, 2019	Discussion of County conditions for Notice to Proceed re License Agreement

Stakeholder	Date	Meeting Type
County Parks	May 23, 2019	Conveyor site walk near James Holden Boys Ranch
County Parks	June 3, 2019	License Agreement notice to proceed concerns: utility locations, site signage; pre-field assessment for bridges, creek trail, access routes
County Parks	June 17, 2019	Pre-construction site and bridge assessment
County Parks	June 27, 2019	Pre-mobilization meeting
County Parks	July 15, 2019	License Agreement conditions status
County Parks	August 8, 2019	Project updates and issues for discussion
County Parks	October 10, 2019	Cultural Investigation status update; in-progress fisheries surveys
County Parks	January 9, 2020	Framework for Memorandum of Understandings (MOUs) - timeline, tracking log
County Parks	February 13, 2020	Interim Risk Reduction Measures, upcoming Valley Water Board Meeting on March 18
County Parks	May 20, 2020	Mapbook and GIS exhibits, ADTP construction schedule timeline; impacts to 0.65 acres county land; permanent ADTP project footprint impacts
County Parks	June 6, 2020	ADTP impacts, Master License Agreement extension request
County Parks	July 9, 2020	ADTP impacts, Acquisition of 0.65 acres of County property; Logistic and Coordination Agreement, GIS drawings
County Parks	November 5, 2020	Discuss land acquisitions needed to implement FOCP and ADSRP.
County Parks	November 20, 2020	FOCP real estate agreements, Coyote Creek flows during the FOCP and ADSRP.
County Parks	November 23, 2020	Coyote Creek flows during FOCP and ADSRP.
County Parks	January 20, 2021	Discuss land agreements needed for the FOCP.
Supervisor Cindy Chavez	January 21, 2021	Follow up on schedule request and provide status update on County approvals for the FOCP.
County Parks	February 3, 2021	Discuss replacement of park facilities per master partnership agreement.
County Parks	February 4, 2021	Discuss potential ADSRP conservation measures.
County Parks	February 25, 2021	Discuss land agreements.
County Parks	April 16, 2021	Discuss land agreements
County Parks	May 13, 2021	Discuss land agreements
County Parks	June 7, 2021	Discuss restoration opportunities at Ogier Ponds.
County Parks	June 7, 2021	Site visit of Cross Valley Pipeline Extension (CVPE).
County Parks	July 22, 2021	Restoration opportunities on County Parks property, construction schedule, CVPE.
County Parks	August 5, 2021	Preliminary mitigation plans and constraints on County-owned property.

Stakeholder	Date	Meeting Type
County Parks	August 20, 2021	Site visit to potential mitigation sites.
County Parks	August 27, 2021	Restoration opportunities on County Parks property, construction schedule, CVPE.
County Parks	September 28, 2021	Project details at Live Oak Picnic Area.
County Parks	October 14, 2021	Construction schedule, mitigation, and land rights.
County Parks	October 28, 2021	Discuss project impacts to recreational amenities on County Park property.
County Parks	November 1, 2021	Discuss the agreement regarding Park replacement options.
County Parks	November 10, 2021	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	December 2, 2021	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	December 8, 2021	Live Oak Picnic Area site visit.
County Parks	December 14, 2021	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	December 28, 2021	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	January 13, 2022	Funding and land agreements.
County Parks	February 8, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	February 22, 2022	Land use agreements
County Parks	March 8, 2022	Land use agreements
County Parks	March 10, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements.
County Parks	March 22, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	April 6, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	April 14, 2022	Coordination meeting.
County Parks	May 4, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	May 11, 2022	Coordination meeting.
County Parks	May 18, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	June 1, 2022	Land use agreements
County Parks	June 15, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	June 29, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	July 15, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	July 27, 2022	Land use agreements

Stakeholder	Date	Meeting Type
County Parks	August 11, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	September 8, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements.
County Parks	October 13, 2022	Construction schedule, project updates, potential mitigation sites, pending agreements
County Parks	October 20, 2022	Land use agreements.
County Parks	October 28, 2022	Land use agreements.
County Parks	November 3, 2022	Coyote Road, park entrance, and parking lots designs.
County Parks	November 10, 2022	Coordination and updates.
County Parks	December 8, 2022	Coordination and updates.
County Parks	January 12, 2023	Coordination and updates.
County Parks	February 9, 2023	Design meeting for Boat Ramp parking and entrance
County Parks	February 16, 2023	Coordination and updates.
Roads and Airports Department	April 5, 2023	Encroachment permit pre-application meeting.
County Parks	March 16, 2023	Coordination and updates.
County Parks	April 13, 2023	Coordination and updates.
County Parks	April 27, 2023	Coordination and updates.
County Parks	May 11, 2023	Coordination and updates.
County Parks	May 25, 2023	Coordination and updates.
County Parks	June 22, 2023	Coordination and updates.
County Parks	June 28, 2023	Coordination and updates.
County Parks	July 11, 2023	Coordination and updates.
County Parks	July 20, 2023	Coordination and updates.
County Parks	August 3, 2023	Coordination and updates.
County Parks	August 9, 2023	Coordination and updates.
County Parks	August 17, 2023	Coordination and updates.
County Parks	August 29, 2023	Coordination and updates.
County Parks	September 14, 2023	Coordination and updates.
County Parks	November 9, 2023	Coordination and updates.
County Parks	January 4, 2024	Coordination and updates.
County Parks	January 18, 2024	Coordination and updates.
County Parks	February 1, 2024	Coordination and updates.
County Parks	February 1, 2024	Discuss agency input, real estate needs, and timeline for the Live Oak Restoration Reach.
County Parks	February 15, 2024	Coordination and updates.
County Parks	February 29, 2024	Coordination and updates.
County Parks	March 1, 2024	Site walk of the Live Oak Picnic Area, Basalt Hill Borrow Area, and Rosendin Park.
County Parks	March 14, 2024	Coordination and updates.

Stakeholder	Date	Meeting Type
County Parks	March 28, 2024	Coordination and updates.
County Parks	April 11, 2024	Coordination and updates.
County Parks	April 25,2024	Coordination and updates.
County Parks	May 9, 2024	Coordination and updates.
County Parks	June 6, 2024	Coordination and updates.
County Parks	June 20, 2024	Coordination and updates.
County Parks	July 18, 2024	Coordination and updates.
County Parks	July 25, 2024	Discuss draft planning study report for Ogier Ponds.
County Parks	September 12, 2024	Coordination and updates.
County Parks	September 27, 2024	Coordination and updates.
County Parks	October 10, 2024	Coordination and updates.
County Parks	October 24, 2024	Coordination and updates.
County Parks	November 7, 2024	Coordination and updates.
Regional		
SCVHA	June 23, 2020	Coordinate expectation for FOCP SCVHP coverage.
SCVHA	August 13, 2020	Coordinate expectation for FOCP SCVHP coverage.
SCVHA	December 22, 2020	Invasive species control plan debrief.
SCVHA	January 13, 2021	Advancing the ADSRP and VHP coverage.
SCVHA	July 9, 2021	Invasive species control plan and restoration
SCVHA	August 8, 2022	Discuss HMMP opportunities for achieving VHP goals.
SCVHA	December 4, 2023	Advancing VHP coverage for the ADSRP.
SCVHA	July 22, 2024	Discuss VHP compliance for the ADSRP.
City of San Jose		
Department of Housing, Beautify SJ	August 30, 2022	Field coordination meeting.
Department of Housing, Beautify SJ	September 19, 2022	Coordination meeting.
Department of Housing, Beautify SJ	November 14, 2022	Coordination meeting.
Department of Housing, Beautify SJ	February 21, 2023	Coordination meeting.
Department of Housing, Beautify SJ	March 13, 2023	Coordination meeting.
Department of Housing, Beautify SJ	April 10, 2023	Coordination meeting.
Department of Housing, Beautify SJ	April 24, 2023	Field community meeting.
Department of Housing, Beautify SJ	May 17, 2023	Coordination meeting.
Department of Housing, Beautify SJ	June 14, 2023	Coordination meeting.
City of Morgan Hill		
Engineering Division	June 13, 2023	Pre-application meeting.
NGOs		
Bay Planning Coalition	November 13, 2020	Project update.

Stakeholder	Date	Meeting Type
Other		
Water retailers	October 14, 2020	Anderson Dam operational impact contingency planning workshop.
Joint Agencies		
FERC, DSOD	February 8, 2017	Project update.
NMFS, FERC DHAC, CDFW	June 21, 2019	FAHCE presentation of findings.
RWQCB, CDFW	July 25, 2019	Site visit for permitting coordination.
USFWS, CDFW	November 12, 2019	Coordinate bald and golden eagle surveys.
DSOD, FERC	March 24, 2020	ADSRP risk workshop.
NMFS, CDFW	May 28, 2020	Discuss Coyote Creek flow and weir diversions.
USFWS, CDFW	June 2, 2020	Discuss potential for bald and golden eagle nest disturbances.
FERC, SHPO	July 14, 2020	Discuss plan to evaluate archaeological sites.
USFWS, CDFW, SCVHA	July 15, 2020	Discuss FOCP coverage under the SCVHP.
FERC, SWRCB, RWQCB	July 28, 2020	FOCP permitting requirements and expectations.
USFWS, NMFS, CDFW, SCVHA	August 14, 2020	Present monitoring findings and discuss plan for fish rescue activities.
FERC, DSOD	August 19, 2020	Potential failure mode analysis workshop for ADTP.
USFWS, CDFW	September 29, 2020	Discuss potential bald and golden eagle impacts from FOCP, next steps.
FERC, USACE, SHPO	October 7, 2020	Discuss implementation of the PA.
FERC, DSOD	October 30, 2020	Discuss ADTP review periods, contracting, milestones.
USFWS, CDFW, SCVHA	November 2, 2020	Discuss future fish rescues, amphibian coverage under SCVHP.
USFWS, CDFW, SCVHA	December 14, 2020	Review USFWS comments on environmental management and monitoring plans.
NMFS, USFWS, CDFW	December 21, 2020	Focused discussion of the invasive species control plan.
USACE, SWRCB, RWQCB	January 14, 2021	Discuss Waters of the U.S. and State associated with the ADTP.
FERC, DSOD	February 18, 2021	Discuss approval of the ADTP design and staging.
FERC, DSOD	February 25, 2021	Discuss project phasing and splitting approvals for the diversion tunnel construction.
FERC, DSOD	March 10, 2021	Reservoir operation and reliability during construction (stochastic analysis) workshop.
FERC, SWRCB	March 11, 2021	Discuss ADTP construction staging approval.
FERC, DSOD	March 18, 2021	Discuss ADTP construction staging approval.
FERC, DSOD	March 25, 2021	Discuss ADTP construction staging approval.
FERC, DSOD	April 8, 2021	ADTP construction phasing approval.
SWRCB, FERC	April 15, 2021	ADTP construction phasing approval.
FERC, DSOD	April 22, 2021	ADTP design and staging approval.

Stakeholder	Date	Meeting Type
FERC, DSOD	April 29, 2021	ADTP design and staging approval.
FERC, DSOD	May 6, 2021	ADTP design and staging approval.
FERC, DSOD	May 10, 2021	ADTP construction phased approvals.
FERC, DSOD	May 13, 2021	ADTP design and staging approval.
FERC, DSOD	May 20, 2021	ADTP design and staging approval.
FERC, DSOD	May 27, 2021	ADTP design and staging approval.
NMFS, CDFW	May 27, 2021	Respond to agency comments on CVPE 95% design review.
FERC, DSOD	June 3, 2021	ADTP design and staging approval.
USACE, RWQCB, SWRCB, NMFS, SCVHA, County Parks	July 14, 2021	Status update on sediment monitoring plan and compensatory mitigation plan.
FERC, DSOD	July 15, 2021	ADTP design and staging approval.
FERC, DSOD	July 22, 2021	ADTP design and staging approval.
FERC, DSOD	July 29, 2021	ADTP design and staging approval.
FERC, DSOD	August 5, 2021	ADTP design and staging approval.
FERC, DSOD	August 19, 2021	ADTP design and staging approval.
FERC, DSOD	September 2, 2021	ADTP design and staging approval.
FERC, SWRCB, RWQCB	September 7, 2021	Discuss conditional approval of ADTP construction.
FERC, DSOD	September 9, 2021	ADTP design and staging approval.
County Parks, VHA	September 13, 2021	Coyote Creek coordination
FERC, SWRCB, DSOD	September 23, 2021	ADTP design and staging approval.
FERC, SWRCB, DSOD	September 30, 2021	ADTP design and staging approval.
FERC, SWRCB, DSOD	October 14, 2021	ADTP design and staging approval.
FERC, DSOD	October 21, 2021	ADTP design and staging approval.
FERC, DSOD	October 28, 2021	ADTP design and staging approval.
FERC, NMFS, USACE, SCVHA, CDFW, County Parks	November 1, 2021	FOCP mitigation and monitoring plan site visit.
FERC, DSOD	November 4, 2021	ADTP design and staging approval.
County Parks, VHA	November 22, 2021	Ogier Ponds coordination
FERC, DSOD	December 2, 2021	ADTP design approval and work authorizations.
NMFS, County Parks	December 8, 2021	HMMP site visit.
FERC, SWRCB, DSOD	December 9, 2021	ADTP design and staging approval.
FERC, DSOD	December 21, 2021	ADTP design approval and work authorizations.
FERC, SWRCB, DSOD	December 28, 2021	ADTP design approval.
FERC, DSOD	January 20, 2022	ADTP construction status update.
NMFS, CDFW	February 2, 2022	Discuss NMFS post-construction operation suggestions and post-ADSRP operation recommendations.
FERC, DSOD	February 3, 2022	ADTP construction status update.
FERC, DSOD	February 17, 2022	ADTP construction status update.

Stakeholder	Date	Meeting Type
FERC, DSOD	March 3, 2022	ADTP construction status update.
County Parks, VHA	March 9, 2022	Ogier Ponds site walk.
FERC, SWRCB, DSOD	April 14, 2022	ADTP construction status update.
FERC, DSOD	May 12, 2022	Status update for ADTP submittals and construction.
FERC, DSOD	May 26, 2022	ADTP construction status update.
FERC, DSOD	July 7, 2022	ADTP construction status update.
FERC, DSOD	July 21, 2022	ADTP construction coordination.
County Parks, VHA	September 1, 2022	Ogier Ponds coordination
NMFS, CDFW	September 14, 2022	Coyote Percolation Dam site visit.
NMFS, CDFW, County Parks	December 9, 2022	Ogier Ponds site visit.
NMFS, USFWS, USACE, CDFW, SWRCB, RWQCB, SCVHA, County Parks	December 13, 2022	Ogier Ponds site visit.
CDFW, USFWS	December 14, 2023	Bald Eagle discussion.
County Parks, VHA	June 20, 2023	Ogier Ponds coordination.
CDFW, County Parks, RWQCB, NMFS	September 26, 2023	FOCP construction sites tour.
CDFW, FERC DHAC, NMFS, SCVWD, RWQCB, SWQCB, SCVHA, USACE, USFWS	July 29, 2024	ADSRP site visit.
CAL FIRE, County Parks, City of Morgan Hill	November 19, 2024	Coordinate for upcoming meeting with community leaders regarding emergency access and evacuation for neighborhoods near the ADSRP.
CAL FIRE, County Parks, City of Morgan Hill	November 21, 2024	Discuss emergency access and evacuation coordination for neighborhoods near the ADSRP.
Interagency and Technical Work Group Meetings (FERC, USACE, USFWS, NMFS, EPA, CDFW, SWRCB, SFBRWQCB, VHA, and SCCDRP)		
NMFS	April 18, 2018	Interagency meeting
CDFW, EPA, FERC DHAC, NMFS, RWQCB, SCVHA, USACE, USFWS	June 27, 2018	Interagency meeting #1
CDFW, FERC DHAC, NMFS, OHP, RWQCB, SCVHA, USFWS	August 22, 2018	Interagency meeting #2
CDFW, FERC DHAC, NMFS, RWQCB, USACE, USFWS	October 24, 2018	Interagency meeting #3
USACE	November 6, 2018	Interagency meeting #4
CDFW, FERC DHAC, NMFS, RWQCB, SCVHA, SWRCB, USACE, USFWS	February 27, 2019	Interagency meeting #5
CDFW, EPA, FERC DHAC, NMFS, RWQCB, SCVHA, SWRCB, USACE, USFWS	April 24, 2019	Interagency meeting #6
CDFW, EPA, FERC D2SI, FERC DHAC, NMFS, RWQCB, SCVHA, SWRCB, USACE, USFWS	June 26, 2019	Interagency meeting #7

Stakeholder	Date	Meeting Type
CDFW, EPA, FERC DHAC, NMFS, RWQCB, SCVHA, USACE, USFWS	August 28, 2019	Interagency meeting #8
CDFW, FERC DHAC, NMFS, RWQCB, SWRCB, SCVHA, USACE, USFWS	October 23, 2019	Interagency meeting #9
CDFW, FERC DHAC, NMFS, RWQCB, SCVHA, SWRCB, USACE, USFWS	November 20, 2019	Interagency meeting #10
NMFS, USFWS, EPA, CDFW, SCVHA	December 11, 2019	Establish Fish and Frog Technical Working Group (Fish/Frog TWG)
NMFS, CDFW, and FERC	December 16, 2019	Establish Fisheries Technical Working Group (Fisheries TWG)
NMFS, CDFW, and FERC	January 21, 2020	Fisheries TWG
NMFS, USFWS, and CDFW	February 6, 2020	Fish/Frog TWG
NMFS, CDFW, and FERC	February 18, 2020	Fisheries TWG
CDFW, EPA, FERC D2SI, FERC DHAC, NMFS, OHP, RWQCB, SCVHA, SWRCB, USACE, USFWS	February 26, 2020	Interagency meeting #11 (FOCP focus)
NMFS, CDFW, and FERC	March 17, 2020	Fisheries TWG
NMFS and CDFW	March 24, 2020	Executive Fisheries Technical Working Group (E-TWG) #1
NMFS, CDFW	April 1, 2020	Fisheries TWG
NMFS, CDFW	April 21, 2020	Fisheries TWG
CDFW, EPA, FERC DHAC, FERC D2SI, NMFS, OHP, RWQCB, SCVHA, SWRCB, USACE, USFWS	April 22, 2020	Interagency meeting #12 (FOCP focus)
NMFS, CDFW	April 28, 2020	E-TWG #2
NMFS	April 28, 2020	1:1 executive management call
NMFS, CDFW	May 26, 2020	Fisheries TWG subcommittee
NMFS and CDFW	May 28, 2020	Fisheries TWG subcommittee
NMFS, CDFW	June 2, 2020	E-TWG #3
NMFS	June 2, 2020	1:1 executive management call
NMFS, CDFW	June 16, 2020	Fisheries TWG #8
NMFS	June 23, 2020	1:1 executive management call
CDFW, EPA, FERC DHAC, FERC D2SI, NMFS, OHP, RWQCB, SCVHA, SWRCB, USACE, USFWS	June 24, 2020	Interagency meeting #13 (FOCP focus)
NMFS, CDFW	June 25, 2020	E-TWG #4
NMFS and CDFW	July 2, 2020	E-TWG #5
NMFS and CDFW	July 9, 2020	Fisheries TWG subcommittee
NMFS, CDFW	July 21, 2020	Fisheries TWG #10
NMFS and CDFW	August 12, 2020	Fisheries TWG subcommittee
CDFW, FERC DHAC, FERC D2SI, NMFS, RWQCB, SCVHA, SWRCB, USACE, USFWS	August 26, 2020	Interagency meeting #14 (FOCP focus)

Stakeholder	Date	Meeting Type
NMFS, CDFW, and FERC	August 27, 2020	Fisheries TWG #11
NMFS and CDFW	September 2, 2020	E-TWG #6
NMFS, CDFW, and FERC	September 15, 2020	Fisheries TWG #12
NMFS	September 21, 2020	1:1 executive management call
NMFS	September 24, 2020	E-TWG #8
NMFS, USFWS, CDFW, County Parks, and FERC	October 20, 2020	Fisheries TWG #13
NMFS and CDFW	October 23, 2020	Fisheries TWG subcommittee
NMFS, CDFW, and USFWS	October 27, 2020	Fisheries TWG
CDFW, NMFS, RWQCB, SWRCB, USACE, USFWS, and County Parks	October 28, 2020	Interagency meeting #15 (FOCP focus)
NMFS, CDFW	November 6, 2020	Fisheries TWG planning meeting.
NMFS and CDFW	November 10, 2020	E-TWG #8
NMFS, USFWS, CDFW, County Parks, and FERC	November 17, 2020	Fisheries TWG #14
NMFS	November 20, 2020	1:1 executive management call
NMFS, CDFW	December 10, 2020	Fisheries TWG planning meeting.
NMFS, USFWS, CDFW, RWQCB, County Parks, FERC	December 15, 2020	Fisheries TWG #15
NMFS and CDFW	December 15, 2020	Fisheries TWG subcommittee: Coyote Percolation Dam
NMFS, CDFW, and FERC	December 21, 2020	Fisheries TWG
CDFW, FERC DHAC, NMFS, RWQCB, SCVHA, SWRCB, USFWS, USACE, County Parks	December 23, 2020	Interagency meeting #16 (FOCP focus)
NMFS and CDFW	January 6, 2021	Fisheries TWG subcommittee
NMFS, CDFW, USFWS	January 11, 2021	Fisheries TWG planning meeting.
NMFS, CDFW, USFWS, RWQCB, SWRCB, County Parks	January 19, 2021	Fisheries TWG #16
NMFS, USFWS, CDFW	February 2, 2021	Fisheries TWG planning meeting
NMFS and CDFW	February 9, 2021	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS, USFWS CDFW, County Parks, RWQCB, SWRCB, USACE	February 16, 2021	Fisheries TWG #17
NMFS, CDFW, and FERC	February 22, 2021	Fisheries TWG
CDFW, EPA, FERC DHAC, FERC D2SI, NMFS, RWQCB, SCVHA, SWRCB, USACE, USFWS, County Parks	February 24, 2021	Interagency meeting #17
NMFS, CDFW, and FERC	February 24, 2021	Fisheries TWG
NMFS and CDFW	February 24, 2021	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS	February 26, 2021	1:1 executive management call
NMFS	March 12, 2021	1:1 executive management call

Stakeholder	Date	Meeting Type
NMFS, USFWS, CDFW, SWRCB, RWQCB, SCVHA, County Parks	March 16, 2021	Fisheries TWG #18
NMFS and CDFW	April 1, 2021	Fisheries TWG subcommittee
NMFS	April 7, 2021	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	April 20, 2021	Fisheries TWG #19
FERC, NMFS, USFWS, USACE, EPA, CDFW, SWRCB, RWQCB, SCVHA, County Parks	April 28, 2021	Interagency meeting #18
FERC, NMFS, USFWS, USACE, CDFW, SWRCB, RWQCB, California Governor's office	April 30, 2021	E-TWG
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	May 12, 2021	Fisheries TWG
NMFS	May 12, 2021	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	May 18, 2021	Fisheries TWG #20
NMFS	May 24, 2021	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	June 15, 2021	Fisheries TWG #21
NMFS, FERC, USFWS, USACE, CDFW, SWRCB, RWQCB, SCVHA, County Parks	June 23, 2021	Interagency meeting #19
NMFS and CDFW	June 24, 2021	Fisheries TWG subcommittee
FERC, NMFS, USFWS, USACE, CDFW, SWRCB, RWQCB, California Governor's office	June 30, 2021	E-TWG #4
NMFS and CDFW	July 21, 2021	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	July 22, 2021	Fisheries TWG #22
NMFS, CDFW, and FERC	August 17, 2021	Fisheries TWG
NMFS, FERC, USFWS, USACE, EPA, CDFW, SWRCB, RWQCB, SCVHA, County Parks	August 25, 2021	Interagency meeting #23
FERC, NMFS, USFWS, USACE, CDFW, SWRCB, RWQCB, California Governor's office	September 1, 2021	E-TWG #5
NMFS	September 20, 2021	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	September 21, 2021	Fisheries TWG #24
NMFS and CDFW	October 5, 2021	Fisheries TWG subcommittee
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	October 19, 2021	Fisheries TWG #25
NM NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE FS	October 27, 2021	Interagency meeting #24

Stakeholder	Date	Meeting Type
NMFS	October 28, 2021	1:1 executive management call
NMFS and CDFW	November 9, 2021	Fisheries TWG subcommittee
NMFS and CDFW	November 15, 2021	E-TWG
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	November 16, 2021	Fisheries TWG #26
NMFS and CDFW	November 18, 2021	E-TWG
NMFS	December 3, 2021	1:1 executive management call
NMFS	December 7, 2021	Fisheries TWG subcommittee (field meeting)
NMFS and CDFW	December 8, 2021	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	December 14, 2021	Fisheries TWG #27
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, USACE	January 5, 2022	Fisheries TWG
NMFS	January 13, 2022	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	January 18, 2022	Fisheries TWG #28
NMFS and CDFW	January 20, 2022	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS	January 25, 2022	1:1 executive management call
NMFS	February 3, 2022	1:1 executive management call
NMFS	February 14, 2022	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	February 15, 2022	Fisheries TWG #29
NMFS, USFWS, USACE, CDFW, RWQCB, SWRCB, SCVHA, County Parks	February 23, 2022	Fisheries TWG subcommittee (dual channels)
NMFS and CDFW	February 28, 2022	E-TWG
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	March 15, 2022	Fisheries TWG #30
NMFS and CDFW	March 17, 2022	E-TWG
NMFS	March 30, 2022	1:1 executive management call
NMFS	April 18, 2022	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	April 19, 2022	Fisheries TWG #31
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	May 17, 2022	Fisheries TWG #32
CDFW, FERC DHAC, NMFS, EPA, RWQCB, County Parks, SCVHP, SWRCB, USACE, USFWS	June 22, 2022	Interagency meeting
NMFS	June 29, 2022	1:1 executive management call
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	July 19, 2022	Fisheries TWG #34
NMFS	August 2, 2022	1:1 executive management call

Stakeholder	Date	Meeting Type
NMFS, CDFW, RWQCB, SWRCB	August 16, 2022	Fisheries TWG subcommittee
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USFWS	August 24, 2022	Interagency meeting
NMFS and CDFW	September 14, 2022	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	September 20, 2022	Fisheries TWG #35
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	October 18, 2022	Fisheries TWG
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWRCB, USACE, USFWS	October 26, 2022	Interagency meeting
NMFS and CDFW	November 4, 2022	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS and CDFW	November 10, 2022	Executive TWG
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	November 15, 2022	Fisheries TWG #36
NMFS	December 9, 2022	Ogier Ponds site visit.
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	December 14, 2022	Fisheries TWG
NMFS, USFWS, CDFW, County Parks, RWQCB, SWRCB, SCVHA USACE	December 28, 2022	Interagency meeting
NMFS	January 11, 2023	1:1 executive management call
NMFS, USFWS, USACE, CDFW, SWRCB, RWQCB, County Parks, SCVHA	January 17, 2023	Fisheries TWG #38
NMFS	January 19, 2023	1:1 executive management call
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USACE, USFWS	February 22, 2023	Interagency meeting
NMFS	February 28, 2023	1:1 executive management call
NMFS and CDFW	March 1, 2023	Executive TWG
NMFS and CDFW	March 14, 2023	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
NMFS and CDFW	March 21, 2023	Fisheries TWG subcommittee: Coyote Creek Percolation Dam
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USACE, USFWS	March 21, 2023	Fisheries TWG #39
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USACE, USFWS	April 26, 2023	Interagency meeting
NMFS	April 28, 2023	1:1 executive management call

Stakeholder	Date	Meeting Type
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USACE, USFWS	May 16, 2023	Fisheries TWG #40
NMFS	May 17, 2023	1:1 executive management call
NMFS and CDFW	May 18, 2023	Executive TWG
NMFS	May 22, 2023	1:1 executive management call
NMFS and CDFW	June 16, 2023	Executive TWG
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USACE, USFWS	June 16, 2023	Fisheries TWG
NMFS	June 23, 2023	1:1 executive management call
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USACE, USFWS	June 28, 2023	Interagency meeting
CDFW, EPA, FERC DHAC, NMFS, RWQCB, County Parks, SCVHA, SWQCB, USACE, USFWS	July 17, 2023	Fisheries TWG
NMFS	August 7, 2023	1:1 executive management call
NMFS and CDFW	August 30, 2023	Executive TWG
NMFS	September 18, 2023	1:1 executive management call
CDFW, FERC DHAC, NMFS, RWQCB, SWQCB, SCVHA, County Parks, USACE, EPA, USFWS	September 19, 2023	TWG meeting
CDFW, FERC DHAC, NMFS, RWQCB, SWQCB, SCVHA, Santa Clara County Parks, USACE, USEPA, USFWS	October 25, 2023	Interagency meeting
CDFW, FERC DHAC, NMFS, SCVWD, RWQCB, SWQCB, SCVHA, County Parks, USACE, EPA, USFWS	November 21, 2023	TWG meeting
CDFW, FERC DHAC, NMFS, SCVWD, RWQCB, SWQCB, SCVHA, County Parks, USACE, EPA, USFWS	January 16, 2024	TWG meeting
CDFW, FERC DHAC, NMFS, SCVWD, RWQCB, SWQCB, SCVHA, County Parks, USACE, EPA, USFWS	March 19, 2024	TWG meeting
CDFW, FERC DHAC, NMFS, SCVWD, RWQCB, SWQCB, SCVHA, County Parks, USACE, EPA, USFWS	May 21, 2024	TWG meeting
CDFW, FERC DHAC, NMFS, SCVWD, RWQCB, SWQCB, SCVHA, USACE, USFWS	August 28, 2024	Interagency meeting.
CDFW, NMFS, EPA, SCVWD, RWQCB, SWQCB	October 9, 2024	Fisheries TWG subcommittee: Coyote Creek Percolation Dam

Notes:
CAL FIRE: California Department of Forestry and Fire Protection

Stakeholder	Date	Meeting Type

CDFW: California Department of Fish and Wildlife
County Parks: Santa Clara County Department of Parks and Recreation
DWR DSOD: Department of Water Resources, Division of Safety of Dams
EPA: Environmental Protection Agency
FERC DHAC: Federal Energy Regulatory Commission, Division of Hydropower and Compliance
FERC D2SI: Federal Energy Regulatory Commission, Division of Dam Safety and Inspections
NMFS: National Marine Fisheries Service
RWQCB: Regional Water Quality Control Board (San Francisco Bay)
SCVHA: Santa Clara Valley Habitat Agency
SWRCB: State Water Resources Control Board
USACE: U.S. Army Corps of Engineers
USFWS: U.S. Fish and Wildlife Service

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix D

ADSRP AMP Detailed Tables

ADSRP & FAHCE Adaptive Management Plan Details

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
FAHCE operating rule curves (3.6.3)	Maintain flows in Coyote Creek that support steelhead rearing habitat during the winter and spring	Maintain winter baseflow releases based on combined storage in Coyote and Anderson reservoirs at 5 cfs, 10 cfs, 15 cfs, 23 cfs, or ≥ 26 cfs at Gage No. 5082 Between Nov. 1 to Apr. 30, except for deviations during flood risk reductions releases, annually.[1] Minimum low storage release of 5 cfs at Gage No. 5082 maintained when storage is below the low storage curve.	Compliance monitoring. Monitor reservoir storage level within Anderson (ALERT 4002) and Coyote (ALERT 4005) Reservoir and a 3-day rolling average of streamflow at Gage No. 5082 for compliance of storage and flow magnitude Nov. 1 to Apr. 30.	Winter baseflow curve storage met and objectives for winter baseflow releases not met[1].	ADSRP AMT evaluates annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify operation protocols to comply with operating rule curves to achieve objectives.	Continuous monitoring during winter baseflow release period (Nov. 1 to Apr. 30); annual reporting.
	Provide steelhead attraction flows during up and downstream migration	Pulse releases for attraction flow of 50 cfs for a duration of 5 days is triggered when combined storage in Anderson and Coyote Reservoir (minus imported water temporarily stored in Anderson) is at or above the Attraction Curve from Feb. 1 to Apr. 30. Pulse releases are to occur up to twice during this time period if the storage threshold is met. Flood releases and spill events in excess of 50 cfs for 5 consecutive days between Feb. 1 to Apr. 30 will also be considered a pulse flow event. [1]	Compliance monitoring. Monitor reservoir storage level within Anderson (ALERT 4002) and Coyote (ALERT 4005) Reservoir and streamflow at Gage No. 5082 Feb. 1–Apr. 30.	Attraction flow curve storage met and objectives for pulse releases not met.	ADSRP AMT evaluates annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify operation protocols to comply with operating rule curves to achieve objectives.	Continuous monitoring during attraction flow release period (Feb. 1–Apr. 30); annual reporting.
	Provide sufficient water depth during adult migration	Pulse flow release for attraction flow (at least 50 cfs) provides water depth ≥0.7 feet over 25% of entire channel cross-section and 10% of continuous cross section at critical riffles.[1]	Effectiveness monitoring. Following CDFW standard operating procedures at all POIs. Repeated following channel forming flows, or other alterations to critical passage locations.	Adult migration water depth objectives not met during pulse flow releases of 90 cfs.	ADSRP AMT evaluates attraction flow monitoring information for Years 1, 3, 5, and 10 after implementation, and after any modification to attraction flow regime. Based on that evaluation, VW may identify refinements to attraction flow magnitude, including modifying reservoir	Within 1 year of implementation and/or when an attraction flow is released, in Years 1, 3, 5, and 10 of ADSRP and after any modification to attraction flow magnitude or duration for the duration of the Project.

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
					releases for salmonid upstream migration, or modifying passage obstacles.	
	Provide sufficient water depth during smolt migration.	Pulse flow release for outmigration flow (50 cfs) provides water depth ≥0.4 feet over 25% of entire channel cross-section and 10% of continuous cross section at critical riffles.[1]	Effectiveness monitoring. Following CDFW standard operating procedures at all POIs. Repeated following channel forming flows, or other alterations to critical passage locations.	Juvenile migration water depth objectives not met during pulse flow releases of 50 cfs.	ADSRP AMT evaluates monitoring results. Based on that evaluation, VW may identify refinements to outmigration flow magnitude, including modifying reservoir releases for salmonid downstream migration, or modifying passage obstacles.	
Summer Post Construction Operations	Provide suitable water temperatures for steelhead rearing during summer within the FCWMZ[2]	Average daily temperature not to exceed 18°C from May 1 through Oct. 31 within the FCWMZ.	Compliance monitoring. Continuous monitoring of stream temperature within the FCWMZ.	Average daily temperature exceeds temperature objectives in years with a cold water program.	ADSRP AMT annual monitoring information for a minimum of 3 years after completion of the Ogier Ponds CM. Based on that evaluation, VW may identify refinements to cold water pool management (i.e., change in cold pool temperature targets or release rates) and/or extent of CWMZ or attainable water temperature measurable objectives.	Within 1 year of implementation or first year with a cold-water program. Monitoring occurs from May to Oct. for the first 10 years of the project.
FAHCE Operating Rule Curves	Avoid stranding	For flow decreases >50 cfs, flow is reduced approximately 50% per step over a maximum of seven equally spaced steps in 72 hours or less.	Compliance monitoring. Monitor streamflow at Gage No. 5082 at 15-minute intervals during flow recessions.	Flow recessions in excess of objectives	ADSRP AMT to evaluate flow ramping criteria annually. Based on evaluation, VW may identify and make annual refinements to ramping	Immediately after implementation, annually for the duration of the Anderson Program during flow recessions.

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
		For flow decreases ≤50 cfs, flow is reduced approximately 50% per step over a maximum of four equally spaced steps in 36 hours or less. The minimum reduction in flow during each ramping step will be 2 cfs.			rate measurable objectives or implementation.	
Phase 2 Coyote Percolation Dam Operations (3.6.5)	Provide safe, effective, and timely upstream and downstream steelhead passage	Meet NOAA fish passage criteria through the facility	Compliance monitoring. Post construction monitoring of water depth and velocity in facility meets design criteria.	Criteria not achieved within range of design flows	ADSRP AMT to evaluate modifications to the facility and post construction monitoring. Based on that evaluation, VW may change operations, to achieve measurable objectives.	Annually beginning immediately after implementation, based on availability of flows.
		Improved migration conditions including depth, velocity, and predation risk as compared to baseline operation	Effectiveness monitoring. Detailed methods to be included in the operations plan	Migration conditions depth, velocity, and predation risk are lower than baseline operations	ADSRP AMT evaluates monitoring data to determine if there is improved migratory conditions over a period to be specified in the operations plan. Based on that evaluation, VW may develop changes to operations protocols to attain measurable objectives,	Monitoring period and frequency to be described in operations plan
Ogier Ponds Restoration	Restore riverine function, provide fish passage, enhance rearing habitat	Restore approximately 6,500 ft of channel and remove all fish passage impediments. Maintain over 67,000 ft^2 of suitable juvenile rearing habitat, and over 33,000 ft^2 of shallow water for fry rearing at typical spring and summer flows (approximately 30-50 cfs). Over 20,000 ft^2 of suitable spawning habitat.	Effectiveness monitoring. Annual monitoring at design flows to determine the success of the project at achieving restoration objectives, and to inform maintenance.	Rearing or spawning habitat less than objectives at 10 years post-construction.	ADSRP AMT to evaluate annual monitoring information for a period of at least 10 years to determine if habitat measurable objectives continue to be met. Based on evaluation, VW may implement Sediment Augmentation program or other appropriate maintenance or restoration activities to maintain habitat measurable objectives.	Annual monitoring for ten years following implementation.
Live Oak Restoration	Increase steelhead spawning habitat, high-flow floodplain habitat, and habitat complexity	Restore over 2,800 ft of channel, create over 20,000 ft^2 of spawning habitat, over 65,000 ft^2 of suitable juvenile rearing habitat, and over 20,000 ft^2 of shallow water for fry rearing at typical spring and summer flows (approximately 30-50 cfs).				

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
Sediment Augmentation	Supplement sediment and spawning gravels downstream of Anderson Dam	Augment at least 500 CY of sediment within the CWMZ	Effectiveness monitoring. Monitor augmentation location and replenish to initial volume at least every five years.	Sediment transport is occurring and volume at augmentation site is less than 500 CY or sediment transport is not occurring.	ADSRP AMT to evaluate annual monitoring information for a period of at least 5 years to determine if augmented gravel is mobilizing and being transported downstream. Based on evaluation, VW may replenish sediment to initial volume, adjust geomorphic flows, or conduct other maintenance or restoration activities to maintain the measurable objectives.	Monitored annually and replenished to initial volume at least every five years.

[1] The rule curves provide a target release rate. Releases from the reservoir may fluctuate slightly due to valve imprecision.

[2] Functional Cold Water Management Zone (FCWMZ) is the reach of Coyote Creek from Anderson Dam to the point at which the creek enters Ogier Ponds. The downstream extent of the cold-water management zone will be set at the upstream end of Ogier Ponds until the completion of the Ogier Ponds Restoration Project at which point it will be extended to the Coyote Creek Golf Drive crossing.

ADSRP & FAHCE Plus Modified Adaptive Management Plan Details

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
FAHCE-plus modified operating rule curves	Maintain flows in Coyote Creek that support steelhead rearing habitat during the winter and spring	Maintain winter baseflow releases based on combined storage in Coyote and Anderson reservoirs at 5 cfs, 10 cfs, 15 cfs, 23 cfs, or ≥ 26 cfs at Gage No. 5082 Between Nov. 1 to Apr. 30, except for deviations during flood risk reductions releases, annually. [1] Minimum low storage release of 5 cfs at Gage No. 5082 maintained when storage is below the low storage curve.	Compliance monitoring. Monitor reservoir storage level within Anderson (ALERT 4002) and Coyote (ALERT 4005) Reservoir and a 3-day rolling average of streamflow at Gage No. 5082 for compliance of storage and flow magnitude Nov. 1 to Apr. 30.	Winter baseflow curve storage met and objectives for winter baseflow releases not met[1].	ADSRP AMT evaluates annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify operation protocols to comply with operating rule curves to achieve objectives.	Continuous monitoring during winter baseflow release period (Nov. 1 to Apr. 30); annual reporting.
	Provide steelhead attraction flows during up and downstream migration	Pulse releases of 90 cfs for 10 days at Gage No. 5082 when combined storage in Anderson and Coyote Reservoir (minus imported water temporarily stored in Anderson) is at or above the Attraction curve from Dec. 1 to Apr. 1. Up to 9 times maximum (no more than twice per month Dec.–Mar. and once in Apr.) during this time period if the storage threshold is met. Flood releases and spill events in excess of 90 cfs for 10 consecutive days between Dec. 1 to Apr. 1 will also be considered a pulse flow event. [1]	Compliance monitoring. Monitor reservoir storage level within Anderson (ALERT 4002) and Coyote (ALERT 4005) Reservoir and streamflow at Gage No. 5082 Dec. 1–Apr. 1.	Attraction flow curve storage met and objectives for pulse releases not met.	ADSRP AMT evaluates a annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify operation protocols to comply with operating rule curves to achieve objectives.	Continuous monitoring during attraction flow release period (Dec. 1–Apr. 1); annual reporting.

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
		Safeguard pulse release for attraction flow of at least 90 cfs for a duration of 5 days when combined storage in Anderson and Coyote reservoirs is at or above 55,000 AF and flow at Gage No. 5058 is at or above 30 cfs for 2 consecutive days from Jan. 15 to Mar. 31, annually, if no other pulse flow of 90 cfs or greater for 10 days or more has been released. Up to twice annually. Safeguard pulse release for attraction flow of at least 90 cfs for a duration of 10 days is triggered if no pulse has been released by Mar. 1 and storage is above the Safeguard threshold (55,000 AF). [1]	Compliance monitoring. Monitor reservoir storage level within Anderson (ALERT 4002) and Coyote (ALERT 4005) Reservoir and streamflow at Gage Nos. 5082 and 5058 Jan. 15–Mar. 31.	Safeguard storage and streamflow threshold met and objectives for safeguard pulse releases not met.	ADSRP AMT evaluates annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify operation protocols to comply with operating rule curves to achieve objectives.	Continuous monitoring Jan. 15–March 31; annual reporting.
		Increase in minimum number of adult upstream passage days into the CWMZ over modeled baseline. Equivalent to a minimum of 7 days per year into the CWMZ	Effectiveness monitoring. Monitor streamflow at Gage No. 5058 Dec 1–Apr. 1.	Objectives for minimum adult passage days not met.	ADSRP AMT evaluates annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify storage trigger, magnitude, frequency, or duration or adjust the attraction flow releases to attain measurable objectives.	Continuous monitoring during attraction flow release period (Dec. 1–Apr. 1); annual reporting.
	Provide steelhead juvenile downstream migration during spring	Pulse releases for outmigration of at least 60 cfs for a duration of at least 3 days at Gage No. 5082 is triggered when combined storage in Anderson and Coyote reservoirs is at or above the Outmigration threshold of 45,000 AF and flow at Gage No. 5058 is at or above 10 cfs for 2 consecutive days from Apr. 1 to May 31, annually. Pulse releases are to occur up to twice annually.	Compliance monitoring. Monitor reservoir storage level within Anderson (ALERT 4002) and Coyote (ALERT 4005) Reservoir and streamflow at Gage Nos. 5082 and 5058; Apr. 1–May 31.	Storage and streamflow threshold met and objectives for outmigration pulse releases not met.	ADSRP AMT evaluates annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify operation protocols to comply with operating	Continuous monitoring during outmigration release period (Apr. 1–May 31); annual reporting.

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
		Pulse release for outmigration flow of at least 60 cfs for a duration of 7 days is triggered if no pulse has been released by May 15 and storage is above the Safeguard threshold of 45,000 AF. [1]			rule curves to achieve objectives.	
		Increase in minimum number of outmigration passage days out of the CWMZ over modeled baseline. Equivalent to a minimum of 14 days per year out of the CWMZ.	Effectiveness monitoring. Monitor streamflow at Gage No. 5082 Feb 1 -May 31, annually.	Objectives for minimum outmigration passage days not met.	ADSRP AMT evaluates annual monitoring information for a minimum of 7 years or the period necessary to obtain information about wet, normal and dry years. Based on that evaluation, VW may modify storage trigger, magnitude, frequency, or duration or adjust the outmigration flow releases to attain measurable objectives.	Continuous monitoring during outmigration flow release period (Dec 1.– May 31); annual reporting.
	Provide sufficient water depth during adult migration	Pulse flow release for attraction flow (at least 90 cfs) provides water depth ≥0.7 feet over 25% of entire channel cross-section and 10% of continuous cross section at critical riffles. [1]	Effectiveness monitoring. Following CDFW standard operating procedures at all POIs. Repeated following channel forming flows, or other alterations to critical passage locations.	Adult migration water depth objectives not met during pulse flow releases of 90 cfs.	ADSRP AMT evaluates attraction flow monitoring information for Years 1, 3, 5, and 10 after implementation, and after any modification to attraction flow regime.. Based on that evaluation, VW may identify refinements to attraction flow magnitude, including modifying reservoir releases for salmonid upstream migration, or modifying passage obstacles.	Within 1 year of implementation and/or when an attraction flow is released, in Years 1, 3, 5, and 10 of ADSRP and after any modification to attraction flow magnitude or duration for the duration of the Project.

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
	Provide sufficient water depth during smolt migration.	Pulse flow release for outmigration flow (60 cfs) provides water depth ≥0.4 feet over 25% of entire channel cross-section and 10% of continuous cross section at critical riffles. [1]	Effectiveness monitoring. Following CDFW standard operating procedures at all POIs. Repeated following channel forming flows, or other alterations to critical passage locations.	Juvenile migration water depth objectives not met during pulse flow releases of 60 cfs.	ADSRP AMT evaluates monitoring results. Based on that evaluation, VW may identify refinements to outmigration flow magnitude, including modifying reservoir releases for salmonid downstream migration, or modifying passage obstacles.	
Summer Post Construction Operations	Provide suitable water temperatures for steelhead rearing during summer within the FCWMZ[2]	Average daily temperature not to exceed 18°C from May 1 through Oct. 31 within the FCWMZ.	Compliance monitoring. Continuous monitoring of stream temperature within the CWMZ.	Average daily temperature exceeds temperature objectives in years with a cold water program.	ADSRP AMT annual monitoring information for a minimum of 3 years after completion of the Ogier Ponds CM. Based on that evaluation, VW may identify refinements to cold water pool management (i.e., change in cold pool temperature targets or release rates) and/or extent of CWMZ or attainable water temperature measurable objectives.	Within 1 year of implementation or first year with a cold water program. Monitoring occurs from May to Oct. for the first 10 years of the project.
FAHCE-plus Modified Operating Rule Curves	Avoid stranding	For flow decreases >50 cfs, flow is reduced approximately 50% per step over a maximum of seven equally spaced steps in 72 hours or less. For flow decreases ≤50 cfs, flow is reduced approximately 50% per step over a maximum of four equally spaced steps in 36 hours or less. The minimum reduction in flow during each ramping step will be 2 cfs.	Compliance monitoring. Monitor streamflow at Gage No. 5082 at 15-minute intervals during flow recessions.	Flow recessions in excess of objectives	ADSRP AMT to evaluate flow ramping criteria annually. Based on evaluation, VW may identify and make annual refinements to ramping rate measurable objectives or implementation.	Immediately after implementation, annually for the duration of the Anderson Program during flow recessions.
Phase 2 Coyote Percolation Dam Operations (3.6.5)	Provide safe, effective, and timely upstream and	Meet NOAA fish passage criteria through the facility	Compliance monitoring. Post construction monitoring of water depth and velocity in facility meets design criteria.	Criteria not achieved within range of design flows	ADSRP AMT to evaluate modifications to the facility and post construction monitoring.	Annually beginning immediately after implementation, based on availability of flows.

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
	downstream steelhead passage				Based on that evaluation, VW may change operations, to achieve measurable objectives.	
		Improved migration conditions including depth, velocity, and predation risk as compared to baseline operation	Effectiveness monitoring. Detailed methods to be included in the operations plan	Migration conditions depth, velocity, and predation risk are lower than baseline operations	ADSRP AMT evaluates monitoring data to determine if there is improved migratory conditions over a period to be specified in the operations plan. Based on that evaluation, VW may develop changes to operations protocols to attain measurable objectives,	Monitoring period and frequency to be described in operations plan
Ogier Ponds Restoration	Restore riverine function, provide fish passage, enhance rearing habitat	Restore approximately 6,500 ft of channel and remove all fish passage impediments. Maintain over 67,000 ft^2 of suitable juvenile rearing habitat, and over 33,000 ft^2 of shallow water for fry rearing at typical spring and summer flows (approximately 30-50 cfs). Over 20,000 ft^2 of suitable spawning habitat.	Effectiveness monitoring. Annual monitoring at design flows to determine the success of the project at achieving restoration objectives, and to inform maintenance.	Rearing or spawning habitat less than objectives at 10 years post-construction.	ADSRP AMT to evaluate annual monitoring information for a period of at least 10 years to determine if habitat measurable objectives continue to be met. Based on evaluation, VW may implement Sediment Augmentation program or other appropriate maintenance or restoration activities to maintain habitat measurable objectives.	Annual monitoring for ten years following implementation.
Live Oak Restoration	Increase steelhead spawning habitat, high-flow floodplain habitat, and habitat complexity	Restore over 2,800 ft of channel, create over 20,000 ft^2 of spawning habitat, over 65,000 ft^2 of suitable juvenile rearing habitat, and over 20,000 ft^2 of shallow water for fry rearing at typical spring and summer flows (approximately 30-50 cfs).				
Sediment Augmentation	Supplement sediment and spawning gravels downstream of Anderson Dam	Augment at least 500 CY of sediment within the CWMZ	Effectiveness monitoring. Monitor augmentation location and replenish to initial volume at least every five years.	Sediment transport is occurring and volume at augmentation site is less than 500 CY or sediment transport is not occurring.	ADSRP AMT to evaluate annual monitoring information for a period of at least 5 years to determine if augmented gravel is mobilizing and being transported downstream. Based on evaluation, VW may replenish sediment to initial volume, adjust	Monitored annually, and replenished to initial volume at least every five years.

Action (BE Section)	Goals	Objectives	Monitoring Type and Methods	Triggers	Potential Management Actions	Monitoring Period and Frequency
					geomorphic flows, or conduct other maintenance or restoration activities to maintain the measurable objectives.	

[1] The rule curves provide a target release rate. Releases from the reservoir may fluctuate slightly due to valve imprecision.

[2] Functional Cold Water Management Zone (FCWMZ) is the reach of Coyote Creek from Anderson Dam to the point at which the creek enters Ogier Ponds. The downstream extent of the cold-water management zone will be set at the upstream end of Ogier Ponds until the completion of the Ogier Ponds Restoration Project at which point it will be extended to the Coyote Creek Golf Drive crossing.

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix E

Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report

Prepared by
Ramboll Americas Engineering Solutions, Inc.
San Francisco, California

Project Number
1690032004

Date
September 5, 2023
Revised: July 16, 2024
Revised: December 12, 2024

AIR QUALITY, GREENHOUSE GAS AND HEALTH RISK ASSESSMENT TECHNICAL REPORT

ANDERSON DAM SEISMIC RETROFIT
SANTA CLARA COUNTY, CALIFORNIA

CONTENTS

TABLES

FIGURES

Acronyms and Abbreviations

ACC	Advanced Clean Cars
AERMET	American Meteorological Society/Environmental Protection Agency Regulatory Model Meteorological Processor
AERMOD	USEPA's atmospheric dispersion modeling system
APCO	Air Pollution Control Officer
AQ	air quality
aREL	acute reference exposure level
ASF	age sensitivity factor
ATCM	California Airborne Toxics Control Measure
BAAQMD	Bay Area Air Quality Management District
BHBA	Basalt Hill Borrow Area
BMP	Best Management Practice
CAAQS	California Ambient Air Quality Standards
Cal/EPA	California Environmental Protection Agency
CalEEMod	California Emissions Estimator Model
CAP	criteria air pollutant
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
cREL	chronic reference exposure level
CPF	cancer potency factor
cy	cubic yards
DSOD	Division of Safety of Dams
DPF	diesel particulate filter
DPM	diesel particulate matter
EDR	Environmental Data Resources
EIR	Environmental Impact Report
EMFAC	EMission FACtor model
EMISFACT	AERMOD keyword for variable emission factor
FAHCE	Fish and Aquatic Habitat Collaborative Effort
FHRP	Fish Habitat Restoration Plan
FOCP	FERC Order Compliance Project
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
g/bhp-hr	gram per brake horsepower hour
g/trip	grams per trip
g/s	gram per second
HARP	Hotspots Analysis and Reporting Program
HI	hazard index
HRA	health risk assessment
HQ	hazard quotient
KRHV	Reid-Hillview Airport
kg	kilogram
L	liter
lbs	pounds
LHDT	light heavy duty truck
m	meter
MDAQMD	Mojave Desert Air Quality Management District
MEI	maximally exposed individual
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NHTSA	National Highway Traffic Safety Administration

NMHC	non-methane hydrocarbon
NCDC	National Climatic Data Center
NOA	naturally occurring asbestos
NOx	oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
OFFROAD2017	(CARB) In-Use Off-Road Equipment model
PC	pleasure craft
PM	particulate matter
$PM_{2.5}$	fine particulate matter less than 2.5 micrometers in aerodynamic diameter
PM_{10}	particulate matter less than 10 micrometers in aerodynamic diameter
ppm	parts per million
ROG	reactive organic gases
SAFE	Safer Affordable Fuel-Efficient
SCAQMD	South Coast Air Quality Management District
SFDPH	San Francisco Department of Public Health
SJVAPCD	San Joaquin Valley Air Pollution Control District
TAC	toxic air contaminant
TOG	total organic gases
$\mu g/m^3$	microgram per cubic meter
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VMT	vehicle miles traveled

1. INTRODUCTION

Ramboll Americas Engineering Solutions, Inc. (Ramboll) conducted an air quality and greenhouse gas (GHG) assessment for the construction and operation of the proposed seismic retrofit of Anderson Dam in Santa Clara County, California (referred to hereafter as the "Proposed Project" or "Project"). The scope and methods used in this assessment are consistent with recommended analyses for projects requiring review under California Environmental Quality Act (CEQA). This document describes the scope and methodology for evaluation of air quality, GHG, and health impacts from Project construction emissions, and cumulative impacts at off-site sensitive receptors. This document also describes the thresholds of significance that were used, which are consistent with the 2022 Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines where appropriate.

This assessment was originally prepared in September 2023, but subsequently revised in July 2024 and November 2024. The July 2024 revision evaluated certain construction changes such as extending work hours, adding some weekend days, beginning work on certain Project components sooner, revising estimated average and maximum daily workers, and a implementing a minor variance to Best Management Practice (BMP) AQ-1 (Use Dust Control Measures) that increases the haul truck speeds on unpaved roads to 25 miles per hour (mph) from 15 mph, except in areas with naturally occurring asbestos. This November 2024 revision evaluates additional project description changes such as adjusting work areas, updating the construction schedule and equipment activity assumptions for all conservation measures, and qualitatively evaluating the potential health risk impacts to recreational users in Rosendin Park.[1]

1.1 Project Description

1.1.1 Existing Conditions

The Project area is located east of U.S. Highway 1 on Cochrane Road. For the purpose of this assessment, the Project area refers to the area within which all construction-related activities or ground disturbances would occur and the areas and facilities that would be operated through the implementation of the Project. The Project area includes Anderson Reservoir, Anderson Dam, Ogier Ponds (approximately 4 miles downstream of Anderson Dam), the Coyote Percolation Dam (approximately 10 miles downstream of Anderson Dam), and lands in the immediate vicinity of Anderson Reservoir and Coyote Creek that are owned by Valley Water and the County of Santa Clara, as well as portions of the Cochrane Road and Coyote Road rights-of-way. The Project area also includes the Coyote Creek channel from Anderson Dam to the Coyote Percolation Dam.

Existing land uses within and adjacent to the Project area include Coyote Creek, parkland and hiking trails, the Anderson Reservoir boat ramp, the Anderson Lake Visitor's Center, the Santa Clara County Justice Training Center, the William F. James Boys Ranch, an orchard, and private residences.

Anderson Dam was completed in 1950, and when operated at the maximum reservoir operating elevation, the dam impounded up to 90,000 acre-feet of water. Anderson Reservoir is part of Valley Water's raw water distribution system, and various infrastructure allows for operational flexibility of the reservoir and the system.

Between 2008 and 2012, several dam safety deficiencies associated with the seismic shaking, faucet offset, flood capacity, and emergency drawdown capabilities were identified. In 2020, the Santa Clara Valley Water District (Valley Water) was mandated by Federal Energy Regulatory Commission (FERC) to implement interim risk reduction measures associated with the Project (i.e., also known as the FERC Order Compliance Project [FOCP]), including restriction of the reservoir. For the purposes of this assessment, existing baseline operations for the Project reflect a seismically restricted capacity (e.g., maintenance of the reservoir at deadpool), and flow releases and

[1] Consistent with the approach taken during preparation of the Partially Recirculated Draft EIR, changes to this report from the July 2024 are not presented in underline/strikeout format to improve readability.

maintenance activities projected to occur following completion of the FOCP, presently under construction. Similarly, the construction baseline assumes completion of facility upgrades and physical changes associated with the FOCP. In other words, “existing conditions”, including the existing Anderson Dam and Reservoir facilities and environmental settings of resources in the vicinity of the Proposed Project are described as they will be following the FOCP, rather than actual existing conditions at the time that this assessment was written.

1.1.2 Proposed Project

The purpose of the Project is to seismically retrofit, maintain, and operate Anderson Dam and Reservoir to meet FERC, California Department of Water Resources, Division of Safety of Dams (DSOD), and Valley Water safety requirements, thereby allowing Valley Water to maximize water supply and groundwater recharge capacity and benefits.

The Project consists of numerous project components that fall into six over-arching categories:

1. Seismic Retrofit Construction. Project components related to the Anderson Dam facility upgrades and improvements to stabilize and mitigate potential seismic risks and comply with current public safety requirements.
2. Conservation Measures Construction. Project components designed to avoid and minimize adverse environmental impacts, and in some cases provide environmental benefits. These project components would be implemented throughout Project construction and/or operation phases. These measures would reduce construction-related impacts and allow for managed aquifer recharge to support water supply requirements, while maintaining wetted habitat for fish, wildlife and other groundwater dependent habitats. Many of these Project components align with the Fish and Aquatic Habitat Collaborative Effort (FAHCE) Phase 1 non-flow measures, as described in the Fish Habitat Restoration Plan (FHRP), and would provide improved fish passage, steelhead spawning and rearing habitat, and restored hydrologic functions.
3. Construction Monitoring. Project components include habitat and species monitoring during construction to document project effects on the environment.
4. Post-Construction Anderson Dam Facilities Operations and Maintenance. Project components that involve how proposed, permanent Anderson Dam facilities would be operated and maintained following construction. These Project components include implementation of the FAHCE Phase 1 flow measures at the Anderson Dam facility, post-construction monitoring, and post-construction maintenance.
5. Post-Construction Conservation Measure Operations and Maintenance. Project components that involve how proposed, permanent Conservation Measure facilities would be operated and maintained following construction. These Conservation Measure facilities include the Ogier Ponds Conservation Measure, maintenance of the North Channel and Live Oak Restoration reaches, Phase 2 Coyote Percolation Dam Fish Passage Enhancements (Phase 2 Coyote Percolation Dam Conservation Measure), and the Sediment Augmentation Program.
6. Post-Construction Project and FAHCE Adaptive Management Program. Adaptive management of all post-construction operations, and all habitat restoration Conservation Measures components would occur in accordance with the FAHCE Adaptive Management Program. Pursuant to the FAHCE Framework, a Project-specific Adaptive Management Program has been developed. The Adaptive Management Program includes four key elements: measurable objectives for steelhead and salmon fisheries and their habitats; compliance monitoring, validation monitoring, effectiveness monitoring, and long-term trend monitoring; adaptive actions that may be identified to assure measurable objectives are met; and reporting.

The components of the Project analysed in this analysis include the Seismic Retrofit Construction as well as construction of three conservation measures: Ogier Ponds Conservation Measure, Phase 2 Coyote Percolation Dam

Conservation Measure, and Sediment Augmentation Program. **Figure 1** shows the location of each of these Project components. **Table 1** shows proposed construction schedule for the Project, which has a duration of 8 years.

Due to the lack of high-emissions activities, the Maintenance of the North Channel Reach and the Maintenance of the Live Oak Restoration Reach conservation measures, Construction Monitoring, Post-Construction Operations and Maintenance, and Post-Construction FAHCE Adaptive Management were not evaluated in this assessment.

1.1.2.1 Seismic Retrofit Construction

Primary construction activities for the seismic retrofit include the following: site mobilization and preparation, including clearing and preparing staging and stockpile areas; reservoir dewatering and cofferdam construction; constructing the temporary water diversion system; dam excavation and fill (including excavation of embankment materials from borrow areas and disposal of excess materials at spoils disposal areas); constructing the new outlet works and spillway; construction other ancillary facilities; construction of the permanent bladder dam; decommissioning the hydroelectric facility; related fisheries improvements; and site restoration.

Seismic retrofit construction is planned over a seven-year duration. The following describes the generalized construction activities by year:

- Year 1: Site mobilization; full dewatering of the reservoir; preparation of staging areas, access and haul roads, in-reservoir stockpile areas, and borrow sites; begin tunnelling for the low-level outlet works; and acquisition of temporary construction easements (as needed).
- Year 2: Full dewatering of the reservoir; cofferdam and extension pipe construction; conversion of existing Stage 1 Diversion System into Stage 2 Diversion System; dam excavation to interim dam with crest of elevation 565 feet (Stage 1a Dam Excavation), and tunnelling for high-level outlet works.
- Year 3: Dam excavation to interim dam with crest of elevation 556 feet (Stage 1b Dam Excavation); construction of high-level outlet works; and demolition of the existing spillway.
- Year 4: Dam excavation to a remnant core (Stage 2a Dam Excavation) and dam fill to interim dam with crest elevation 556 feet (Stage 2b Fill); and construction of the spillway.
- Year 5: Dam fill to interim dam with crest elevation 565 feet (Stage 3a Dam Fill); construction of the spillway; and construction of the low-level outlet works. Drilling and blasting would occur in Year 5 and Year 6 to enable efficient excavation.
- Year 6: Dam fill to new dam crest elevation 657 feet (Stage 3b Dam Fill); completion of low-level outlet works, including sloping intake structure and outlet structure; and completion of the spillway including the unlined chute, and refilling of the reservoir.
- Year 7: Permanent roadways and site restoration; and repaving of Cochrane Road.

Table 1 shows a summary of the expected construction schedule. **Figure 1** shows the general area in which seismic retrofit construction will be occurring. **Table 2** shows the phasing schedule for seismic retrofit construction.[2]

Following seismic retrofit construction, Anderson Reservoir capacity would be restored to its unrestricted capacity and allowed to withstand a normal operational range of water levels in the reservoir. Operations of the Project include flow regulation, and management and maintenance activities, which were not quantified.

[2] The first year of construction was modeled to occur in 2024, whereas construction will actually start in a later year. However, this is a conservative assumption for purposes of estimating emissions because emissions from construction equipment fleets will get cleaner over time due to regulatory requirements.

1.1.2.2 Conservation Measures Construction

The Project includes conservation measures, which are components designed to avoid and minimize adverse environmental impacts, and in some cases provide environmental benefits. These project components would be implemented throughout Project construction and/or operation phases.

As part of the Project, Ramboll analyzed three conservation measures with the potential to have air quality and GHG impacts: Ogier Ponds Conservation Measure, Phase 2 Coyote Percolation Dam Conservation Measure, and Sediment Augmentation Program.

Ogier Ponds Conservation Measure

The Ogier Ponds area consists of six historic gravel mining ponds, both perennial to semi-perennial in nature, located within former quarry borrow pits. Ogier Ponds were created by quarry reclamation work between 1994-1997. Coyote Creek flows into Pond 1 and continues via surface hydraulic connections through Ponds 2, 3, 4, and 5 before returning to Coyote Creek downstream of the Ogier Ponds area. As a result of creek flows and groundwater seepage, Ponds 1, 2, 3, 4, and 5 are permanently wetted and Pond 6 is seasonally wetted.

The Ogier Ponds Conservation Measure would consist of reconstructing the pre-1997 creek channel to create a geomorphically stable creek reach with a connected floodplain, and adding habitat and biological features to the creek and floodplain. The Ogier Ponds Conservation Measure would entail filling Pond 1 and constructing a new section of creek channel at the area currently occupied by Pond 1. The new section of creek channel would start at Pond 1 and connect to the pre-1997 channel alignment located west of Ponds 2, 3, 4, and 5. The Ogier Ponds Conservation Measure would completely fill and remove Ponds 1 and 5, partially fill Ponds 2 and 4, and construct earthen berms to separate the unfilled portions of Pond 2 from the restored channel. No changes are proposed at Ponds 3 and 6. This new channel alignment would separate Coyote Creek from the Ogier Ponds and reconnect the current Coyote Creek channel downstream of the Pond 4. The complete filling of Ponds 1 and 5, and partial filling of Ponds 2 and 4 would allow restoration of flow to the pre-1997 channel with a connected floodplain.

The Ogier Ponds Conservation Measure would result in ecological enhancements to the channel and floodplain, ameliorate the adverse water temperature, fish migration, and fish entrainment effects of the current hydraulic connection between the creek and the ponds, and integrate public access and interpretation of natural resources and historical features within and along a portion of Coyote Creek on County Parks property.

Phase 2 Coyote Percolation Dam Conservation Measure

As part of the FOCP, the Coyote Percolation Dam was replaced with an inflatable bladder dam (known as Phase 1 Coyote Percolation Dam), to accommodate releases from the Anderson Dam Tunnel Project. The Phase 2 Coyote Percolation Dam Conservation Measure conservation measure would consist of constructing downstream channel modifications to facilitate upstream and downstream fish passage over the deflated bladder dam over a range of flow conditions. The Phase 2 Coyote Percolation Dam Conservation Measure conservation measure area is located along Coyote Creek, approximately 10.5 miles downstream of Anderson Dam.

Sediment Augmentation Program

Sediment augmentation activities would improve geomorphic processes that create and maintain steelhead habitat (sediments and spawning gravels) and reduce channel incision that is typical in Lower Coyote Creek downstream of the dam.

Valley Water would place sediment materials in Coyote Creek at multiple locations in collaboration with the Technical Working Group and using available monitoring data from the Live Oak Restoration Reach Project gravel augmentation program. Valley Water would develop a Sediment Augmentation Program no later than two years prior to the planned completion of ADSRP construction, in consultation with the Technical Working Group. At a minimum, Valley Water would ensure the Sediment Augmentation Program initially includes approximately 500 cubic yards (cy) of sediment (composition to be determined with the Technical Working Group) placed within the Live Oak Restoration Reach following completion of ADSRP construction, including Ogier Ponds restoration and initiation of Anderson Dam post-construction operations.

1.2 Objective and Methodology

The purpose of the air quality and GHG analysis is to assess potential criteria air pollutant (CAP) and GHG emissions, as well as health risks and hazards that would result from the construction and operation of the Proposed Project consistent with guidelines and methodologies from air quality regulatory agencies, specifically, the BAAQMD, the California Air Resources Board (CARB), the California Office of Environmental Health Hazard Assessment (OEHHA), and the US Environmental Protection Agency (USEPA). The analysis in this report followed the BAAQMD 2022 CEQA Guidelines where appropriate. In addition to the evaluation of an individual project, the CEQA Guidelines recommend an analysis of cumulative impacts when the project's incremental effect is cumulatively considerable (14 Cal. Code Regs., § 15130, subd. (a)). For an air quality health risk assessment (HRA), the cumulative analysis is performed when a project is in an area that includes other air emissions sources within a "zone of influence" of 1,000 feet surrounding the project. This report evaluates the risks and hazards associated with Project construction activities on off-site receptors and the cumulative impact to off-site sensitive receptors from Project construction and surrounding sources.

1.2.1 Resources

Ramboll directly or indirectly relied on emissions estimation guidance from government sponsored organizations, government-commissioned studies of energy use patterns, Project-specific studies, and emissions estimation software as described below. In cases noted below, third-party studies were also relied upon to support analyses and assumptions made outside of the approach described above. Where Project-specific data estimates were available, they were used preferentially instead of model defaults. The methodology used to calculate this emissions inventory is described in detail in the following sections, including citations to information used in this inventory.

1.2.1.1 CalEEMod

Ramboll primarily utilized the methodology from the California Emissions Estimator Model (CalEEMod) version 2022.1 to assist in quantifying the criteria pollutant and GHG emissions in the inventories presented in this report for the Project. CalEEMod is a statewide program designed to calculate both criteria and GHG emissions from development projects in California. This model was originally developed under the auspices of the South Coast Air Quality Management District (SCAQMD) and received input from other California air districts. It is currently supported by numerous lead agencies for use in quantifying the emissions associated with development projects undergoing environmental review. CalEEMod utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available.

CalEEMod provides a platform to calculate annual operational criteria pollutant emissions from a land use development project. Specifically, the model aids the user in estimating operational emissions associated with a fully built out land use development. This includes emissions from on-road mobile vehicle traffic associated with the land uses, emissions from landscaping equipment and other off-road mobile sources, emissions from natural gas usage in the buildings, emissions associated with electricity usage in the buildings and electricity usage associated with water usage. This also includes emissions associated with solid waste disposal.

CalEEMod uses sources such as the USEPA AP-42 emission factors (USEPA 2023a), CARB's approved on-road and off-road equipment emission models such as the Emission FACtor model (EMFAC) and In-Use Off-Road Equipment model (OFFROAD), and studies commissioned by California agencies such as the California Energy Commission and CalRecycle. OFFROAD is an emission factor model used to calculate emission rates from off-road mobile sources (e.g., construction equipment, agricultural equipment) (CARB 2021). The off-road diesel equipment emission factors used by CalEEMod are based on the CARB OFFROAD2017 program. EMFAC is an emission factor model used to calculate emissions rates from on-road vehicles (e.g., passenger vehicles) (CARB 2021). The emission factors used by CalEEMod for on-road vehicles are based on the CARB EMFAC2021 program. EMFAC2021 incorporates USEPA and CARB regulations and standards (e.g., Advanced Clean Trucks and the Heavy Duty Omnibus). EMFAC2021 was incorporated into this analysis.

In addition, CalEEMod contains default values and existing regulatory methodologies to use in each specific local air district or county. Appropriate state-wide default values can be utilized if regional default values are not defined. Ramboll used default factors for Santa Clara County for the emissions inventory, unless otherwise noted in the methodology descriptions below.

Thresholds for Evaluation

1.3.1 Criteria Pollutants and Precursors

Project construction emissions of CAPs and precursors were evaluated and compared with the BAAQMD's 2022 CEQA Guidelines thresholds of significance. Project construction emissions were compared to the average daily construction emission thresholds of 54 pounds per day of ROG, NO_X, and $PM_{2.5}$ and 82 pounds per day of PM_{10}. BAAQMD thresholds of significance for construction-related PM_{10} and $PM_{2.5}$ mass emissions apply to exhaust emissions only and do not include fugitive dust emissions, which are addressed through BAAQMD's BMPs.

CEQA also requires evaluation of whether the Project would conflict with or obstruct implementation of the applicable air quality plan. Analysis of the Project's consistency with the applicable air quality plan is shown in Environmental Impact Report (EIR) Section 3.3, *Air Quality*.

1.3.2 Greenhouse Gases

BAAQMD's 2022 CEQA Guidelines recommend GHG thresholds of significance for land use plans and projects, but do not recommend GHG thresholds of significance directly relevant to the Project (i.e., for large construction projects or for operation of water projects such as dams and reservoirs). Even though the 2022 CEQA Guidelines do not set a GHG threshold for construction projects, to minimize GHG and air pollutant emissions, the 2022 CEQA Guidelines recommend that projects incorporate 18 BMPs for reducing construction emissions.

Chapter 6 of BAAQMD's 2022 CEQA Guidelines outlines operational thresholds for land use development projects. To demonstrate that a project is doing its "fair share" of implementing the goal of carbon neutrality by 2045, a project must reflect one of two approaches: building and transportation design elements (Approach A), or consistency with a qualified GHG reduction strategy (Approach B). However, Approach A is geared toward traditional residential or commercial projects and not infrastructure projects, and are therefore not appropriate for use here.

CEQA also requires evaluation of a project's consistency with an applicable plan, policy or regulation adopted for the purpose of reducing environmental impacts, including plans adopted to reduce the emissions of GHGs. The analysis of the Project's consistency with applicable plans to reduce GHG emissions is shown in EIR Section 3.9, *Greenhouse Gas Emissions*.

1.3.3 Health Risks and Hazards

The HRA evaluates the estimated cancer risk, non-cancer chronic and acute hazard index (HI), and fine particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) concentration associated with construction of the Project. The cumulative analysis estimates the total excess lifetime cancer risks, non-cancer HI, and $PM_{2.5}$ concentrations that are attributable to off-site rail, mobile, and stationary sources within the 1,000-foot "zone of influence" in addition to effects from the construction of the Project.

The HRA evaluates potential sensitive receptor locations including "people—children, adults, and seniors—occupying or residing in:

- residential dwellings, including apartments, houses, condominiums, single-room occupancy units, and residential hotels;
- places of business;
- schools, colleges, and universities;
- daycare centers;
- hospitals;
- temporary housing, shelters, or encampments;
- detention centers or correctional facilities and
- senior-care facilities." (BAAQMD 2022a)

To meet these objectives, this HRA was conducted consistent with the following guidance:

- Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2015a);
- May 2022 BAAQMD CEQA Guidelines (BAAQMD 2022a);
- BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards (BAAQMD 2012); and
- BAAQMD Health Risk Assessment Modeling Protocol (BAAQMD 2020).

The results of the construction health risk analyses are compared with the BAAQMD 2022 CEQA significance thresholds for single sources. The thresholds are:

Single Source Impacts:

- An excess lifetime cancer risk level of more than 10 in one million;
- Non-cancer chronic and acute HIs greater than 1.0; and
- An incremental increase in the annual average $PM_{2.5}$ of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$).

Cumulative Impacts:

- An excess lifetime cancer risk level of more than 100 in one million;
- A chronic non-cancer HI greater than 10.0; and
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$.

As discussed in detail in **Sections 5 and 6**, health impacts from the Project are based on emissions of toxic air contaminants (TACs) from diesel and gasoline combustion, and speciated particulate matter from blasting activities. Diesel particulate matter (DPM) does not have an acute non-cancer toxicity value, so an acute HI from diesel exhaust is not estimated.

Despite emissions thresholds for particulate matter not requiring fugitive dust to be included, recent guidance from BAAQMD clarified that $PM_{2.5}$ from fugitive dust from earth movement activity during construction should be included in the comparison to the $PM_{2.5}$ concentration threshold. To be conservative, fugitive dust is included in this analysis. Additionally, resuspended road dust from Project construction traffic is included in this analysis.

1.3.4 Carbon Monoxide

The BAAQMD does not have thresholds of significance for construction-related carbon monoxide (CO) impacts. For project operations, BAAQMD has established localized CO concentration significance thresholds of 9.0 parts per million (ppm) based on an 8-hour average and 20.0 ppm based on a 1-hour average. The Project's potential impacts related to CO concentrations generated during operation would be minimal, as discussed in **Section 3**.

1.3.5 Odor

The BAAQMD does not have thresholds of significance for construction-related odor impacts. For project operations, BAAQMD has established a significance threshold of 5 confirmed odor complaints per year averaged over 3 years. The Project's potential impacts related to odor generation during operation would be minimal, as discussed in **Section 4**.

Document Organization

This Technical Report is divided into seven sections as follows:

Section 1.0 – Introduction: describes the purpose and scope of the air quality and GHG analysis, the objectives and methodology used, and outlines the document organization.

Section 2.0 – Criteria Air Pollutant, Toxic Air Contaminant, and Greenhouse Gas Emission Estimates: describes the methods used to estimate CAP, TAC, and GHG emissions from the Project, and includes the Project CAP and GHG emissions results and comparison to the applicable thresholds of significance.

Section 3.0 – Carbon Monoxide Analysis: discusses evaluation of potential carbon monoxide impacts.

Section 4.0 – Odor Analysis: discusses evaluation of potential odor impacts.

Section 5.0 – Estimated Air Concentrations: discusses the air dispersion modeling, the selection of the dispersion models, the data used in the dispersion models (e.g., terrain, meteorology, source characterization), and identifies receptor locations evaluated in the HRA.

Section 6.0 – Health Risk Assessment: provides an overview of the methodology for conducting the HRA, and includes the Project HRA results and comparison to the BAAQMD thresholds of significance.

Section 7.0 – Cumulative Analysis: summarizes the approach used in the cumulative analysis. The analysis of criteria air pollutants and GHG emissions is inherently cumulative.

Section 8.0 – References: includes a listing of all references cited in this report.

2. CRITERIA AIR POLLUTANT, TOXIC AIR CONTAMINANT, AND GREENHOUSE GAS EMISSION ESTIMATES

Project CAP, TAC, and GHG emissions from Proposed Project construction sources were estimated. Methodologies used to calculate CAP, TAC, and GHG emissions are summarized below.

2.1 Emission Calculation Methodologies and Results

2.1.1 Seismic Retrofit Construction

A detailed seismic retrofit construction equipment list, which includes the type, quantity, construction schedule and hours of operation anticipated for each piece of equipment for each construction activity, is summarized in **Table 3**. This data was used to estimate construction emissions using calculation methodologies consistent with CalEEMod 2022.1. It was assumed that all construction off-road equipment is diesel powered except for those specified as electric or gasoline powered. In addition to off-road equipment, seismic retrofit construction would also include on-road construction trips, on-site gasoline trucks, gasoline-powered dredging boats, fugitive dust, paving, and blasting activities involving ammonium nitrate/fuel oil. All diesel-fueled equipment emissions of PM_{10} were assumed to be DPM, which is a TAC.

As discussed in **Section 1.3.1**, BAAQMD thresholds for fugitive dust are compliance with its BMPs. As such, the seismic retrofit construction will include watering of exposed surfaces twice a day and street sweeping of paved surfaces once daily. Due to the unique and complex nature of seismic retrofit construction, a minor variance from the BAAQMD BMPs is necessary in certain situations and areas to make it feasible for the Project, as discussed in Section 2.1.1.4, *Fugitive Dust*. As discussed in **Section 1.3.3**, emissions from fugitive dust are included in the estimation of $PM_{2.5}$ concentration.

Additional mitigation measures were analyzed to determine the respective reduction in seismic retrofit construction CAP and TAC emissions. The following mitigation measures were analyzed under a mitigated seismic retrofit construction scenario:

- Use of USEPA or CARB Tier 4 Final engines for all diesel construction equipment;
- Use of wind screens to enclose the Project's blasting area; and
- Use of boats and on-road trucks of model year 2010 or newer.

These mitigations are discussed further in **Section 2.3**.

2.1.1.1 Construction Schedule and Phasing

Seismic retrofit construction is assumed to last seven years. A mix of construction equipment would operate over the course of any given day. **Table 2** shows a construction phasing schedule.

Construction activities would generally be conducted during a 10-hour shift per day, between 6:00 a.m. and 4:00 p.m., Monday through Saturday, with limited Sunday work. Sunday work would include up to 12 Sundays in Years 1 through 3, 40 Sundays in Year 4, and 12 Sundays in Years 5 through 7. Specific project components that would require modified construction hours include:

- Construction of the replacement dam and spillway, and conversion of existing Stage 1 Diversion System into Stage 2 Diversion System – two 10-hour shifts, with a 0.5 -hour lunch break (one shift between 6:00 a.m. and 4:30 p.m., and the second shift from 6:00 p.m. to 4:30 a.m., Monday through Saturday and certain Sundays);
- Blasting at the Basalt Hill Borrow Area (BHBA) – restricted hours of 8:00 a.m. to 5:00 p.m.;

- Cochrane Road – communication lines and repaving – construction may occur outside the work window of 6:00 a.m. and 4:00 p.m., including weekends on a limited basis up to 24-hours per day, 6 days per week;
- Delivery of materials (i.e., equipment, aggregate base, and drainage and filter material) – 7:00 a.m. to 8:00 p.m., Monday to Friday;
- Tunneling (e.g., use of a road header) required for the outlet works (e.g., construction of the high-level outlet works and low-level outlet works at the dam) – 24 hours per day (two 12-hour shifts), 6 days per week; and,
- Support production (e.g., concrete placement) – 24 hours per day (two 12-hour shifts), 6 days per week.

However, equipment engines would not be expected to run during this entire period. The equipment list for the seismic retrofit construction is shown in **Table 3**.

2.1.1.2 Diesel Construction Off-road Equipment

Emissions calculations associated with off-road construction equipment were based on the construction schedule and the type, size, fuel type, tier level, hours of operation and utilization factor for each piece of equipment. A Project-specific construction equipment list for the seismic retrofit is presented in **Table 3**. For diesel-powered off-road construction equipment, methodologies consistent with CalEEMod were used to estimate emissions. Where Project-specific equipment information was not available, CalEEMod default horsepower was used. Load factors for each piece of equipment were based on default factors from CalEEMod.

The CalEEMod methodology for off-road construction equipment emissions relied on the CARB In-Use Off-Road Equipment model (OFFROAD2017) as well as specific emission factors by engine tier.

Emissions are calculated outside of CalEEMod using the same methodologies and emission factors as CalEEMod. Emissions were calculated using the following formula, which is consistent with CalEEMod:

$$E_C = \sum (EF_C * HP * LF * Hr * Red * C)$$

Where:

E_C: off-road equipment exhaust emissions in pounds (lbs)

EF_C: emission factor (g/bhp-hr) (CalEEMod defaults)

HP: equipment horsepower (CalEEMod defaults or Project-specific)

LF: equipment load factor (CalEEMod defaults)

Hr: equipment operating hours

Red: reduction from diesel particulate filter (DPF), as applicable

C: unit conversion factor

Unmitigated emissions were based on fleetwide average emission factors from OFFROAD2017. For mitigated emissions, calculations assume emission factors from CalEEMod associated with Tier 4 final engines for all diesel construction equipment.

2.1.1.3 Electric Equipment

Electrical equipment for the seismic retrofit consists primarily of ventilation fans and small excavators. Electric equipment does not directly emit CAPs. The equipment is anticipated to make a negligible contribution to overall Project GHG emissions, and thus are not quantified in this report.

2.1.1.4 Fugitive Dust

Fugitive dust contributes to PM_{10} and $PM_{2.5}$ emissions and is generated by the various activities occurring at the Project site. The following subsections describe the methodology used to calculate fugitive dust emissions from Project activities.

Fugitive dust emissions are not included in the comparison to thresholds for criteria air pollutant emissions as these thresholds for construction are for exhaust only. However, to be conservative, fugitive dust emissions are included in the estimation of $PM_{2.5}$ concentration based on recent guidance provide by the BAAQMD.

Control of fugitive dust emissions through BAAQMD BMPs will be utilized for most Project activities, when feasible. The basic BMPs which were considered when developing fugitive dust emission rates include the following:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

3. All vehicle speeds on unpaved roads shall be limited to 15 mph.

The 15 mph speed limit would apply to all vehicles and equipment only in areas containing naturally occurring asbestos (NOA). Outside of these areas, a 25 mph speed limit would be observed for haul trucks on unpaved roads (light duty pick-up trucks would observe the 15 mph limit), such as the in-reservoir access roads to Stockpile Areas K and L. The fugitive dust emissions from haul trips outside areas of naturally occurring asbestos were estimated using vehicle speeds of 25 mph.

Paved Road Dust

Fugitive dust emissions from paved road dust includes dust generated by construction which settles onto surrounding roadways and is re-entrained into the air. The emission factor for paved road dust is calculated on a per-vehicle miles traveled (VMT) basis. Total VMT was determined using estimated worker, vendor, and hauling trip rates and default CalEEMod trip lengths. Emissions assume a 26% reduction due to street sweeping of arterial roads. The emission factor derivation for paved road dust is presented in **Table 4a**, and emissions from paved road dust are presented in **Table 5a**.

Unpaved Road Dust

Fugitive dust emissions from unpaved road dust includes dust which is kicked up by offroad vehicles during trips along on-site roadways. The emission factor for unpaved road dust is calculated on a per-VMT basis. Total VMT was determined using estimated on-site trip rates as shown for each year in **Table 7b**. Emissions assume a 55% reduction due to watering two times per day. The emission factor derivation for unpaved road dust is presented in **Table 4b**, and emissions from unpaved road dust are presented in **Table 5b**.

Grading

Fugitive dust emissions from grading equipment (i.e., graders and scrapers) occur during the grading and utility phases. Grading emissions were estimated using CalEEMod methodology and assumptions. The emission factor for grading is calculated on a per-VMT basis. Equipment VMT was calculated using the maximum area disturbed per day, based on Project-specific data and CalEEMod default assumptions. Emissions assume a 61% reduction due to watering two times per day. Grading emissions are presented in **Table 5c**.

Material Loading

Fugitive dust from material loading activities includes the unloading of construction materials and loading of soil onto the haul trucks during the grading and excavation phases. Material loading fugitive dust emissions were estimated using CalEEMod methodology and assumptions. The emission factor for material loading is calculated on a per-ton basis. Material loaded in cubic yards is based on Project-specific data. Emissions assume a 61% reduction due to watering two times per day. Emissions from material loading are presented in **Table 5d**.

Bulldozing

Fugitive dust from bulldozing activities includes the movement and disturbance of soil by bulldozers during excavation phases. Bulldozing fugitive dust emissions were estimated using CalEEMod methodology and assumptions. The emission factor for bulldozing is calculated on a per-hour basis of dozer operation. Emissions assume a 61% reduction due to watering two times per day. Emissions from bulldozing are presented in **Table 5e**.

Windblown dust

Fugitive emissions from windblown dust includes the dust naturally generated by stockpile areas during all phases of construction. Windblown fugitive dust emissions were estimated using CalEEMod methodology and assumptions. The emission factor for windblown dust is calculated on a per-acre basis. The maximum daily wind-erodible area was conservatively assumed for each stockpile to be the full extent of the storage or staging area where stockpiling would be occurring. Emissions assume a 90% reduction from a watering rate of storage piles at 1.4 gallons/hour-yard^2. Emissions from windblown dust are presented in **Tables 5f-5g**.

Demolition

Fugitive dust from demolition includes the dust generated by the demolition of existing dam structures. Demolition fugitive dust emissions were estimated using CalEEMod methodology and assumptions. The emission factor for demolition is calculated on a per-ton basis of building/demolition waste, which is based on Project-specific data. Emissions assume a 36% reduction due to watering two times per day. Emissions from demolition are presented in **Table 5h**.

2.1.1.5 Paving

Reactive organic gas (ROG) emissions from paving includes the off-gassing emissions caused from pouring and setting of asphalt. Paving emissions were estimated using CalEEMod methodology and assumptions. The emission factor for paving is calculated on a per-acre basis. The total area paved during construction, including the boat ramp parking area, dam toe parking area, Staging Area 3, and access roads. Emissions from paving are presented in **Table 6**.

2.1.1.6 On-road Construction Trips

Construction trip assumptions for workers, vendors, and haul trucks are shown for each year in **Table 7a**. Trip lengths are shown in **Table 7c**.

Emission factors from EMFAC2021,[5] the CARB Emission Factors model for on-road emissions, were used for emissions of CAPs and GHGs. The emission factors used for on-road construction trips cover the anticipated years of construction. EMFAC2021 incorporates the Pavley Clean Car Standards and the Advanced Clean Cars (ACC) program.

Running exhaust, running loss, tire wear, and brake wear emission factors were estimated with a gram/mile factor. These emissions were calculated as shown below:

$$E_M = \sum (EF_M * VMT)$$

[5] CARB has published off-model adjustment factors to account for the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program" (SAFE 1) adopted by the USEPA and the National Highway Traffic Safety Administration (NHTSA). These adjustment factors will not be incorporated into this analysis as this regulation is currently under litigation and the USEPA and NHTSA have proposed rulemakings to repeal SAFE 1.

Where:

VMT: Trip Length*Trip Number

EF_M: emission factor (gram/mile) from EMFAC2021

Emissions from vehicle idling exhaust, starting exhaust, and evaporative emissions were estimated with a gram/trip emission factor. Idling emission factors were only estimated for heavy duty trucks as idling emissions occur during extended idling events while the truck is operating but not traveling any significant distance (e.g., during loading and unloading). In EMFAC2021, an extended idling event is defined as “a continuous segment of vehicle activity that meets three criteria: all instantaneous vehicle speeds being lower than 5 mph, the total distance of less than 1 mile, and the total duration of more than 5 minutes” (CARB 2021). EMFAC takes account of idling emissions from light duty vehicles and other vehicle types in running emissions estimates. These emissions were estimated as shown below:

$$E_T = \sum (EF_T * Trip\ Number)$$

Where:

EF_T = emissions factor (g/trip) from EMFAC2021.

Trip Number = trips provided by Project

Idling time is modeled to be consistent with California Airborne Toxics Control Measure (ATCM) to limit diesel-fueled commercial motor vehicle idling (CARB 2016).

Road dust emissions are calculated using CARB methodology. The on-road entrained dust emission factor derivation is shown in **Table 4a**.

2.1.1.7 On-Site Gasoline Trucks

Most equipment on site will be powered by diesel, with the exception of boats and on-site gasoline trucks for transporting equipment, workers, and materials between staging areas. It was conservatively assumed that all on-site gasoline trucks correspond to EMFAC’s LHDT2 category, which includes light-heavy duty trucks with a gross vehicle weight rating between 10,001-14,000 pounds. Trucks were conservatively assumed to travel at an average speed of 15 mph, consistent with BAAQMD basic construction mitigation measures (BAAQMD 2022a). Emissions from on-site gasoline truck trips were calculated using the same methodology as on-road construction trips in **Section 2.1.1.6** and summarized in **Tables 8 and 9**.

2.1.1.8 On-Site Boats

Emissions were estimated using emission factors and methodology from CARB’s Pleasure Craft (PC) Model Database, matched to their respective gasoline-fueled boat classifications (CARB 2014). Exhaust emissions were calculated using the same methodology as the off-road equipment in **Section 2.1.1.2**. Evaporative emissions are the sum of hot soak, diurnal, resting loss, and running loss emissions, and were estimated using emission factors from the CARB PC Model Database and the provided construction schedule. Mitigated emissions assume model year 2010 or newer boats. Emissions from on-site boat activities are summarized in **Tables 10 through 12**.

2.1.1.9 Blasting

Emissions calculations associated with blasting activities were based on the number of blast holes drilled, type of explosives, and amounts of material shifted by blasting, as shown in **Tables 13 and 14a-14c**. Three types of emissions are associated with blasting activities: blast hole drilling, dust entrainment, and use of explosives. The total emissions associated with blasting are the addition of the emissions from the respective blasting activities associated with each phase.

For emissions from blast hole drilling and dust entrainment, and blasting criteria emissions, emissions were estimated using methods A, B, and C from the Mojave Desert AQMD Emissions Inventory Guidance for Mineral Handling and Processing Industries (MDAQMD 1999). All three methods are equivalent to USEPA's AP-42 methodology found in Chapters 11.9 and 13.3 (USEPA 2010a, USEPA 2010b). When estimating hourly emissions from blasting, emissions assume one complete blast occurs in one hour of activity.

Blasting emissions were speciated using specific on-site soil composition profiles (Valley Water 2021). Yearly emissions were estimated using the median detected value of all soil samples, and hourly emissions were estimated using the 95% upper confidence level for all soil samples. Hexavalent chromium was estimated to make up 5% of all speciated chromium, consistent with guidance for aggregate piles provided by the San Joaquin Valley Air Pollution Control District (SJVAPCD 2017). Emissions of speciated metals from blasting are summarized in **Table 15**.

2.1.1.10 Construction CAP and GHG Emissions Summary for Seismic Retrofit Component

A summary of maximum annual average daily construction CAP emissions for the seismic retrofit is shown in **Summary Table A**. A full summary of unmitigated and mitigated construction CAP emissions from the seismic retrofit is provided in **Tables 16 and 17**, respectively. CAP emissions are reported in units of annual average daily emissions for each year of construction. The annual construction emissions for each year were averaged over the number of days construction is expected to occur in the respective year to evaluate average daily emissions in pounds per day.

A summary of the annual unmitigated and mitigated GHG emissions for seismic retrofit construction is shown in **Summary Table B**. A full summary is provided in **Tables 18 and 19**, respectively. GHG emissions are reported in total metric tons of carbon dioxide equivalents.

Summary Table A. Summary of Maximum Average Daily Construction CAP Emissions from the Seismic Retrofit

	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
		lb/day		
BAAQMD Threshold of Significance	54	54	82	54
Unmitigated Emissions	398	1,013	41	32
Exceed Threshold?	***Yes***	***Yes***	*No*	*No*
Mitigated Emissions	67	259	37	28
Exceed Threshold?	***Yes***	***Yes***	*No*	*No*

Source: Table 16, Table 17

Summary Table B. Summary of Annual Construction GHG Emissions from the Seismic Retrofit

Year	**Total Unmitigated Project Construction GHG Emissions (MT of CO_2e)**	**Total Mitigated[1] Project Construction GHG Emissions (MT of CO_2e)**
Year 1	5,257	4,292
Year 2	26,381	26,378
Year 3	26,741	26,735
Year 4	34,604	34,594
Year 5	29,287	29,279
Year 6	29,847	29,838

Year	Total Unmitigated Project Construction GHG Emissions (MT of CO_2e)	Total Mitigated[1] Project Construction GHG Emissions (MT of CO_2e)
Year 7	4,054	4,051
Total	**156,171**	**155,167**

Source: Table 18, Table 19

[1] Given the type and duration of electrified equipment use is unknown at this time, to be conservative, reductions from Mitigation Measure GHG-1 (Construction GHG Reduction Measures) were not quantified in this analysis. The mitigated GHG emissions only reflect the implementation of Mitigation Measure AQ-1's requirement that all boat engines and on-road trucks used in construction be model year 2010 or newer.

2.1.2 Conservation Measures Construction

The emissions from the construction associated with the conservation measures were analyzed using similar methodologies as the seismic retrofit construction. Details on the differences in methodology are provided below.

For each conservation measure, detailed schedule assumptions are shown in **Table 20** (Ogier Ponds Conservation Measure), **Table 30** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Table 40** (Sediment Augmentation Program). Construction activities associated with the Ogier Ponds Conservation Measure would occur from Year 6 through Year 8, Phase 2 Coyote Percolation Dam Conservation Measure would occur in Years 1 and 2, and Sediment Augmentation Program would occur in Year 8. For all three of these conservation measures, construction activities would generally be conducted during a 12-hour shift per day, between 6:00 a.m. and 6:00 p.m., Monday through Friday. Equipment maintenance would occur on Saturdays, and no work would occur on Sundays. Select construction activities such as the operation of pumps and electric generators to control groundwater seepage may operate at any time on any day of the week. The equipment list for the construction of the conservation measures is shown in **Table 21** (Ogier Ponds Conservation Measure), **Table 31** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Table 41** (Sediment Augmentation Program). After the initial placement of sediment under the Sediment Augmentation Program following the completion of Seismic Retrofit construction, the long-term post-construction adaptive management of the Sediment Augmentation Program would be implemented pursuant to the Project and FAHCE Adaptive Management Program on at least a 5-year replenishment schedule for up to 20 years. In the September 2023 analysis and the July 2024 revision, the Sediment Augmentation Program was assumed to occur from Year 2 through Year 15. In this analysis, the construction schedule and equipment assumptions for the Sediment Augmentation Program were refined to more accurately reflect the activities associated with the initial placement of sediment. Annual sediment deposition and transport monitoring and long-term habitat assessment monitoring would be conducted as a part of this conservation measure, and the sediment would be replaced as necessary to replenish to initial volume at least every 5 years. The precise long-term monitoring and maintenance activities would be determined in consultation with the Adaptive Management Team, and therefore are speculative and were not quantified in this analysis.

Fugitive dust emissions are presented in **Tables 22a-22d** (Ogier Ponds Conservation Measure), **Tables 32a-32d** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Tables 42a-42d** (Sediment Augmentation Program).

Worker, vendor, and haul trips for each conservation measure were calculated based on CalEEMod defaults where project-specific data were not available. Although defaults for vendor trips are only available for the building construction phase, vendor trips were conservatively estimated to be 20% of worker trips for all phases. Construction trips and trip lengths are shown in **Tables 23a-23b** (Ogier Ponds Conservation Measure), **Tables 33a-33b** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Tables 43a-43b** (Sediment Augmentation Program).

Emissions from on-site gasoline truck trips associated with construction for each conservation measure are summarized in **Tables 24-25** (Ogier Ponds Conservation Measure), **Tables 34-35** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Tables 44-45** (Sediment Augmentation Program).

Summaries of maximum annual average daily construction CAP emissions for Ogier Ponds Conservation Measure, Phase 2 Coyote Percolation Dam Conservation Measure, and Sediment Augmentation Program are shown in **Summary Tables C-E**, respectively. Summaries of the annual unmitigated and mitigated GHG emissions are shown in **Summary Tables F-H**.

A full summary of unmitigated construction CAP emissions from the conservation measures is shown in **Table 26** (Ogier Ponds Conservation Measure), **Table 36** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Table 46** (Sediment Augmentation Program). A full summary of mitigated construction CAP emissions from the conservation measures is shown in **Table 27** (Ogier Ponds Conservation Measure), **Table 37** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Table 47** (Sediment Augmentation Program).

A full summary of unmitigated construction GHG emissions from the conservation measures is shown in **Table 28** (Ogier Ponds Conservation Measure), **Table 38** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Table 48** (Sediment Augmentation Program). A full summary of mitigated construction GHG emissions from the conservation measures is shown in **Table 29** (Ogier Ponds Conservation Measure), **Table 39** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Table 49** (Sediment Augmentation Program).

Summary Table C. Summary of Maximum Annual Average Daily Construction CAP Emissions from the Ogier Ponds Conservation Measure

	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
		lb/day		
BAAQMD Threshold of Significance	54	54	82	54
Unmitigated Emissions	40	231	28	16
Exceed Threshold?	*No*	***Yes***	*No*	*No*
Mitigated Emissions	12	89	10	5.5
Exceed Threshold?	*No*	***Yes***	*No*	*No*

Source: Table 26, Table 27

Summary Table D. Summary of Maximum Annual Average Daily Construction CAP Emissions from the Phase 2 Coyote Percolation Dam Conservation Measure

	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
		lb/day		
BAAQMD Threshold of Significance	54	54	82	54
Unmitigated Emissions	5.3	45	7.9	5.0
Exceed Threshold?	*No*	*No*	*No*	*No*
Mitigated Emissions	1.5	13	2.8	1.6
Exceed Threshold?	*No*	*No*	*No*	*No*

Source: Table 36, Table 37

Summary Table E. Summary of Maximum Annual Average Daily Construction CAP Emissions from the Sediment Augmentation Program

	ROG	NO_X	PM_{10}	$PM_{2.5}$
	lb/day			
BAAQMD Threshold of Significance	54	54	82	54
Unmitigated Emissions	0.46	3.1	0.25	0.12
Exceed Threshold?	*No*	*No*	*No*	*No*
Mitigated Emissions	0.21	1.7	0.19	0.074
Exceed Threshold?	*No*	*No*	*No*	*No*
Source: Table 46, Table 47				

Summary Table F. Summary of Annual Construction GHG Emissions from the Ogier Ponds Conservation Measure

Year	Total Unmitigated Project Construction GHG Emissions (MT of CO_2e)	Total Mitigated Project Construction GHG Emissions (MT of CO_2e)
Year 6	15,042	15,018
Year 7	9,897	9,888
Year 8	3,873	3,873
Total	**28,813**	**28,779**
Source: Table 28, Table 29		

Summary Table G. Summary of Annual Construction GHG Emissions from the Phase 2 Coyote Percolation Dam Conservation Measure

Year	Total Unmitigated Project Construction GHG Emissions (MT of CO_2e)	Total Mitigated Project Construction GHG Emissions (MT of CO_2e)
Year 1	783	782
Year 2	1,196	1,193
Total	**1,979**	**1,975**
Source: Table 38, Table 39		

Summary Table H. Summary of Annual Construction GHG Emissions from the Sediment Augmentation Program

Year	Total Unmitigated Project Construction GHG Emissions (MT of CO_2e)	Total Mitigated Project Construction GHG Emissions (MT of CO_2e)
Year 8	2.8	2.8
Total	**2.8**	**2.8**
Source: Table 48, Table 49		

2.1.3 Overall Project Construction

The summary of maximum annual average daily construction CAP emissions for the overall Project construction is shown in **Summary Table I**. The summary of annual average GHG emissions for the overall Project construction is shown in **Summary Table J**.

Summary Table I. Summary of Maximum Annual Average Daily Construction CAP Emissions from the Overall Project Construction

	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
		lb/day		
BAAQMD Threshold of Significance	54	54	82	54
Unmitigated Emissions	401	1,166	45	37
Exceed Threshold?	***Yes***	***Yes***	*No*	*No*
Mitigated Emissions	68	330	38	29
Exceed Threshold?	***Yes***	***Yes***	*No*	*No*

Source: Table 50, Table 51

Summary Table J. Summary of Annual Construction GHG Emissions from the Overall Project Construction

Year	**Total Unmitigated Project Construction GHG Emissions (MT of CO_2e)**	**Total Mitigated[1] Project Construction GHG Emissions (MT of CO_2e)**
Year 1	6,040	5,075
Year 2	27,577	27,571
Year 3	26,741	26,735
Year 4	34,604	34,594
Year 5	29,287	29,279
Year 6	44,889	44,856
Year 7	13,952	13,939
Year 8	3,876	3,876
Total	**186,966**	**185,925**

Source: Table 52, Table 53

[1] Given the type and duration of electrified equipment use is unknown at this time, to be conservative, reductions from Mitigation Measure GHG-1 (Construction GHG Reduction Measures) were not quantified in this analysis. The mitigated GHG emissions only reflect the implementation of Mitigation Measure AQ-1's requirement that all boat engines and on-road trucks used in construction be model year 2010 or newer.

Operational Emissions

Post-construction operations and maintenance of Anderson Dam and the Conservation Measures would involve minimal activities generating air pollutant emissions. Operation of Anderson Dam would remain essentially unchanged from existing conditions. An emergency backup diesel generator will be installed to replace the existing generator at Anderson Dam; however, there is no expected change in the CAP, TAC, or GHG emissions as part of this replacement. Since no other new long-term operational sources would be added by the Project, operational emissions were not analyzed.

Proposed Mitigation Measures

Several mitigation measures were incorporated into the analysis as parts of Mitigation Measures AQ-1 (Construction CAP Reduction Measures) and AQ-2 (Construction Blasting Fugitive Dust Emissions Reduction Measure). The measures are summarized below.[6]

(AQ-1) Tier 4 Construction Equipment. Valley Water shall ensure all off-road construction equipment with greater than 25 hp and operating for more than 20 hours total over the entire duration of construction activities have engines that meet or exceed either USEPA or CARB Tier 4 Final offroad emission standards.

(AQ-1) Boat and On-Road Trucks Model Years of 2010 or Newer. To reduce exhaust emissions from dredging occurring at the dam toe, Valley Water shall ensure that all on-road trucks and boats used during construction are of model year 2010 or newer.

(AQ-2) Blasting Wind Screens. To reduce emissions of particulate matter from blasting activities at the Basalt Hill Borrow Area, Valley Water shall install three-sided wind screens. Wind screens should be made of a solid fabric or other material capable of catching at least 75% of particulate matter greater than 2.5 micrometers in diameter. Screens should be used in combination with watering of the blasting area.

6 Given the type and duration of electrified equipment use is unknown at this time, to be conservative, reductions from Mitigation Measure GHG-1 (Construction GHG Reduction Measures) were not quantified in this analysis. The mitigated GHG emissions only reflect the implementation of Mitigation Measure AQ-1's requirement that all boat engines and on-road trucks used in construction be model year 2010 or newer.

3. CARBON MONOXIDE ANALYSIS

The BAAQMD does not have a significance threshold for construction-related CO impacts. CO impacts from operations are expected to be below significance levels if the following screening criteria is met:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway). (BAAQMD 2022a)

Operation of Anderson Dam following Project construction would remain essentially unchanged from existing conditions. The Project would not generate additional operational mobile trips compared to the existing conditions and is therefore not projected to produce more than 24,000 trips per hour. In addition, the Project is not expected to conflict with any applicable congestion management program because it would generate additional operational mobile trips. Therefore, additional analysis is not needed. As such, operational traffic is expected to be a minor contributor to CO concentrations in the vicinity of the Project site.

4. ODOR ANALYSIS

Although offensive odors rarely cause physical harm, they can be unpleasant, leading to considerable distress among the public. In addition, they often generate citizen complaints to local governments and air districts. Odor impacts on residential areas and other sensitive receptors, such as hospitals, daycare centers, and schools, warrant the closest scrutiny, but consideration should also be given to other land uses where people may congregate, such as recreational facilities, work sites, and commercial areas.

4.1 Regulation of Odors

According to BAAQMD's 2022 CEQA guidelines, examples of land uses that have the potential to generate considerable odors include, but are not limited to, wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. The Project is an infrastructure retrofit project, which is not a land use identified in BAAQMD's CEQA guidelines with an odor screening distance (BAAQMD 2022a).

BAAQMD Regulation 7 contains requirements on the discharge of odorous substances after the Air Pollution Control Officer (APCO) receives odor complaints from ten or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel, or residence [BAAQMD 7-102] (BAAQMD 1982). The operations within the Project will be subject to this regulation and are expected to comply with the requirements if the regulation becomes applicable via BAAQMD 7-102, which is not anticipated.

4.2 Applicable Best Management Practices

The Santa Clara Valley Water District Best Management Practices Handbook (Valley Water 2014) contains the following BMP relevant to odor:

> **AQ-2**: Avoid Stockpiling Odorous Materials – Would avoid stockpiling odorous materials (for example, reservoir sediment containing high levels of hydrogen sulfide) within 1,000 feet of residential areas or other odor sensitive land uses, including recreational areas.

Implementation of BMP AQ-2 (Avoid Stockpiling Odorous Materials) would minimize odors from construction.

4.3 Project Odors

During Project construction, odors could be emitted from diesel exhaust generated by construction equipment and haul trucks. However, construction and hauling activities near existing receptors would be temporary, intermittent, and only during construction hours. Additionally, the diesel exhaust emissions and the associated odors would be diffusive in nature (i.e., spread out over several large work areas) and would not persist upon completion of construction.

When the reservoir and channels are fully dewatered during construction, odors could be emitted from exposed organic matter. However, the exposed organic matter is not anticipated to be a permanent odor source because the sediment would dry out or be removed during clearing and grubbing to allow for a clear construction site. Odors could be emitted from the short-term stockpiling of the sediment materials. However, through the implementation of BMP AQ-2 and the Sediment Augmentation Program conservation measure, the Project would avoid stockpiling odorous material nearby sensitive receptors and the removed sediment would be washed and sorted prior to being placed in Coyote Creek.

Project operations include managing stream flow and water depth of the reservoir, and managing sedimentation, deposition and/or erosion potential in several channels of Coyote Creek. During Project operation, odors could be emitted from exposed organic matter due to seasonal changes in water level, but such odors (if present) are not expected to be substantially different from existing conditions.

Evaluation of Odor Impacts

As discussed above, BAAQMD has not developed an odor screening distance for this Project land use type, which suggests that construction and operation of reservoirs/waterbodies are not common sources of odor. Sensitive receptors such as recreationists would be potentially near active construction work areas on a temporary basis and are unlikely to experience substantial or long-term odors from the Project. In addition to comparing to the odor screening distances, Ramboll also evaluated the location of nearby sensitive receptors relative to predominant winds. **Figure 2** shows a 5-year (2009-2014) wind rose from Reid-Hillview Airport (KRHV), which is located approximately 15 miles northwest of the Project site. As indicated by **Figure 2**, the predominant winds are from the north-northwest. While there are nearby residences to the south and southeast of the Project site (i.e., less than 1 mile), those locations would be potentially downwind of active construction work areas on a temporary basis and are unlikely to experience substantial or long-term odors from the Project.

BAAQMD is the agency responsible for investigating and controlling odor complaints in the area. BAAQMD enforces odor control by helping to document if a public nuisance exists. Upon receipt of a complaint, BAAQMD sends an investigator to interview the complainant and to locate the odor source, if possible. BAAQMD typically brings a public nuisance court action when there are a substantial number of confirmed odor events within a 24-hour period. Based on BAAQMD CEQA Guidelines (BAAQMD 2022a), an odor source with five or more confirmed complaints per year averaged over three years is considered to have a substantial effect on receptors. Based on data provided by BAAQMD through a public records request in which Ramboll requested all publicly available odor complaints in Morgan Hill, California, for the most recent and available three-year period (i.e., February 2020 through February 2023), BAAQMD has received zero confirmed odor complaints regarding odor associated with Anderson Dam (including Anderson Lake and associated recreational activities) (BAAQMD 2023a). Since the conservation measures' sites are smaller in size and scale than the seismic retrofit site, the number of odor complaints received for Anderson Dam is expected to be representative for the conservation measures. Thus, based on the odor complaint history, Anderson Dam is not considered a significant source of odors in the area.

5. ESTIMATED AIR CONCENTRATIONS

To evaluate the health risks and concentration of air toxics upon the surrounding community, BAAQMD recommends estimating concentrations using air pollution dispersion modeling. The methodologies used to evaluate emissions for the Proposed Project and cumulative HRA impacts are based on the most recent BAAQMD CEQA Guidelines (BAAQMD 2022a) and the most recent Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2015a).

Chemical Selection and Sources of Emissions

The Project would emit TACs from the combustion of gasoline and diesel fuels and blasting of soil at Basalt Hill. The cancer risk and chronic non-cancer analyses in the HRA for the Project were based on DPM concentrations from diesel combustion, total organic gases (TOG) concentrations from gasoline combustion, and site-specific soil speciation profile data for blasting.

Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen (California Environmental Protection Agency [Cal/EPA], OEHHA 1998). Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks and non-cancer chronic HI associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks and HI associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components" (OEHHA 2015b). BAAQMD states "diesel exhaust particulate matter should be used as a surrogate for all TAC emissions from diesel-fueled compression-ignition internal combustion engines" (BAAQMD 2021). DPM emissions are assumed to be equal to exhaust PM_{10} from on- and off-road construction equipment.

The Cal/EPA-approved toxicity values for DPM were used to evaluate health impacts from construction and operational diesel fueled sources (Cal/EPA 2022).

Health effects from exhaust and evaporation from gasoline combustion were based on specific TAC emissions. Emissions of TOG from gasoline-fueled vehicles and boats were speciated using organic chemical profiles from BAAQMD (BAAQMD 2012).[7] The organic profile used for gasoline trucks can be found in **Table 9**, and was utilized for the seismic retrofit and conservation measures. The profile used for boat emissions is shown in **Table 12**. The Cal/EPA-approved toxicity values for each TAC were used to evaluate health impacts from operational gasoline fueled sources (Cal/EPA 2022).

Cancer risk and chronic and acute hazards from blasting activity are based on soil compositions provided in the Anderson Dam Seismic Retrofit Project Naturally Occurring Asbestos and Metals Evaluation Report (Valley Water 2021). Soil composition values utilized in emissions calculations and respective TAC emissions are shown in **Table 15**.

5.1.1 Assessment of Multi-Pathway Non-Inhalation Pathways

OEHHA Hot Spots Guidance (OEHHA 2015a) requires the evaluation of non-inhalation exposure pathways, referred to as a multi-pathway analysis, in risk assessments prepared to meet the BAAQMD CEQA Guidelines. Selection of

[7] Speciation profile is from BAAQMD's Recommended Methods for Screening and Modeling Local Risks and Hazards (BAAQMD 2012), Table 14, Toxic Speciation of TOG due to Tailpipe Emissions, and Table 15, Toxic Speciation of TOG due to Evaporative Losses.

the additional pathways for a multi-pathway analysis is specific to the chemical and land use designations in the area impacted by the project. As shown in **Table 15,** the chemicals that are emitted from Project blasting and must be evaluated in a multi-pathway analysis are: arsenic, beryllium, cadmium, chromium (VI), lead, and nickel. Emissions were estimated as described in **Section 2.1.1.9**, and CARB's HARP Air Dispersion Modeling and Risk Tool dated 22118 (CARB 2022) was used to estimate health risks, as described further in **Section 6.**

AERMOD Modeling

The American Meteorological Society/Environmental Protection Agency regulatory air dispersion model (AERMOD Version 22112) was used to evaluate ambient air concentrations at off-site receptors (USEPA 2022).[8] For each receptor location, the model generates air concentrations that result from emissions from multiple sources. In this case, air dispersion factors as unit emissions were modeled and air concentrations were calculated in a subsequent post-processing step.

Air dispersion models such as AERMOD require a variety of inputs such as source parameters, meteorological data, topographical data, and receptor parameters. When site-specific information is unknown, default parameter sets that are designed to produce conservative (i.e., overestimates of) air concentrations were used (USEPA 2022).

5.2.1 Meteorological Data

Air dispersion modeling applications require the use of meteorological data that ideally are spatially and temporally representative of conditions in the immediate vicinity of the site under consideration. For this analysis, meteorological data collected from the Reid-Hillview Airport (KRHV), located in Santa Clara County, for the years 2009-2014, were used. This data was downloaded from NOAA's National Climatic Data Center (NCDC) and was processed by BAAQMD with AERMET Version 14134 (BAAQMD 2023b).

5.2.2 Terrain and Land Use Considerations

Elevation and land use data were imported from the National Elevation Dataset (NED) maintained by the United States Geological Survey ([USGS] 2013) in NED 1/3 arc seconds.

An important consideration in an air dispersion modeling analysis is whether or not to model an area as urban. As the Project is surrounded by recreational and forested land, the default rural option was used in the modeling. The rural option tends to produce more conservative concentrations than the urban option due to the enhanced turbulence associated with urban environments due to the additional mixing associated with the heat island effect.

5.2.3 Emission Rates

Emissions were modeled using the χ/Q ("chi over q") method, such that each source has a unit emission rate (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors (with units of micrograms per cubic meter (([$\mu g/m^3$])/[g/s]). Actual emission rates were multiplied by the dispersion factors to obtain concentrations.

5.2.3.1 Construction Emission Rates

For the construction phase, emitting activities were modeled to reflect the actual hours of the day that construction activity would occur. Two modeled scenarios were performed to account for varying construction hours by activity. In the first scenario, emissions were modeled as occurring between 7 AM and 5 PM, consistent with the expected construction hours for the Project (assuming the first hour of construction 6-7am would be used for site mobilization and safety meetings without heavy construction equipment in line with the City of Morgan Hill noise ordinance). The AERMOD EMISFACT option was used to limit emissions to this period. Emissions were also

[8] On October 12, 2023, USEPA released AERMOD Version 23132. However, AERMOD Version 22112 was the most recent version at the time of Draft EIR preparations, and the updates to the modeling software are minor and would not substantially affect results (USEPA 2023b).

modeled as occurring over 24 hours a day, given that several construction activities could occur over 20 and 24 hours per day.

In accordance with OEHHA guidance (OEHHA 2009), annual average concentrations were estimated and used to evaluate cancer risk, chronic non-cancer, and $PM_{2.5}$ impacts. Acute non-cancer impacts were estimated using the maximum 1-hour concentration.

For annual average ambient air concentrations over the construction phase, the estimated annual average dispersion factors were multiplied by the annual average emission rates. The emission rates would vary day to day, with some days having no emissions. To estimate an annual average, the model assumes a constant emission rate during the entire year. Thus, the average emission rates were calculated by taking the total mass of emissions and dividing by the hours considered in the model; equipment operating 10 hours per day was modeled at 10 hours, while equipment operating 20 or 24 hours per day was modeled at 24 hours.

For acute non-cancer hazard analyses, the estimated 1-hour maximum dispersion factors for each source group were used. These dispersion factors were multiplied by the maximum 1-hour emission rate to determine the maximum 1-hour concentration for a given source group. Note that because the maximum emissions for each group are not expected to occur during the same hour of the year, summing the maximum 1-hour concentrations across all source groups yields conservative (i.e., overestimates of) total air concentrations.

5.2.4 Source Parameters

5.2.4.1 Construction Sources

Source location and parameters are necessary to model the dispersion of air emissions. For construction, area sources were used to represent the on-site activity in AERMOD. The on-site construction exhaust sources were modeled as area sources with a release height of 5 meters (SCAQMD 2008) and an initial vertical dimension of 1.4 meters (SFDPH 2020). Fugitive dust sources from grading, demolition, and truck hauling during construction were modeled with a release height of 0 meters and an initial vertical dimension of 1 meter (SCAQMD 2008). Construction area source group locations are presented in **Figure 3** (Seismic Retrofit), **Figure 5** (Ogier Ponds Conservation Measure), **Figure 6** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Figure 7** (Sediment Augmentation Program).

Exhaust and fugitive dust emissions from heavy-duty haul and vendor trucks on roadways were modeled using volume sources. The modeled release height was 2.55 meters, the initial lateral dimension was the roadway width plus six meters divided by 2.15, and the initial vertical dimension was 2.37 meters, consistent with the USEPA haul road guidance (USEPA 2012). On-road construction worker trips would have negligible impact and therefore were not included in the HRA analysis for excess lifetime cancer risk and chronic HI. $PM_{2.5}$ emissions associated with on-road construction worker trips were included in the construction HRA analysis for $PM_{2.5}$ concentration modeling. Construction on-road source group locations are presented **Figure 3** (Seismic Retrofit), **Figure 5** (Ogier Ponds Conservation Measure), **Figure 6** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Figure 7** (Sediment Augmentation Program). Routes to the Sediment Augmentation Program for augmentation sites overlapping with Ogier Ponds Conservation Measure and the seismic retrofit were assumed to be the same routes used for each project component, respectively.

The Project generator used during seismic retrofit construction was modeled following the recommended default parameters specified in the BAAQMD CEQA Guidelines: as point sources with a release height of 3.7 meters above ground level, an exit temperature of 872 degrees Fahrenheit, an exit velocity of 45 meters per second, and an exit diameter of 0.18 meters (BAAQMD 2022a). Analysis assumes the generator would be located directly southeast of the dam.

5.2.5 Receptors

TAC concentrations were estimated at off-site sensitive receptor populations. As discussed in **Section 1.3.3**, sensitive receptors include areas with residents, schools, daycare centers, parks, hospitals and senior care facilities.

Residential areas were modeled as a grid with 20 meter (65.6 feet) spacing within 1,000 feet of the Project site and 50 meter spacing within 1,000 meters of the project site. Recreational areas and areas over water were modeled as a grid with 50 meter spacing.

Other sensitive receptor locations were identified using a report from Environmental Data Resources (EDR 2020). The EDR report identified schools, daycare centers, nursing homes and hospitals near the Project site. These locations were modeled as discrete locations.

Off-site receptors were modeled at the breathing height of 1.5 meters, consistent with BAAQMD Health Risk Assessment Protocol (BAAQMD 2020) and the BAAQMD CEQA Guidelines (BAAQMD 2022a).

Maximum average annual and 1-hour dispersion factors were estimated for each receptor location.

Receptor locations that were used in the HRA are depicted in **Figure 4** (Seismic Retrofit), **Figure 5** (Ogier Ponds Conservation Measure), **Figure 6** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Figure 7** (Sediment Augmentation Program).

5.2.6 Modeling for Conservation Measures

Concentrations of TACs associated with construction of the conservation measures were estimated using similar methodologies as the seismic retrofit construction. Details on the differences in methodology are provided below.

For the construction phase, emitting activities were modeled to reflect the actual hours of the day that construction activity would occur. Emissions from construction work areas were modeled as occurring between 6 AM and 6 PM, consistent with the expected construction hours for the conservation measures. The AERMOD EMISFACT option was used to limit emissions to this time period. The average emission rates were calculated by taking the total mass of emissions and dividing by the hours considered in the model (12 hours per day, 365 days per year).

TAC concentrations were estimated at off-site sensitive receptor populations. Residential areas were modeled as a grid with 20 meter (65.6 feet) spacing within 1,000 feet of the conservation measure sites. Routes were modeled within 1,000 feet of the conservation measure sites. **Figures 5, 6, and 7** include a map of receptor locations that were used in the HRA, for each conservation measure respectively.

6. HEALTH RISK ASSESSMENT

In February 2015, OEHHA released the updated Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2015a), which combines information from previously released and adopted technical support documents to delineate OEHHA's revised risk assessment methodologies based on current science. The BAAQMD issued guidelines on adopting the OEHHA 2015 Guidance Manual (BAAQMD 2020) and has also incorporated the OEHHA Guidance into their CEQA Guidelines (BAAQMD 2022a). This evaluation utilizes the OEHHA 2015 methodology; details of which are discussed below.

Project Construction Sources Evaluated

Excess lifetime cancer risk, non-cancer chronic HI, and $PM_{2.5}$ concentration were evaluated for off-site sensitive receptor exposure to emissions from Proposed Project construction. Acute HI was evaluated for any off-site receptor which is accessible to the public. Construction source group locations are presented **Figure 3** (Seismic Retrofit), **Figure 5** (Ogier Ponds Conservation Measure), **Figure 6** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Figure 7** (Sediment Augmentation Program).

Exposure Assessment

Potentially Exposed Populations: This analysis evaluated off-site receptors potentially exposed to Project emissions from construction activities.

For cancer risk, chronic HI, and $PM_{2.5}$ concentration, impacts were evaluated at off-site sensitive receptors. All exposed populations were conservatively evaluated with residential exposure assumptions. In Ramboll's experience, residential receptors are conservative when analysing impacts at other non-residential locations, such as workplaces, due to the extended duration for which residents are exposed to air toxics.

Acute HI is evaluated based on the maximum hourly concentrations of acute toxicants estimated at off-site receptors. Because acute hazard requires only one hour of exposure, acute impacts were evaluated at any location which is anticipated to be accessible to the public.

Exposure Assumptions: The exposure parameters used to estimate excess lifetime cancer risks for all potentially exposed populations for the construction evaluation for this analysis were obtained using risk assessment guidelines from OEHHA (OEHHA 2015a) and BAAQMD (BAAQMD 2020). **Table 54** shows the proposed exposure parameters that were used for the HRA.

Calculation of Intake: The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, IF_{inh}, can be calculated as follows:

$$IF_{inh} = \frac{DBR * FAH * EF * ED * CF}{AT}$$

Where:

IF_{inh}	=	Intake Factor for Inhalation (m^3/kg-day)
DBR	=	Daily Breathing Rate (L/kg-day)
FAH	=	Frequency of Time at Home (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
AT	=	Averaging Time (days)
CF	=	Conversion Factor, 0.001 (m^3/L)

The chemical intake or dose was estimated by multiplying the inhalation intake factor, IF_{inh}, by the chemical concentration in air, C_i. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in the current OEHHA Hot Spots guidance (OEHHA 2015a).

6.2.1 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. For purposes of calculating exposure criteria to be used in risk assessments, adverse health effects are classified into two broad categories – cancer and non-cancer endpoints. Toxicity values that are used to estimate the likelihood of adverse effects occurring in humans at different exposure levels are identified as part of the toxicity assessment component of a risk assessment.

Toxicity values for all TACs are consistent with OEHHA-approved values found in the HARP Air Dispersion Modeling and Risk Tool (CARB 2022).

6.2.2 Age Sensitivity Factors

The estimated excess lifetime cancer risks for a resident were adjusted using age sensitivity factors (ASFs) that account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (OEHHA 2009) and OEHHA 2015 Guidance (2015a). Cancer risk estimates were weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) was applied to ages 16 and older. **Table 55** presents the age sensitivity weighted intake factors by year and age bin by exposure scenario.

Risk Characterization

6.3.1 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF).

The equation that was used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$Risk_{inh} = C_i \times CF \times IF_{inh} \times CPF \times ASF$$

Where:

$Risk_{inh}$ = Cancer risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)

C_i = Annual average air concentration for $chemical_i$ ($\mu g/m^3$)

CF = Conversion factor (mg/µg)

IF_{inh} = Intake factor for inhalation (m^3/kg-day)

CPF_i = Cancer potency factor for $chemical_i$ (mg chemical/kg body weight-day)$^{-1}$

6.3.2 Estimation of Chronic Noncancer Hazard Indices

The potential for exposure to result in adverse chronic noncancer effects was evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic reference exposure level (cREL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ). To evaluate the chronic health effects from annual exposure to multiple chemicals, the chronic HQs for all chemicals are summed, yielding a chronic HI.

$$HQ_i = C_i / cREL$$

Where:

HQ_i	=	Chronic hazard quotient for chemical i
C_i	=	Annual average concentration of chemical i (µg/m³)
$cREL_i$	=	Chronic noncancer reference exposure level for chemical i (µg/m³)

6.3.3 Estimation of Acute Noncancer Hazard Indices

The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.

$$HQ_i = C_i / aREL$$

Where:

HQ_i	=	Acute hazard quotient for chemical i
C_i	=	One-hour maximum concentration of chemical i (µg/m³)
$aREL_i$	=	Acute reference exposure level for chemical i (µg/m³)

6.4 Comparison to CEQA Thresholds

Health impacts from the construction of each modeled Project component (i.e., Seismic Retrofit, Ogier Ponds Conservation Measure, Phase 2 Coyote Percolation Dam Conservation Measure, and Sediment Augmentation Program) were compared to the BAAQMD CEQA thresholds discussed in **Section 1.3.3**. In addition, the combined health impacts from all Project components were also compared to the BAAQMD CEQA thresholds.

6.5 Health Risk Assessment Results

6.5.1 Impacts from the Project

HRA results are summarized in **Summary Tables K-O**. A breakdown of excess lifetime cancer risk, chronic HI, acute HI, and $PM_{2.5}$ concentration from Project construction is shown in **Table 56** (Seismic Retrofit), **Table 57** (Ogier Ponds Conservation Measure), **Table 58** (Phase 2 Coyote Percolation Dam Conservation Measure), and **Table 59** (Sediment Augmentation Program). These tables also show the year for which the maximum impact occurs for non-cancer chronic HI, acute HI, and $PM_{2.5}$ concentrations. Project maximally exposed individuals (MEI) are shown in **Figure 8**.

Summary Table K. Summary of Health Risk Assessment Results from the Seismic Retrofit

	Excess Lifetime Cancer Risk (in a million)	Chronic HI (unitless)	Acute HI (unitless)	$PM_{2.5}$ Concentration ($\mu g/m^3$)
BAAQMD Threshold of Significance	10	1	1	0.3
Unmitigated Risks	80	0.075	15	0.77
Exceed Threshold?	**Yes**	No	**Yes**	**Yes**
Mitigated Risks	17	0.016	3.7	0.43
Exceed Threshold?	**Yes**	No	**Yes**	**Yes**

Source: Table 56

Summary Table L. Summary of Health Risk Assessment Results from the Ogier Ponds Conservation Measure

	Excess Lifetime Cancer Risk (in a million)	Chronic HI (unitless)	Acute HI (unitless)	$PM_{2.5}$ Concentration ($\mu g/m^3$)
BAAQMD Threshold of Significance	10	1	1	0.3
Unmitigated Risks	2.7	0.012	0.0039	0.19
Exceed Threshold?	No	No	No	No
Mitigated Risks	0.77	0.0037	0.0039	0.064
Exceed Threshold?	No	No	No	No

Source: Table 57

Summary Table M. Summary of Health Risk Assessment Results from the Phase 2 Coyote Percolation Dam Conservation Measure

	Excess Lifetime Cancer Risk (in a million)	Chronic HI (unitless)	Acute HI (unitless)	$PM_{2.5}$ Concentration ($\mu g/m^3$)
BAAQMD Threshold of Significance	10	1	1	0.3
Unmitigated Risks	2.7	0.0018	0.023	0.051
Exceed Threshold?	No	No	No	No
Mitigated Risks	0.48	0.00034	0.023	0.016
Exceed Threshold?	No	No	No	No

Source: Table 58

Summary Table N. Summary of Health Risk Assessment Results from the Sediment Augmentation Program

	Excess Lifetime Cancer Risk (in a million)	**Chronic HI** (unitless)	**Acute HI** (unitless)	**$PM_{2.5}$ Concentration** (µg/m³)
BAAQMD Threshold of Significance	10	1	1	0.3
Unmitigated Risks	<0.001	<0.001	<0.001	<0.001
Exceed Threshold?	No	No	No	No
Mitigated Risks	<0.001	<0.001	<0.001	<0.001
Exceed Threshold?	No	No	No	No

Source: Table 59

Summary Table O. Summary of Health Risk Assessment Results from Overall Project Construction

	Excess Lifetime Cancer Risk (in a million)	**Chronic HI** (unitless)	**Acute HI** (unitless)	**$PM_{2.5}$ Concentration** (µg/m³)
BAAQMD Threshold of Significance	10	1	1	0.3
Unmitigated Risks	80	0.077	15	0.77
Exceed Threshold?	**Yes**	No	**Yes**	**Yes**
Mitigated Risks	17	0.017	3.7	0.43
Exceed Threshold?	**Yes**	No	**Yes**	**Yes**

Source: Table 60

BAAQMD CEQA Guidelines establish a project-level incremental $PM_{2.5}$ concentration CEQA significance level of 0.3 micrograms per cubic meter (µg/m³), based on an annual average. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) for also exist for $PM_{2.5}$. The $PM_{2.5}$ NAAQS include an annual average concentration of 12 µg/m³ (based on the annual mean) and a 24-hour average concentration of 35 µg/m³ (based on the 8th highest concentration for that averaging time).[11] The $PM_{2.5}$ CAAQS include an annual average concentration of 12 µg/m³, but the State has not established a 24-hour average $PM_{2.5}$ CAAQS. Cumulative $PM_{2.5}$ concentrations due to seismic retrofit construction activities at the Project MEI are shown in **Summary Table P**; the concentrations associated with mitigated emissions from the seismic retrofit represent a small fraction of background and a small fraction of the NAAQS and CAAQS, which provides additional context of the fine particulate matter impacts.

[11] On February 7, 2024, USEPA lowered the NAAQS for fine particle pollution ($PM_{2.5}$) by revising the level of the primary (health-based) annual $PM_{2.5}$ standard to 9.0 µg/m³. The effective date of the new standard was May 6, 2024. However, the 12.0 µg/m³ standard was the standard at the time of Draft EIR preparation.

Summary Table P. Background Fine Particulate Matter Concentrations in the Project Area

Pollutant	Averaging Period	AAQS ($\mu g/m^3$)	Form of Standard	Background Concentration[1] ($\mu g/m^3$)	Unmitigated Seismic Retrofit Contribution at Project $PM_{2.5}$ MEI[2] ($\mu g/m^3$)	Mitigated Seismic Retrofit Contribution at Project $PM_{2.5}$ MEI[2,3] ($\mu g/m^3$)
$PM_{2.5}$	24-Hour	35 (NAAQS)	8th Highest Maximum Concentration	25	1.66	0.84
$PM_{2.5}$	Annual	12.0 (NAAQSCAAQS)	Annual Mean	8.9	0.67	0.35

[1] Background concentrations are USEPA design values from 2021-2023 for the monitor located at San Jose – Knox, the closest $PM_{2.5}$ monitor to the Project area.
[2] Emission rates modeled as emissions in lb/year converted to g/s for 365 days (for comparison to the annual NAAQS) and for a typical day in Year 4 (the seismic retrofit construction year of maximum unmitigated and mitigated $PM_{2.5}$ emissions). Emission rates conservatively include fugitive $PM_{2.5}$. The seismic retrofit construction contribution was evaluated at the Project $PM_{2.5}$ MEI.
[3] Due to the Project changes, the seismic retrofit construction year of maximum unmitigated and mitigated $PM_{2.5}$ emissions has changed from Year 6 in the Draft EIR to Year 4 in this analysis. $PM_{2.5}$ concentrations are not only dependent on emissions, but also the source locations and activities for a given year. Therefore, even though the total emissions from seismic retrofit construction increased compared to the Draft EIR, the unmitigated and mitigated 24-hour 8th highest maximum $PM_{2.5}$ concentration decreased due to the other factors (i.e., geographical distribution and magnitude of emissions in a given year) associated with the change in the year of maximum emissions.

6.5.2 Impacts on Rosendin Park Receptors

Throughout FOCP implementation and extending throughout the construction of the Project, certain trails and public access to Anderson Dam and Reservoir would be closed for all or portions of Seismic Retrofit construction to provide public safety. Trails in Rosendin Park would also be fully closed for 3 to 4 months during the initial blasting phase of Seismic Retrofit Components construction which would occur sometime during Year 4, 5, or 6 of Project construction, and be partially closed throughout the duration of blasting (with the nearest open trails over 900 feet from the blasting area, though typically much further). Aside from the trail closures within the Project boundaries of the BHBA, there would be no planned closures of the Rosendin Park Area before Year 4 or after Year 6 of Project construction. Since recreational receptors are unlikely to be present and exposed to air toxics from Project construction for an extended duration, health risk impacts on Rosendin Park receptors are expected to be low and were not quantified in this analysis.

7. CUMULATIVE ANALYSIS

Consistent with the BAAQMD CEQA guidelines, the combined impacts from off-site sources were evaluated within the "zone of influence" of the Project. Off-site sources include BAAQMD permitted stationary sources, roadways, and railways.

The cumulative impact for the HRA was evaluated at the MEI for Project construction, which includes seismic retrofit, Ogier Ponds Conservation Measure, Phase 2 Coyote Percolation Dam Conservation Measure, and Sediment Augmentation Program. The MEI is the receptor with the highest incremental cancer risk, chronic HQ, and $PM_{2.5}$ concentration from the Project across all populations and exposure scenarios.

Health impacts from all identified sources within 1,000 feet of the Project MEI were evaluated at this single location and added to the results from the Project's impacts. The sources that were considered in this analysis are described below.

Results at the MEI were compared to the significance thresholds for cumulative impacts:

- An excess lifetime cancer risk level of more than 100 in one million;
- A chronic non-cancer HI greater than 10; and
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.8 µg/m^3.

7.1 Stationary Sources

BAAQMD provides a stationary source GIS map tool to use to evaluate the impacts of off-site stationary sources (BAAQMD 2023c). Consistent with BAAQMD guidance, a request was sent to BAAQMD to provide the emissions from nearby stationary sources within 1,000 feet of the Project boundary. No stationary sources were found within 1,000 feet of any maximally impacted receptors.

7.2 Roadway Sources

To evaluate potential health risk impacts from existing traffic on major roadways and highways, BAAQMD provides raster files of health impacts (BAAQMD 2022b). Ramboll pulled the corresponding excess lifetime cancer risk, chronic HI, and $PM_{2.5}$ concentration values for the MEI from the raster file. The BAAQMD tool represents the impact from the background traffic on the roadways. These tools were used to estimate cancer risk, chronic HI, and $PM_{2.5}$ concentrations from vehicle travel on major roadways and highways surrounding the Project. The tools developed by BAAQMD are based on EMFAC2021, traffic data from 2019, and an operational start year of 2022. They represent a conservative estimate of health impacts, largely due to the reduction in emissions of the vehicle fleet between 2022 and when project construction will occur. The primary roadway source near the Project is Interstate 101.

7.3 Railway Sources

BAAMQD provides raster files with health impacts from railways (BAAQMD 2022b).[12] Caltrain is over 1,000 feet from the Project. The health impacts from the raster file were used to estimate the potential impact from railways at the MEIs, and it was determined that railway emissions do not contribute to health risks at the MEIs.

7.4 Cumulative Summary

As described above, nearby relevant cumulative sources include highways, streets, and railways. Impacts from these cumulative sources are combined with Project construction impacts at the off-site Project MEI. A summary of

[12] These include diesel locomotives used to transport freight along Class I rail lines, to transport people along commuter/passenger rail lines, and for goods movements at railyards in West Oakland and Richmond/North Richmond/San Pablo.

cumulative impacts at the Project MEI is shown in **Summary Table Q** below. Additional details can be found in **Table 61**.

Summary Table Q. Summary of Cumulative Health Risk Assessment Results

	BAAQMD Threshold of Significance	Mitigated[13]	
		MEI	***Exceed Threshold?***
Excess Lifetime Cancer Risk (in a million)	100	18	*No*
Chronic HI	10	0.018	*No*
$PM_{2.5}$ Concentration (µg/m^3)	0.8	0.47	*No*

Source: Table 61

[13] While this table only presents the mitigated cumulative heath risk assessment results, the unmitigated values are presented in Table 61 and are also below the BAAQMD thresholds of significance.

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TABLES

Table 1
Construction Years
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Calendar Year[1]	Project Year
2024	Year 1
2025	Year 2
2026	Year 3
2027	Year 4
2028	Year 5
2029	Year 6
2030	Year 7
2031	Year 8

Notes:

1. The construction years shown in this Technical Report were selected during Draft Environmental Impact Report (EIR) preparation for modeling purposes only and are not accurate. Estimating emissions from these calendar years is conservative, as fleet emissions will become cleaner in later years.

Table 2
Construction Phasing Schedule
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Year	Construction Activity	Start Date	End Date	Number of Days[2]
Year 1	Miscellaneous Activities	3/4/2024	12/31/2024	272
	Construction of the Haul Roads and Preparation of Stockpile Areas	3/4/2024	7/4/2024	118
	Dredging at Dam Toe	3/4/2024	7/31/2024	141
	Upstream Shaft excavation	4/1/2024	8/30/2024	143
	Excavate upstream portal	6/23/2024	8/30/2024	69
	Tunnel excavation	9/2/2024	12/20/2024	107
	Tunnel lining	11/4/2024	11/29/2024	26
Year 2 (Stage 1a)	Miscellaneous Activities	1/1/2025	12/31/2025	325
	Construct cofferdam	1/1/2025	2/1/2025	32
	Construct bypass pump system and diversion extension pipe	1/1/2025	3/16/2025	75
	Conveying bypass flows to the Stage 1 Diversion Systems	1/1/2025	8/1/2025	195
	Excavate downstream portal	1/1/2025	5/1/2025	116
	Installation and operating the Water Treatment System	1/1/2025	12/31/2025	325
	Stage 1a excavation (incl. work at stockpile areas & reservoir disposal)	1/1/2025	7/1/2025	168
	Tunnel excavation	1/1/2025	3/1/2025	60
	Tunnel lining	1/1/2025	2/16/2025	47
	Construction of intake structure following LLOT lining	1/1/2025	3/1/2025	60
	Demolish accl bld, inst., dam crest paving, exst intake&outlet struct	1/1/2025	4/16/2025	103
Year 3 (Stage 1b)	Miscellaneous Activities	1/1/2026	12/31/2026	325
	Stage 1b excavation (incl. work at stockpile areas & reservoir disposal)	1/1/2026	8/1/2026	195
	Construction of the tie-back wall at Cochrane Road	1/1/2026	3/16/2026	75
	Demolish existing spillway	1/1/2026	10/1/2026	247
	Excavation and foundation preparation	1/1/2026	4/1/2026	90
	HLOW and Access Adit portal excavation	1/1/2026	7/1/2026	168
	HLOW Tunnel and Access Adit Tunnel excavation	1/1/2026	7/1/2026	168
	HLOW Tunnel and Access Adit lining	1/1/2026	6/1/2026	142
	Construction of intake structure, concrete encasement	1/1/2026	5/1/2026	116
	Gate Shaft excavation	1/1/2026	3/1/2026	60
	Gate Shaft lining	1/1/2026	3/16/2026	75
	Installation and operating the Water Treatment System	1/1/2026	12/31/2026	325
Year 4	Miscellaneous Activities	1/1/2027	12/31/2027	353
	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	1/1/2027	11/1/2027	301
	Stage 2a excavation (incl. work at stockpile areas & reservoir disposal)	1/1/2027	4/16/2027	106
	Stage 2b Fill (incl. work at stockpile areas & reservoir disposal)	1/1/2027	6/16/2027	167
	Excavation and foundation preparation	1/1/2027	12/31/2027	353
	Construction of spillway structure	1/1/2027	10/1/2027	274
	Pipe, mechanical and electrical installation	1/1/2027	5/1/2027	121
	Installation and operating the Water Treatment System	1/1/2027	12/31/2027	353
Year 5 (Stage 3a)	Miscellaneous Activities	1/1/2028	12/31/2028	325
	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	1/1/2028	11/1/2028	274
	Stage 3a Fill (incl. work at stockpile areas & reservoir disposal)	1/1/2028	7/1/2028	169
	Preparation, excavation, blasting, and hauling of material	1/1/2028	12/1/2028	300
	Strip sediment, excavate test trenches	1/1/2028	2/16/2028	47
	Construction of spillway structure	1/1/2028	10/1/2028	247
	Excavate sloping intake structure (upper half)	1/1/2028	2/16/2028	47
	Construction of sloping intake structure (upper half)	1/1/2028	6/1/2028	143
	Construction of CIP tunnel and outlet structure	1/1/2028	7/1/2028	169
	Excavate downstream portal trench and outlet structure foundation	1/1/2028	4/1/2028	91
	Pipe, mechanical and electrical installation	1/1/2028	3/16/2028	76
	Connection of the Pipeline and Force Main to the LLOW outlet structure	1/1/2028	2/16/2028	47
	Installation and operating the Water Treatment System	1/1/2028	12/31/2028	325
Year 6 (Stage 3b)	Miscellaneous Activities	1/1/2029	12/31/2029	325
	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	1/1/2029	11/1/2029	274
	Construct bypass pump system	1/1/2029	2/1/2029	32
	Conveying bypass flows to the Stage 1 Diversion Systems	1/1/2029	8/1/2029	195
	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	1/1/2029	7/1/2029	168
	Excavation, blasting, and hauling of material	1/1/2029	5/1/2029	116
	Excavation, hauling & moisture conditioning	1/1/2029	5/1/2029	116
	Excavate sloping intake structure (lower half)	1/1/2029	2/1/2029	32
	Construction of sloping intake structure (lower half)	1/1/2029	4/1/2029	90
	Pipe, mechanical and electrical installation	1/1/2029	5/1/2029	116
	Demolish diversion intake structure	1/1/2029	2/1/2029	32
	Construct pipe supports, lining at Diversion Tunnel/LLOT intersection	1/1/2029	3/1/2029	60
	Pipe, mechanical and electrical installation	1/1/2029	5/1/2029	116
	Excavation and foundation preparation	1/1/2029	4/1/2029	90
	Installation and operating the Water Treatment System	1/1/2029	12/31/2029	325
Year 7	Miscellaneous Activities	1/1/2030	11/25/2030	294
	Construction of concrete lined channel	1/1/2030	10/1/2030	247
	Restoring parking areas and construction of permanent access roads	1/1/2030	10/1/2030	247
	Allowance - scope to be determined	1/1/2030	10/1/2030	247

Notes:
1. Construction schedule and phasing information were provided by Valley Water.
2. Project construction will generally occur on Mondays through Saturdays between the hours of 7 AM and 5 PM. Additional construction workdays are included for up to 12 Sundays each year for all years except for Year 4. Year 4 construction activity includes up to 40 Sundays.

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Miscellaneous Activities	Miscellaneous Activities	Year 1	9	Medium excavator	Diesel	0.5	1	172	10
		Year 1	9	Loader	Diesel	0.5	1	298	10
		Year 1	9	Light truck - Forman	Gasoline	1	1	290	10
		Year 1	9	Light truck - Crew	Gasoline	1	1	290	10
Haul Roads and Stockpile Area preparations	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	5	Medium Bulldozer	Diesel	0.9	2	354	10
		Year 1	5	Medium excavator	Diesel	0.9	2	273	10
		Year 1	5	Motor grader	Diesel	0.9	1	290	10
		Year 1	5	Track drill rig	Diesel	0.9	2	201	10
		Year 1	5	Light truck - Forman	Gasoline	0.9	3	290	10
		Year 1	5	Light truck - Crew	Gasoline	0.9	1	290	10
		Year 1	5	Articulated dump truck	Diesel	0.9	2	496	10
		Year 1	5	Water truck	Diesel	0.9	2	330	10
		Year 1	5	Pump for water trucks	Diesel	1	1	74	10
		Year 1	5	Loader	Diesel	0.9	1	298	10
Dam Foundation Excavation	Dredging at Dam Toe	Year 1	5	Light truck - Personnel	Gasoline	0.9	3	290	10
		Year 1	5	Boat - 30' Work Boat	Gasoline	0.9	1	400	10
		Year 1	5	Boat - 16' Whaler	Gasoline	0.9	1	115	10
		Year 1	5	Boat - 16' Skiff	Gasoline	0.9	1	40	10
		Year 1	5	Crane - 275t	Diesel	0.9	1	228	10
		Year 1	5	Crane - 70t	Diesel	0.9	1	160	10
		Year 1	5	Modular Barge	N/A	0.9	9	0	10
		Year 1	5	Modular Barge	N/A	0.9	2	0	10
		Year 1	5	Dredge Pump	Diesel	0.9	1	150	10
LLOW	Upstream Shaft excavation	Year 1	4	Crane 150t	Diesel	0.7	1	300	20
		Year 1	4	Small backhoe	Diesel	0.7	1	70	20
		Year 1	4	Jacklegs	Air	0.7	2	-	20
		Year 1	4	Track drill rig	Diesel	0.7	1	201	10
		Year 1	4	Compressor	Diesel	0.7	1	173	20
		Year 1	4	Shotcrete batch plant	Diesel	0.7	1	75	20
		Year 1	4	Loader	Diesel	0.7	1	298	20
		Year 1	4	Telehandler	Diesel	0.7	1	110	20
		Year 1	4	Pump	Diesel	1	1	17	24
		Year 1	4	Ventilation fan	Electrical	1	1	-	24
		Year 1	4	Generator (80 kW)	Diesel	1	1	152	24
		Year 1	4	Articulated dump truck	Diesel	0.7	1	496	20
		Year 1	4	Light truck - Forman	Gasoline	1	1	290	20
		Year 1	4	Light truck - Crew	Gasoline	1	1	290	20
		Year 1	4	No Equipment - Crew	-	1	-	-	20
	Excavate upstream portal	Year 1	2	Large excavator	Diesel	0.9	1	410	10
		Year 1	2	Track drill rig	Diesel	0.7	1	201	10
		Year 1	2	Compressor	Diesel	0.7	1	173	10
		Year 1	2	Loader	Diesel	0.7	1	298	10
		Year 1	2	Manlift	Diesel	0.7	1	67	10
		Year 1	2	Pump	Diesel	1	1	17	10
		Year 1	2	Generator (80 kW)	Diesel	1	1	152	24
		Year 1	2	Articulated dump truck	Diesel	0.9	2	496	10
		Year 1	2	Light truck - Forman	Gasoline	1	1	290	10
		Year 1	2	Light truck - Crew	Gasoline	1	1	290	10
		Year 1	2	No Equipment - Crew	-	1	-	-	10
	Tunnel excavation	Year 1	3	Compressor	Diesel	0.7	1	173	20
		Year 1	3	Bobcat	Diesel	0.7	1	68	20
		Year 1	3	Shotcrete batch plant	Diesel	0.7	1	50	20
		Year 1	3	Loader	Diesel	0.7	1	298	20
		Year 1	3	Telehandler	Diesel	0.7	1	110	20
		Year 1	3	Pump	Diesel	1	1	17	24
		Year 1	3	Ventilation fan	Electrical	1	1	-	24
		Year 1	3	Road-header	Electrical	0.7	1	-	20
		Year 1	3	Robotic shotcrete machine	Diesel	0.7	1	27	20
		Year 1	3	Scooptrams	Diesel	0.7	1	250	20
		Year 1	3	Generator (80 kW)	Diesel	1	1	152	24
		Year 1	3	Articulated dump truck	Diesel	0.7	1	496	20
		Year 1	3	Light truck - Forman	Gasoline	1	1	290	20
		Year 1	3	Light truck - Crew	Gasoline	1	1	290	20
		Year 1	3	No Equipment - Crew	-	1	-	-	20
	Tunnel lining	Year 1	1	Concrete pump truck	Diesel	0.7	1	500	20
		Year 1	1	Compressor	Diesel	0.7	1	173	20
		Year 1	1	Bobcat	Diesel	0.7	1	68	20
		Year 1	1	Loader	Diesel	0.5	1	298	20
		Year 1	1	Telehandler	Diesel	0.7	1	110	20
		Year 1	1	Pump	Diesel	1	1	17	24
		Year 1	1	Ventilation fan	Electrical	1	1	-	20
		Year 1	1	Welder	Diesel	0.7	1	66	20
		Year 1	1	Concrete vibrator	Gasoline	0.7	2	6.5	20
		Year 1	1	Generator (80 kW)	Diesel	1	1	152	24
		Year 1	1	Light truck - Forman	Gasoline	1	1	290	20
		Year 1	1	Light truck - Crew	Gasoline	1	2	290	20
		Year 1	1	No Equipment - Crew	-	0.7	-	-	20

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Miscellaneous Activities	Miscellaneous Activities	Year 2	12	Medium excavator	Diesel	0.5	1	172	10
		Year 2	12	Loader	Diesel	0.5	1	298	10
		Year 2	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 2	12	Light truck - Crew	Gasoline	1	1	290	10
Cofferdam	Construct Cofferdam	Year 2	1	Long-reach excavator	Diesel	0.8	1	424	20
		Year 2	1	Track drill rig	Diesel	0.3	1	201	20
		Year 2	1	Crane 150t	Diesel	0.3	1	300	20
		Year 2	1	Vibratory sheetpile driver	Diesel	0.3	1	654	20
		Year 2	1	Welder	Diesel	0.3	1	66	20
		Year 2	1	Concrete vibrator	Gasoline	0.3	2	6.5	20
		Year 2	1	Generator (80 kW)	Diesel	1	1	152	20
		Year 2	1	Concrete pump truck	Diesel	0.3	1	500	20
		Year 2	1	Light truck - Forman	Gasoline	1	1	290	20
		Year 2	1	Light truck - Crew	Gasoline	1	1	290	20
Bypass Pump System and Extension Pipe	Construct bypass pump system and diversion extension pipe	Year 2	2.5	Medium excavator	Diesel	1	1	273	10
		Year 2	2.5	Loader	Diesel	0.3	1	298	10
		Year 2	2.5	Vibratory plate	Diesel	0.3	1	15.7	10
		Year 2	2.5	Tamper	Gasoline	0.3	1	3.5	10
		Year 2	2.5	Welder	Diesel	0.5	1	66	10
		Year 2	2.5	Pump	Diesel	1	1	17	10
		Year 2	2.5	Generator (80 kW)	Diesel	1	1	152	10
		Year 2	2.5	Articulated dump truck	Diesel	0.5	1	496	10
		Year 2	2.5	Light truck - Forman	Gasoline	1	1	290	10
		Year 2	2.5	Light truck - Crew	Gasoline	1	1	290	10
Bypass Pump System	Conveying bypass flows to the Stage 1 Diversion Systems	Year 2	7	15 cfs capacity pump	Diesel	1	2	900	24
		Year 2	7	Backup 15 cfs capacity pump	Diesel	0	2	900	24
		Year 2	7	Site generator (2,000 kW)	Diesel	0	1	2700	24
HLOW	Excavate downstream portal	Year 2	4	Large excavator	Diesel	0.9	1	410	10
		Year 2	4	Track drill rig	Diesel	0.7	1	201	10
		Year 2	4	Compressor	Diesel	0.7	1	173	10
		Year 2	4	Loader	Diesel	0.7	1	298	10
		Year 2	4	Manlift	Diesel	0.7	1	67	10
		Year 2	4	Pump	Diesel	1	1	17	10
		Year 2	4	Generator (80 kW)	Diesel	1	1	152	10
		Year 2	4	Articulated dump truck	Diesel	0.9	2	496	10
		Year 2	4	Light truck - Forman	Gasoline	1	1	290	10
		Year 2	4	Light truck - Crew	Gasoline	1	1	290	10
Water Treatment System	Installation and operating the Water Treatment System	Year 2	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 2	12	Light truck - Crew	Gasoline	1	1	290	10
Dam	Stage 1a excavation (incl. work at stockpile areas & reservoir disposal)	Year 2	6	Large excavator	Diesel	1	1	810	20
		Year 2	6	Large excavator	Diesel	1	1	410	20
		Year 2	6	Medium excavator	Diesel	1	2	273	20
		Year 2	6	Motor grader	Diesel	1	1	290	20
		Year 2	6	Loader	Diesel	1	2	298	20
		Year 2	6	Bulldozer	Diesel	1	1	722	20
		Year 2	6	Bulldozer w/discs	Diesel	1	3	354	20
		Year 2	6	Bulldozer	Diesel	1	4	354	20
		Year 2	6	Bulldozer	Diesel	1	2	215	20
		Year 2	6	Grizzly to screen transition	Diesel	1	1	200	20
		Year 2	6	Generator (80 kW)	Diesel	1	1	152	20
		Year 2	6	Large rigid-body dump truck	Diesel	1	6	719	20
		Year 2	6	Articulated dump truck	Diesel	1	9	496	20
		Year 2	6	Water truck	Diesel	1	5	330	20
		Year 2	6	Pump for water trucks	Diesel	1	1	74	10
		Year 2	6	Light plant for night work	Diesel	0.5	14	25	20
		Year 2	6	Light truck - Forman	Gasoline	1	5	290	20
		Year 2	6	Light truck - Crew	Gasoline	1	2	290	20
LLOW	Tunnel excavation	Year 2	2	Compressor	Diesel	0.7	1	173	20
		Year 2	2	Bobcat	Diesel	0.7	1	68	20
		Year 2	2	Loader	Diesel	0.7	1	298	20
		Year 2	2	Telehandler	Diesel	0.7	1	110	20
		Year 2	2	Pump	Diesel	1	1	17	24
		Year 2	2	Ventilation fan	Electrical	1	1	-	24
		Year 2	2	Road-header	Electrical	0.7	1	-	20
		Year 2	2	Scooptrams	Diesel	0.7	1	250	20
		Year 2	2	Generator (80 kW)	Diesel	1	1	152	24
		Year 2	2	Articulated dump truck	Diesel	0.7	1	496	20
		Year 2	2	Light truck - Forman	Gasoline	1	1	290	20
		Year 2	2	Light truck - Crew	Gasoline	1	1	290	20
		Year 2	2	No Equipment - Crew	-	1	-	-	20
	Tunnel lining	Year 2	1.5	Concrete pump truck	Diesel	0.7	1	500	20
		Year 2	1.5	Compressor	Diesel	0.7	1	173	20
		Year 2	1.5	Bobcat	Diesel	0.7	1	68	20
		Year 2	1.5	Loader	Diesel	0.5	1	298	20
		Year 2	1.5	Telehandler	Diesel	0.7	1	110	20
		Year 2	1.5	Pump	Diesel	1	1	17	24
		Year 2	1.5	Ventilation fan	Electrical	1	1	-	20
		Year 2	1.5	Welder	Diesel	0.7	1	66	20
		Year 2	1.5	Concrete vibrator	Gasoline	0.7	2	6.5	20
		Year 2	1.5	Generator (80 kW)	Diesel	1	1	152	24
		Year 2	1.5	Light truck - Forman	Gasoline	1	1	290	20
		Year 2	1.5	Light truck - Crew	Gasoline	1	2	290	20

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Diversion Intake Structure	Construction of intake structure following LLOT lining	Year 2	2	Concrete pump truck	Diesel	0.7	1	500	10
		Year 2	2	Compressor	Diesel	0.7	1	173	10
		Year 2	2	Bobcat	Diesel	0.7	1	68	10
		Year 2	2	Loader	Diesel	0.7	1	298	10
		Year 2	2	Manlift	Diesel	0.7	1	67	10
		Year 2	2	Crane 150t	Diesel	0.7	1	300	10
		Year 2	2	Welder	Diesel	0.7	1	66	10
		Year 2	2	Concrete vibrator	Gasoline	0.7	2	6.5	10
		Year 2	2	Generator (80 kW)	Diesel	1	1	152	10
		Year 2	2	Light truck - Forman	Gasoline	1	1	290	10
		Year 2	2	Light truck - Crew	Gasoline	1	1	290	10
Year 2 Demolition	Demolish accl bld, inst., dam crest paving, exst intake&outlet struct	Year 2	3.5	Medium excavator	Diesel	0.7	2	273	10
		Year 2	3.5	Bulldozer	Diesel	0.5	1	354	10
		Year 2	3.5	Loader	Diesel	1	1	298	10
		Year 2	3.5	Compressor	Diesel	0.7	2	173	10
		Year 2	3.5	Jackhammer	gasoline	0.7	2	2.4	10
		Year 2	3.5	Generator (80 kW)	Diesel	1	1	152	10
		Year 2	3.5	Water truck	Diesel	0.7	1	330	10
		Year 2	3.5	Light truck - Forman	Gasoline	1	1	290	10
		Year 2	3.5	Light truck - Crew	Gasoline	1	1	290	10
Miscellaneous Activities	Miscellaneous Activities	Year 3	12	Medium excavator	Diesel	0.5	1	172	10
		Year 3	12	Loader	Diesel	0.5	1	298	10
		Year 3	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	12	Light truck - Crew	Gasoline	1	1	290	10
Dam	Stage 1b excavation (incl. work at stockpile areas & reservoir disposal)	Year 3	7	Large excavator	Diesel	1	1	810	20
		Year 3	7	Large excavator	Diesel	1	1	410	20
		Year 3	7	Medium excavator	Diesel	1	2	273	20
		Year 3	7	Motor grader	Diesel	1	1	290	20
		Year 3	7	Loader	Diesel	1	2	298	20
		Year 3	7	Bulldozer	Diesel	1	1	722	20
		Year 3	2	Bulldozer w/discs	Diesel	1	2	354	20
		Year 3	7	Bulldozer	Diesel	1	4	354	20
		Year 3	7	Bulldozer	Diesel	1	2	215	20
		Year 3	-	Grizzly to screen transition	Diesel	-	1	200	20
		Year 3	7	Generator (80 kW)	Diesel	1	1	152	20
		Year 3	7	Pump	Diesel	0.5	2	17	24
		Year 3	7	Large rigid-body dump truck	Diesel	1	6	719	20
		Year 3	7	Articulated dump truck	Diesel	1	6	496	20
		Year 3	2	Padfoot roller	Diesel	1	2	174	20
		Year 3	2	Tamping foot roller	Diesel	1	1	405	20
		Year 3	7	Water truck	Diesel	1	5	330	20
		Year 3	7	Pump for water trucks	Diesel	1	1	74	10
		Year 3	7	Light plant for night work	Diesel	0.5	9	25	20
		Year 3	7	Light truck - Forman	Gasoline	1	4	290	20
		Year 3	7	Light truck - Crew	Gasoline	1	2	290	20
Tie-back Wall at Cochrane Road	Construction of the tie-back wall at Cochrane Road	Year 3	2.5	Medium excavator	Diesel	0.5	2	410	10
		Year 3	2.5	Track drill rig	Diesel	0.5	2	201	10
		Year 3	2.5	Compressor	Diesel	0.5	1	173	10
		Year 3	2.5	Shotcrete batch plant	-	0.5	-	-	10
		Year 3	2.5	Concrete pump truck	Diesel	0.5	1	500	10
		Year 3	2.5	Manlift	Diesel	0.5	1	67	10
		Year 3	2.5	Generator (80 kW)	Diesel	1	1	152	10
		Year 3	2.5	Articulated dump truck	-	0.5	-	-	10
		Year 3	2.5	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	2.5	Light truck - Crew	Gasoline	1	1	290	10
Spillway	Demolish existing spillway	Year 3	9	Excavator-mounted hoe-ram	Diesel	0.5	1	273	10
		Year 3	9	Medium excavator	Diesel	0.9	1	273	10
		Year 3	9	Loader	Diesel	0.5	1	298	10
		Year 3	9	Compressor	Diesel	0.9	2	173	10
		Year 3	9	Jackhammer	gasoline	0.9	2	2.4	10
		Year 3	9	Generator (80 kW)	Diesel	0.9	1	152	10
		Year 3	9	Water truck	Diesel	0.9	1	330	10
		Year 3	9	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	9	Light truck - Crew	Gasoline	1	1	290	10
	Excavation and foundation preparation	Year 3	3	Articulated dump truck	Diesel	0.25	1	496	10
		Year 3	3	Medium excavator	Diesel	0.7	1	273	10
		Year 3	3	Mini excavator	Diesel	0.7	1	45	10
		Year 3	3	Track drill rig	Diesel	0.7	2	201	10
		Year 3	3	Compressor	Diesel	0.7	1	173	10
		Year 3	3	Loader	Diesel	0.7	1	298	10
		Year 3	3	Pump	Diesel	1	1	17	10
		Year 3	3	Generator (80 kW)	Diesel	1	1	152	10
		Year 3	3	Water truck	Diesel	0.5	1	330	10
		Year 3	3	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	3	Light truck - Crew	Gasoline	1	1	290	10

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
HLOW	HLOW and Access Adit portal excavation	Year 3	6	Large excavator	Diesel	0.9	1	410	10
		Year 3	6	Track drill rig	Diesel	0.7	2	201	10
		Year 3	6	Compressor	Diesel	0.7	1	173	10
		Year 3	6	Loader	Diesel	0.7	1	298	10
		Year 3	6	Manlift	Diesel	0.7	1	67	10
		Year 3	6	Pump	Diesel	1	1	17	10
		Year 3	6	Generator (80 kW)	Diesel	1	1	152	10
		Year 3	6	Articulated dump truck	Diesel	0.9	2	496	10
		Year 3	6	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	6	Light truck - Crew	Gasoline	1	1	290	10
	HLOW Tunnel and Access Adit Tunnel excavation	Year 3	6	Compressor	Diesel	0.7	1	173	20
		Year 3	6	Bobcat	Diesel	0.7	1	68	20
		Year 3	6	Shotcrete batch plant	Diesel	0.7	1	50	20
		Year 3	6	Loader	Diesel	0.7	1	298	20
		Year 3	6	Telehandler	Diesel	0.7	1	110	20
		Year 3	6	Pump	Diesel	1	1	17	24
		Year 3	6	Ventilation fan	Electrical	1	1	-	24
		Year 3	6	Road-header	Electrical	0.7	1	-	20
		Year 3	6	Robotic shotcrete machine	Diesel	0.7	1	27	20
		Year 3	6	Scooptrams	Diesel	0.7	1	250	20
		Year 3	6	Generator (80 kW)	Diesel	1	1	152	24
		Year 3	6	Articulated dump truck	Diesel	0.7	1	496	20
		Year 3	6	Light truck - Forman	Gasoline	1	1	290	20
		Year 3	6	Light truck - Crew	Gasoline	1	1	290	20
	HLOW Tunnel and Access Adit lining	Year 3	5	Concrete pump truck	Diesel	0.7	1	500	20
		Year 3	5	Compressor	Diesel	0.7	1	173	20
		Year 3	5	Bobcat	Diesel	0.7	1	68	20
		Year 3	5	Loader	Diesel	0.5	1	298	20
		Year 3	5	Telehandler	Diesel	0.7	1	110	20
		Year 3	5	Pump	Diesel	1	1	17	24
		Year 3	5	Ventilation fan	Electrical	1	1	-	20
		Year 3	5	Welder	Diesel	0.7	1	66	20
		Year 3	5	Concrete vibrator	Gasoline	0.7	2	6.5	20
		Year 3	5	Generator (80 kW)	Diesel	1	1	152	24
		Year 3	5	Light truck - Forman	Gasoline	1	1	290	20
		Year 3	5	Light truck - Crew	Gasoline	1	2	290	20
	Construction of intake structure, concrete encasement	Year 3	4	Concrete pump truck	Diesel	0.7	1	500	10
		Year 3	4	Compressor	Diesel	0.7	1	173	10
		Year 3	4	Bobcat	Diesel	0.7	1	68	10
		Year 3	4	Loader	Diesel	0.7	1	298	10
		Year 3	4	Manlift	Diesel	0.7	1	67	10
		Year 3	4	Crane 150t	Diesel	0.7	1	300	10
		Year 3	4	Welder	Diesel	0.7	1	66	10
		Year 3	4	Concrete vibrator	Gasoline	0.7	2	6.5	10
		Year 3	4	Generator (80 kW)	Diesel	1	1	152	10
		Year 3	4	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	4	Light truck - Crew	Gasoline	1	2	290	10
	Gate Shaft excavation	Year 3	2	Crane 150t	Diesel	0.7	1	300	20
		Year 3	2	Small backhoe	Diesel	0.7	1	70	20
		Year 3	2	Jacklegs	Air	0.7	2	-	20
		Year 3	2	Compressor	Diesel	0.7	1	173	20
		Year 3	2	Shotcrete batch plant	Diesel	0.7	1	75	20
		Year 3	2	Loader	Diesel	0.7	1	298	20
		Year 3	2	Telehandler	Diesel	0.7	1	110	20
		Year 3	2	Pump	Diesel	1	1	17	24
		Year 3	2	Ventilation fan	Electrical	1	1	-	24
		Year 3	2	Generator (80 kW)	Diesel	1	1	152	24
		Year 3	2	Articulated dump truck	Diesel	0.7	1	496	20
		Year 3	2	Light truck - Forman	Gasoline	1	1	290	20
		Year 3	2	Light truck - Crew	Gasoline	1	1	290	20
		Year 3	2	No Equipment - Crew	-	1	-	-	20
	Gate Shaft lining	Year 3	2.5	Concrete pump truck	Diesel	0.7	1	500	10
		Year 3	2.5	Crane 150t	Diesel	0.7	1	300	10
		Year 3	2.5	Compressor	Diesel	0.7	1	173	10
		Year 3	2.5	Loader	Diesel	0.7	1	298	10
		Year 3	2.5	Manlift	Diesel	0.7	1	67	10
		Year 3	2.5	Pump	Diesel	0.5	1	17	24
		Year 3	2.5	Ventilation fan	Electrical	1	1	-	24
		Year 3	2.5	Welder	Diesel	0.7	1	66	10
		Year 3	2.5	Concrete vibrator	Gasoline	0.7	2	6.5	10
		Year 3	2.5	Generator (80 kW)	Diesel	1	1	152	24
		Year 3	2.5	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	2.5	Light truck - Crew	Gasoline	1	1	290	10
Water Treatment System	Installation and operating the Water Treatment System	Year 3	12	3,000 gpm treatment system	Diesel	1	1	800	24
		Year 3	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 3	12	Light truck - Crew	Gasoline	1	1	290	10
Miscellaneous Activities	Miscellaneous Activities	Year 4	12	Medium excavator	Diesel	0.5	1	172	10
		Year 4	12	Loader	Diesel	0.5	1	298	10
		Year 4	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 4	12	Light truck - Crew	Gasoline	1	1	290	10

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Import Filter and Drain Material	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	Year 4	10	Bulldozer	Diesel	0.5	1	215	10
		Year 4	10	Loader	Diesel	0.5	1	298	10
		Year 4	10	Highway dump truck	Diesel	1	11	500	10
		Year 4	10	Light truck - Forman	Gasoline	1	1	290	10
Dam	Stage 2a excavation (incl. work at stockpile areas & reservoir disposal)	Year 4	3.5	Large excavator	Diesel	1	2	1000	20
		Year 4	3.5	Large excavator	Diesel	1	1	410	20
		Year 4	3.5	Medium excavator	Diesel	1	2	273	20
		Year 4	3.5	Small backhoe	Diesel	1	1	70	20
		Year 4	3.5	Motor grader	Diesel	1	1	290	20
		Year 4	3.5	Loader	Diesel	-	2	298	20
		Year 4	3.5	Bulldozer	Diesel	1	1	722	20
		Year 4	3.5	Bulldozer w/discs	Diesel	1	2	354	20
		Year 4	3.5	Bulldozer	Diesel	1	1	354	20
		Year 4	3.5	Bulldozer	Diesel	1	2	215	20
		Year 4	3.5	Grizzly to screen transition	Diesel	-	1	200	20
		Year 4	3.5	Generator (80 kW)	Diesel	1	1	152	20
		Year 4	3.5	Pump	Diesel	1	2	17	24
		Year 4	3.5	Large rigid-body dump truck	Diesel	1	7	719	20
		Year 4	3.5	Articulated dump truck	Diesel	1	5	496	20
		Year 4	3.5	Water truck	Diesel	1	4	330	20
		Year 4	3.5	Pump for water trucks	Diesel	1	1	74	10
		Year 4	3.5	Light plant for night work	Diesel	0.5	11	25	20
		Year 4	3.5	Light truck - Forman	Gasoline	1	6	290	20
		Year 4	3.5	Light truck - Crew	Gasoline	1	3	290	20
	Stage 2b Fill (incl. work at stockpile areas & reservoir disposal)	Year 4	5.5	Large excavator	Diesel	1	2	1000	20
		Year 4	5.5	Medium excavator	Diesel	1	2	273	20
		Year 4	5.5	Small backhoe	Diesel	1	1	70	20
		Year 4	5.5	Loader	Diesel	1	1	298	20
		Year 4	5.5	Motor grader	Diesel	1	1	290	20
		Year 4	5.5	Bulldozer	Diesel	1	4	722	20
		Year 4	5.5	Bulldozer w/discs	Diesel	1	2	354	20
		Year 4	5.5	Bulldozer	Diesel	1	4	354	20
		Year 4	5.5	Bulldozer	Diesel	1	1	215	20
		Year 4	5.5	Vibratory smooth drum roller	Diesel	1	2	174	20
		Year 4	5.5	Padfoot roller	Diesel	1	2	174	20
		Year 4	5.5	Tamping foot roller	Diesel	1	3	405	20
		Year 4	5.5	Compressor	Diesel	1	1	173	20
		Year 4	5.5	Pump	Diesel	1	2	17	24
		Year 4	5.5	Generator (80 kW)	Diesel	1	1	152	24
		Year 4	5.5	Large rigid-body dump truck	Diesel	1	7	719	20
		Year 4	5.5	Articulated dump truck	Diesel	1	4	496	20
		Year 4	5.5	Water truck	Diesel	1	5	330	20
		Year 4	5.5	Pump for water trucks	Diesel	1	1	74	10
		Year 4	5.5	Light plant for night work	Diesel	0.5	10	25	20
		Year 4	5.5	Light truck - Forman	Gasoline	1	6	290	20
		Year 4	5.5	Light truck - Crew	Gasoline	1	4	290	20
Spillway	Excavation and foundation preparation	Year 4	12	Articulated dump truck	Diesel	0.25	1	496	10
		Year 4	12	Medium excavator	Diesel	0.7	1	273	10
		Year 4	12	Mini excavator	Diesel	0.7	1	45	10
		Year 4	12	Track drill rig	Diesel	0.7	2	201	10
		Year 4	12	Compressor	Diesel	0.7	1	173	10
		Year 4	12	Loader	Diesel	0.7	1	298	10
		Year 4	12	Pump	Diesel	1	2	17	24
		Year 4	12	Generator (80 kW)	Diesel	1	1	152	10
		Year 4	12	Water truck	Diesel	0.5	1	330	10
		Year 4	12	Pump for water trucks	Diesel	1	1	74	10
		Year 4	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 4	12	Light truck - Crew	Gasoline	1	1	290	10
	Construction of spillway structure	Year 4	9	Concrete pump truck	Diesel	0.7	1	500	10
		Year 4	9	Compressor	Diesel	0.7	1	173	10
		Year 4	9	Bobcat	Diesel	0.7	1	68	10
		Year 4	9	Loader	Diesel	0.7	1	298	10
		Year 4	9	Manlift	Diesel	0.7	2	67	10
		Year 4	9	Crane 150t	Diesel	0.7	1	300	10
		Year 4	9	Pump	Diesel	1	2	17	24
		Year 4	9	Welder	Diesel	0.7	2	66	10
		Year 4	9	Concrete vibrator	Gasoline	0.7	4	6.5	10
		Year 4	9	Generator (80 kW)	Diesel	1	1	152	24
		Year 4	9	Light truck - Forman	Gasoline	1	2	290	10
		Year 4	9	Light truck - Crew	Gasoline	1	1	290	10
		Year 4	9	Light truck - Carpenters	Gasoline	1	2	290	10
HLOW	Pipe, mechanical and electrical installation	Year 4	4	Crane 150t	Diesel	0.8	1	300	10
		Year 4	4	Manlift	Diesel	0.8	1	67	10
		Year 4	4	Welder	Diesel	0.8	1	66	10
		Year 4	4	Loader	Diesel	0.8	1	298	10
		Year 4	4	Generator (80 kW)	Diesel	1	1	152	10
		Year 4	4	Light truck - Forman	Gasoline	1	2	290	10
		Year 4	4	Light truck - Crew	Gasoline	1	2	290	10
Water Treatment System	Installation and operating the Water Treatment System	Year 4	12	3,000 gpm treatment system	Diesel	1	1	800	24
		Year 4	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 4	12	Light truck - Crew	Gasoline	1	1	290	10

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Miscellaneous Activities	Miscellaneous Activities	Year 5	12	Medium excavator	Diesel	0.5	1	172	10
		Year 5	12	Loader	Diesel	0.5	1	298	10
		Year 5	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	12	Light truck - Crew	Gasoline	1	1	290	10
Import Filter and Drain Material	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	Year 5	10	Bulldozer	Diesel	0.5	1	215	10
		Year 5	10	Loader	Diesel	0.5	1	298	10
		Year 5	10	Highway dump truck	Diesel	1	9	500	10
		Year 5	10	Light truck - Forman	Gasoline	1	1	290	10
Dam	Stage 3a Fill (incl. work at stockpile areas & reservoir disposal)	Year 5	6	Large excavator	Diesel	1	1	810	20
		Year 5	6	Medium excavator	Diesel	1	1	410	20
		Year 5	6	Medium excavator	Diesel	1	2	273	20
		Year 5	6	Small backhoe	Diesel	1	1	70	20
		Year 5	6	Loader	Diesel	1	1	298	20
		Year 5	6	Motor grader	Diesel	1	1	290	20
		Year 5	6	Bulldozer	Diesel	1	2	722	20
		Year 5	6	Bulldozer w/discs	Diesel	0.5	2	354	20
		Year 5	6	Bulldozer	Diesel	1	3	354	20
		Year 5	6	Bulldozer	Diesel	1	1	215	20
		Year 5	6	Vibratory smooth drum roller	Diesel	1	2	174	20
		Year 5	6	Padfoot roller	Diesel	1	4	174	20
		Year 5	6	Tamping foot roller	Diesel	1	3	405	20
		Year 5	6	Compressor	Diesel	1	1	173	20
		Year 5	6	Pump	Diesel	1	1	17	24
		Year 5	6	Generator (80 kW)	Diesel	1	1	152	24
		Year 5	6	Large rigid-body dump truck	Diesel	1	6	719	20
		Year 5	6	Articulated dump truck	Diesel	1	6	496	20
		Year 5	6	Water truck	Diesel	1	7	330	20
		Year 5	6	Pump for water trucks	Diesel	1	1	74	10
		Year 5	6	Light plant for night work	Diesel	0.5	12	25	20
		Year 5	6	Light truck - Forman	Gasoline	1	8	290	20
		Year 5	6	Light truck - Crew	Gasoline	1	4	290	20
Develop BHBA	Preparation, excavation, blasting, and hauling of material	Year 5	11	Articulated dump truck	Diesel	0.5	2	496	10
		Year 5	11	Large excavator	Diesel	1	1	410	10
		Year 5	11	Bulldozers w/riper	Diesel	1	1	957	10
		Year 5	11	Track drill rig	Diesel	0.2	2	201	10
		Year 5	11	Explosives truck	Diesel	0.2	1	500	10
		Year 5	11	Compressor	Diesel	0.3	2	173	10
		Year 5	11	Loader	Diesel	1	1	298	10
		Year 5	11	Manlift	Diesel	0.3	1	67	10
		Year 5	11	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	11	Light truck - Crew	Gasoline	1	1	290	10
Develop PGBP	Strip sediment, excavate test trenches	Year 5	1.5	Articulated dump truck	Diesel	0.5	2	496	10
		Year 5	1.5	Large excavator	Diesel	1	1	410	10
		Year 5	1.5	Bulldozer	Diesel	1	1	354	10
		Year 5	1.5	Bulldozer w/discs	Diesel	1	4	354	10
		Year 5	1.5	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	1.5	Light truck - Crew	Gasoline	1	-	290	10
Spillway	Construction of spillway structure	Year 5	5	Concrete pump truck	Diesel	0.7	1	500	10
		Year 5	5	Compressor	Diesel	0.7	1	173	10
		Year 5	5	Bobcat	Diesel	0.7	1	68	10
		Year 5	5	Loader	Diesel	0.7	1	298	10
		Year 5	5	Manlift	Diesel	0.7	2	67	10
		Year 5	5	Crane 150t	Diesel	0.7	1	300	10
		Year 5	5	Pump	Diesel	1	1	17	24
		Year 5	5	Welder	Diesel	0.7	2	66	10
		Year 5	5	Concrete vibrator	Gasoline	0.7	4	6.5	10
		Year 5	5	Generator (80 kW)	Diesel	1	1	152	24
		Year 5	5	Light truck - Forman	Gasoline	1	2	290	10
		Year 5	5	Light truck - Crew	Gasoline	1	1	290	10
		Year 5	5	Light truck - Carpenters	Gasoline	1	2	290	10
LLOW - Sloping Intake	Excavate sloping intake structure (upper half)	Year 5	1.5	Large excavator	Diesel	0.9	1	410	10
		Year 5	1.5	Track drill rig	Diesel	0.7	1	201	10
		Year 5	1.5	Compressor	Diesel	0.7	1	173	10
		Year 5	1.5	Loader	Diesel	0.7	1	298	10
		Year 5	1.5	Manlift	Diesel	0.7	1	67	10
		Year 5	1.5	Pump	Diesel	1	2	17	10
		Year 5	1.5	Generator (80 kW)	Diesel	1	1	152	10
		Year 5	1.5	Articulated dump truck	Diesel	0.9	2	496	10
		Year 5	1.5	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	1.5	Light truck - Crew	Gasoline	1	1	290	10
	Construction of sloping intake structure (upper half)	Year 5	5	Concrete pump truck	Diesel	0.7	1	500	10
		Year 5	5	Compressor	Diesel	0.7	1	173	10
		Year 5	5	Bobcat	Diesel	0.7	1	68	10
		Year 5	5	Loader	Diesel	0.7	1	298	10
		Year 5	5	Manlift	Diesel	0.7	1	67	10
		Year 5	5	Crane 150t	Diesel	0.7	1	300	10
		Year 5	5	Welder	Diesel	0.7	1	66	10
		Year 5	5	Concrete vibrator	Gasoline	0.7	2	6.5	10
		Year 5	5	Generator (80 kW)	Diesel	1	1	152	10
		Year 5	5	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	5	Light truck - Crew	Gasoline	1	1	290	10
		Year 5	5	Light truck - Carpenters	Gasoline	0.8	2	290	10

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
LLOW - CIP Tunnel/Outlet Structure	Construction of CIP tunnel and outlet structure	Year 5	6	Concrete pump truck	Diesel	0.7	1	500	10
		Year 5	6	Compressor	Diesel	0.7	1	173	10
		Year 5	6	Bobcat	Diesel	0.7	1	68	10
		Year 5	6	Loader	Diesel	0.7	1	298	10
		Year 5	6	Manlift	Diesel	0.7	2	67	10
		Year 5	6	Crane 150t	Diesel	0.7	1	300	10
		Year 5	6	Pump	Diesel	1	1	17	24
		Year 5	6	Welder	Diesel	0.7	2	66	10
		Year 5	6	Concrete vibrator	Gasoline	0.7	4	6.5	10
		Year 5	6	Generator (80 kW)	Diesel	1	1	152	24
		Year 5	6	Light truck - Forman	Gasoline	1	2	290	10
		Year 5	6	Light truck - Crew	Gasoline	1	1	290	10
		Year 5	6	Light truck - Carpenters	Gasoline	1	2	290	10
	Excavate downstream portal trench and outlet structure foundation	Year 5	3	Large excavator	Diesel	0.9	1	410	10
		Year 5	3	Track drill rig	Diesel	0.5	2	201	10
		Year 5	3	Compressor	Diesel	0.5	1	173	10
		Year 5	3	Loader	Diesel	0.5	1	298	10
		Year 5	3	Manlift	Diesel	0.5	1	67	10
		Year 5	3	Pump	Diesel	1	1	17	24
		Year 5	3	Generator (80 kW)	Diesel	1	1	152	24
		Year 5	3	Articulated dump truck	Diesel	0.9	2	496	10
		Year 5	3	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	3	Light truck - Crew	Gasoline	1	1	290	10
LLOW - Outlet Structure	Pipe, mechanical and electrical installation	Year 5	2.5	Crane 150t	Diesel	0.8	1	300	10
		Year 5	2.5	Telehandler	Diesel	0.8	1	110	10
		Year 5	2.5	Welder	Diesel	0.8	1	66	10
		Year 5	2.5	Loader	Diesel	0.8	1	298	10
		Year 5	2.5	Generator (80 kW)	Diesel	1	1	152	10
		Year 5	2.5	Light truck - Forman	Gasoline	1	2	290	10
		Year 5	2.5	Light truck - Crew	Gasoline	1	2	290	10
Main Avenue Pipeline, Anderson Force Main	Connection of the Pipeline and Force Main to the LLOW outlet structure	Year 5	1.5	Medium excavator	Diesel	0.7	1	273	10
		Year 5	1.5	Loader	Diesel		1	298	10
		Year 5	1.5	Vibratory smooth drum roller	Diesel	0.3	1	174	10
		Year 5	1.5	Vibratory plate	Diesel	0.3	1	15.7	10
		Year 5	1.5	Tamper	Gasoline	0.3	1	3.5	10
		Year 5	1.5	Welder	Diesel	0.5	1	66	10
		Year 5	1.5	Pump	Diesel	1	1	17	10
		Year 5	1.5	Generator (80 kW)	Diesel	1	1	152	10
		Year 5	1.5	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	1.5	Light truck - Crew	Gasoline	1	1	290	10
Water Treatment System	Installation and operating the Water Treatment System	Year 5	12	3,000 gpm treatment system	Diesel	1	1	800	24
		Year 5	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 5	12	Light truck - Crew	Gasoline	1	1	290	10
Miscellaneous Activities	Miscellaneous Activities	Year 6	12	Medium excavator	Diesel	0.5	1	172	10
		Year 6	12	Loader	Diesel	0.5	1	298	10
		Year 6	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	12	Light truck - Crew	Gasoline	1	1	290	10
Import Filter and Drain Material	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	Year 6	10	Bulldozer	Diesel	0.5	1	215	10
		Year 6	10	Loader	Diesel	0.5	1	298	10
		Year 6	10	Highway dump truck	Diesel	1	12	500	10
		Year 6	10	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	10	No Equipment - Crew	-	1	-	-	10
Bypass Pump System	Construct bypass pump system	Year 6	1	Medium excavator	Diesel	1	1	273	10
		Year 6	1	Loader	Diesel	0.3	1	298	10
		Year 6	1	Vibratory plate	Diesel	0.3	1	15.7	10
		Year 6	1	Tamper	Gasoline	0.3	1	3.5	10
		Year 6	1	Welder	Diesel	0.5	1	66	10
		Year 6	1	Pump	Diesel	1	1	17	10
		Year 6	1	Generator (80 kW)	Diesel	1	1	152	10
		Year 6	1	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	1	Light truck - Crew	Gasoline	1	1	290	10
	Conveying bypass flows to the Stage 1 Diversion Systems	Year 6	7	15 cfs capacity pump	Diesel	1	2	900	24
		Year 6	7	Backup 15 cfs capacity pump	Diesel	0	2	900	24
		Year 6	7	Site generator (2,000 kW)	Diesel	0	1	2700	24
Dam	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6	6	Large excavator	Diesel	1	1	810	20
		Year 6	6	Medium excavator	Diesel	1	1	410	20
		Year 6	6	Medium excavator	Diesel	1	2	273	20
		Year 6	6	Small backhoe	Diesel	1	2	70	20
		Year 6	6	Loader	Diesel	1	1	298	20
		Year 6	6	Motor grader	Diesel	1	1	290	20
		Year 6	6	Bulldozer	Diesel	1	1	722	20
		Year 6	6	Bulldozer w/discs	Diesel	1	2	354	20
		Year 6	6	Bulldozer	Diesel	1	2	354	20
		Year 6	6	Bulldozer	Diesel	1	1	215	20
		Year 6	6	Vibratory smooth drum roller	Diesel	1	2	174	20
		Year 6	6	Padfoot roller	Diesel	1	4	174	20
		Year 6	6	Tamping foot roller	Diesel	1	4	405	20
		Year 6	6	Compressor	Diesel	1	2	173	20
		Year 6	6	Generator (80 kW)	Diesel	1	2	152	20
		Year 6	6	Large rigid-body dump truck	Diesel	1	3	719	20
		Year 6	6	Articulated dump truck	Diesel	1	5	496	20
		Year 6	6	Water truck	Diesel	1	6	330	20
		Year 6	6	Pump for water trucks	Diesel	1	1	74	10
		Year 6	6	Light plant for night work	Diesel	0.5	10	25	20
		Year 6	6	Light truck - Forman	Gasoline	1	6	290	20
		Year 6	6	Light truck - Crew	Gasoline	1	2	290	20

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Develop BHBA	Excavation, blasting, and hauling of material	Year 6	4	Articulated dump truck	Diesel	0.9	2	496	10
		Year 6	4	Large excavator	Diesel	0.9	1	810	10
		Year 6	4	Bulldozers w/riper	Diesel	0.9	1	957	10
		Year 6	4	Loader	Diesel	0.7	1	298	10
		Year 6	4	Track drill rig	Diesel	0.2	2	201	10
		Year 6	4	Explosives truck	Diesel	0.2	1	500	10
		Year 6	4	Compressor	Diesel	0.2	2	173	10
		Year 6	4	Manlift	Diesel	0.2	1	67	10
		Year 6	4	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	4	Light truck - Crew	Gasoline	0.2	1	290	10
Develop PGBP	Excavation, hauling & moisture conditioning	Year 6	4	Articulated dump truck	Diesel	0.7	2	496	10
		Year 6	4	Large excavator	Diesel	1	1	410	10
		Year 6	4	Bulldozer	Diesel	1	4	354	10
		Year 6	4	Bulldozer w/discs	Diesel	1	2	354	10
		Year 6	4	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	4	Light truck - Crew	Gasoline	1	-	290	10
LLOW - Sloping Intake	Excavate sloping intake structure (lower half)	Year 6	1	Large excavator	Diesel	0.9	1	410	10
		Year 6	1	Track drill rig	Diesel	0.7	1	201	10
		Year 6	1	Compressor	Diesel	0.7	1	173	10
		Year 6	1	Loader	Diesel	0.7	1	298	10
		Year 6	1	Manlift	Diesel	0.7	1	67	10
		Year 6	1	Pump	Diesel	1	1	17	24
		Year 6	1	Generator (80 kW)	Diesel	1	1	152	24
		Year 6	1	Articulated dump truck	Diesel	0.9	2	496	10
		Year 6	1	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	1	Light truck - Crew	Gasoline	1	1	290	10
	Construction of sloping intake structure (lower half)	Year 6	3	Concrete pump truck	Diesel	0.7	1	500	10
		Year 6	3	Compressor	Diesel	0.7	1	173	10
		Year 6	3	Bobcat	Diesel	0.7	1	68	10
		Year 6	3	Loader	Diesel	0.7	1	298	10
		Year 6	3	Manlift	Diesel	0.7	1	67	10
		Year 6	3	Crane 150t	Diesel	0.7	1	300	10
		Year 6	3	Welder	Diesel	0.7	1	66	10
		Year 6	3	Concrete vibrator	Gasoline	0.7	2	6.5	10
		Year 6	3	Pump	Diesel	1	1	17	24
		Year 6	3	Generator (80 kW)	Diesel	1	1	152	24
		Year 6	3	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	3	Light truck - Crew	Gasoline	1	1	290	10
		Year 6	3	Light truck - Carpenters	Gasoline	0.8	2	290	10
	Pipe, mechanical and electrical installation	Year 6	2	Crane 150t	Diesel	0.8	1	300	10
		Year 6	2	Manlift	Diesel	0.8	1	67	10
		Year 6	2	Welder	Diesel	0.8	1	66	10
		Year 6	2	Loader	Diesel	0.8	1	298	10
		Year 6	2	Generator (80 kW)	Diesel	1	1	152	10
		Year 6	2	Light truck - Forman	Gasoline	1	2	290	10
		Year 6	2	Light truck - Crew	Gasoline	1	2	290	10
LLOW-LLOT	Demolish diversion intake structure	Year 6	1	Excavator-mounted hoe-ram	Diesel	0.5	1	273	10
		Year 6	1	Medium excavator	Diesel	0.9	1	273	10
		Year 6	1	Loader	Diesel	0.5	1	298	10
		Year 6	1	Compressor	Diesel	0.9	2	173	10
		Year 6	1	Jackhammer	gasoline	0.9	2	2.4	10
		Year 6	1	Generator (80 kW)	Diesel	0.9	1	152	10
		Year 6	1	Water truck	Diesel	0.9	1	330	10
		Year 6	1	Pump for water trucks	Diesel	1	1	74	10
		Year 6	1	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	1	Light truck - Crew	Gasoline	1	1	290	10
LLOW - LLOT	Construct pipe supports, lining at Diversion Tunnel/LLOT intersection	Year 6	2	Concrete pump truck	Diesel	0.7	1	500	10
		Year 6	2	Compressor	Diesel	0.7	1	173	10
		Year 6	2	Bobcat	Diesel	0.7	1	68	10
		Year 6	2	Loader	Diesel	0.5	1	298	10
		Year 6	2	Telehandler	Diesel	0.7	1	110	10
		Year 6	2	Jackhammer	Air	0.25	2	-	10
		Year 6	2	Pump	Diesel	1	1	17	10
		Year 6	2	Ventilation fan	Electrical	1	1	-	10
		Year 6	2	Welder	Diesel	0.7	1	66	10
		Year 6	2	Concrete vibrator	Gasoline	0.7	2	6.5	10
		Year 6	2	Generator (80 kW)	Diesel	1	1	152	10
		Year 6	2	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	2	Light truck - Crew	Gasoline	1	2	290	10
LLOW - LLOT/CIP Tunnel	Pipe, mechanical and electrical installation	Year 6	4	Crane 150t	Diesel	0.8	1	300	10
		Year 6	4	Telehandler	Diesel	0.8	1	110	10
		Year 6	4	Welder	Diesel	0.8	1	66	10
		Year 6	4	Loader	Diesel	0.8	1	298	10
		Year 6	4	Ventilation fan	Electrical	1	1	-	10
		Year 6	4	Generator (80 kW)	Diesel	1	1	152	10
		Year 6	4	Light truck - Forman	Gasoline	1	2	290	10
		Year 6	4	Light truck - Crew	Gasoline	1	2	290	10
Unlined Spillway Channel	Excavation and foundation preparation	Year 6	3	Large excavator	Diesel	0.9	1	410	10
		Year 6	3	Track drill rig	Diesel	0.7	2	201	10
		Year 6	3	Compressor	Diesel	0.7	1	173	10
		Year 6	3	Loader	Diesel	0.7	1	298	10
		Year 6	3	Pump	Diesel	1	1	17	24
		Year 6	3	Generator (80 kW)	Diesel	1	1	152	24
		Year 6	3	Articulated dump truck	Diesel	0.9	3	496	10
		Year 6	3	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	3	Light truck - Crew	Gasoline	1	1	290	10

Table 3
Construction Equipment List
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Project Component	Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Water Treatment System	Installation and operating the Water Treatment System	Year 6	12	3,000 gpm treatment system	Diesel	1	1	800	24
		Year 6	12	Light truck - Forman	Gasoline	1	1	290	10
		Year 6	12	Light truck - Crew	Gasoline	1	1	290	10
Miscellaneous Activities	Miscellaneous Activities	Year 7	9	Medium excavator	Diesel	0.5	1	172	10
		Year 7	9	Loader	Diesel	0.5	1	298	10
		Year 7	9	Light truck - Forman	Gasoline	1	1	290	10
		Year 7	9	Light truck - Crew	Gasoline	1	1	290	10
Unlined Spillway Channel	Construction of concrete lined channel	Year 7	9	Concrete pump truck	Diesel	0.7	1	500	10
		Year 7	9	Compressor	Diesel	0.7	1	173	10
		Year 7	9	Bobcat	Diesel	0.7	1	68	10
		Year 7	9	Loader	Diesel	0.7	1	298	10
		Year 7	9	Manlift	Diesel	0.7	1	67	10
		Year 7	9	Crane 150t	Diesel	0.7	1	300	10
		Year 7	9	Welder	Diesel	0.7	1	66	10
		Year 7	9	Concrete vibrator	Gasoline	0.7	2	6.5	10
		Year 7	9	Pump	Diesel	1	1	17	24
		Year 7	9	Generator (80 kW)	Diesel	1	1	152	24
		Year 7	9	Light truck - Forman	Gasoline	1	2	290	10
		Year 7	9	Light truck - Crew	Gasoline	1	1	290	10
		Year 7	9	Light truck - Carpenters	Gasoline	0.8	2	290	10
Permanent Access Roads	Restoring parking areas and construction of permanent access roads	Year 7	9	Concrete pump truck	Diesel	0.25	1	500	10
		Year 7	9	Articulated dump truck	Diesel	0.7	2	496	10
		Year 7	9	Medium excavator	Diesel	0.7	1	273	10
		Year 7	9	Bulldozer	Diesel	0.7	1	354	10
		Year 7	3	Track drill rig	Diesel	0.7	1	201	10
		Year 7	3	Compressor	Diesel	0.7	1	173	10
		Year 7	9	Loader	Diesel	1	1	298	10
		Year 7	3	Manlift	Diesel	0.7	1	67	10
		Year 7	9	Motor grader	Diesel	0.7	1	290	10
		Year 7	9	Padfoot roller	Diesel	0.3	1	174	10
		Year 7	9	Tamping foot roller	Diesel	0.3	1	405	10
		Year 7	9	Vibratory smooth drum roller	Diesel	0.3	1	174	10
		Year 7	9	Asphalt paving machine	Diesel	0.7	1	225	10
		Year 7	9	Asphalt compactor	Diesel	0.7	1	100	10
		Year 7	9	Water truck	Diesel	0.5	1	330	10
		Year 7	9	Pump for water trucks	Diesel	1	1	74	10
		Year 7	9	Concrete vibrator	Gasoline	0.5	2	6.5	10
		Year 7	9	Generator (80 kW)	Diesel	1	1	152	10
		Year 7	9	Light truck - Forman	Gasoline	1	2	290	10
		Year 7	9	Light truck - Crew	Gasoline	1	2	290	10
Restoration	Allowance	Year 7	9	Articulated dump truck	Diesel	0.5	2	496	10
		Year 7	9	Medium excavator	Diesel	1	1	273	10
		Year 7	9	Bulldozer	Diesel	0.5	1	354	10
		Year 7	9	Loader	Diesel	1	1	298	10
		Year 7	9	Water truck	Diesel	0.5	1	330	10
		Year 7	9	Generator (80 kW)	Diesel	1	1	152	10
		Year 7	9	Light truck - Forman	Gasoline	1	1	290	10
		Year 7	9	Light truck - Crew	Gasoline	1	1	290	10
Dam Excavation[1]	Stage 1a	Year 2	12	Site generator (2,000 kW)	Diesel	0.75	1	2700	24
	Stage 1b	Year 3	12	Site generator (2,000 kW)	Diesel	0.75	1	2700	24
Excavation and Fill[1]	Stage 2a	Year 4	12	Site generator (2,000 kW)	Diesel	0.75	1	2700	24
	Stage 2b	Year 4	12	Site generator (2,000 kW)	Diesel	0.75	1	2700	24
Dam Fill[1]	Stage 3a	Year 5	12	Site generator (2,000 kW)	Diesel	0.75	1	2700	24
	Stage 3b	Year 6	12	Site generator (2,000 kW)	Diesel	0.75	1	2700	24

Notes:
1. Use of the construction site generator was provided by the Valley Water from years 2 through 6. The generator will be operated 24/7, and will not be operational during winter months.

Abbreviations:
cfs - cubic foot per second
gpm - gallons per minute
HP - horsepower
kW - kilowatt
t - ton

Table 4-a
Paved Road Fugitive Dust Emission Factors
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Paved Road Dust Equation[1]

E [lb/VMT] = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

Parameter	Value
k = particle size multiplier for PM_{10} [lb/VMT]	0.0022
sL = roadway silt loading [grams per square meter - g/m^2]	0.032
W = average weight of vehicles traveling the road [tons]	2.4
P = number of “wet” days in Morgan Hill with at least 0.01 in of precipitation during the annual averaging period	32.8
N = number of days in the averaging period	365
PM_{10} speciation profile fraction	0.46
$PM_{2.5}$ speciation profile fraction	0.069
E = Fugitive PM_{10} Emission Factor [g/VMT]	**0.10**
E = Fugitive $PM_{2.5}$ Emission Factor [g/VMT][2]	**0.016**
E = Fugitive PM_{10} Emission Factor with Street Sweeping Reduction [g/VMT][3]	**0.077**
E = Fugitive $PM_{2.5}$ Emission Factor with Street Sweeping Reduction [g/VMT][3]	**0.012**

Notes:

1. Road dust equation is based on the U.S. EPA AP-42 Chapter 13.2.1: Paved Roads. Parameter values were obtained from the 2016 California ARB Paved Entrained Road Dust methodology using major roadways silt loading, annual Morgan Hill "wet" days, and statewide average vehicle fleet weight.

2. $PM_{2.5}$ emission factor was scaled from the PM_{10} value based on the ARB's guidance.

3. A 26% reduction in the PM_{10} emission factor was taken for street sweeping of arterial/collector streets, based on SCAQMD's Fugitive Dust Table XI-C. The $PM_{2.5}$ emissions factor was scaled from the PM_{10} value based on the ARB's guidance.

Abbreviations:

ARB - Air Resources Board
g - grams
lb - pounds
m^2 - square meters
mph - miles per hour
PM - particulate matter
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
SCAQMD - South Coast Air Quality Management District
USEPA - United States Environmental Protection Agency
VMT - vehicle miles traveled

References:

USEPA. 2011. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 13.2.1, Paved Roads. Available online at: https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf

California ARB. 2018. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf

SCAQMD. 2007. Table XI-C Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 4-b
Unpaved Road Fugitive Dust Emission Factors
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Unpaved Road Dust Equation[1]
E [lb/VMT] = (k*(s/12)*(S/30)^0.5/(M/0.5)^0.2 - C) * (1-P/365)

Parameter	Value
k = particle size multiplier for PM_{10} [lb/VMT]	1.8
s = surface material silt content (%)	8.5
S = mean vehicle speed (mph)[3]	25
M = surface material moisture content (%)	0.50
C = emission factor for 1980's vehicle fleet exhaust, brake wear & tire wear	4.7E-04
P = number of “wet” days in Morgan Hill with at least 0.01 in of precipitation during the annual averaging period	32.8
N = number of days in the averaging period	365
PM_{10} speciation profile fraction	0.46
$PM_{2.5}$ speciation profile fraction	0.069
Reduction from watering 2x daily	0.55
E = Fugitive PM_{10} Emission Factor at 25 mph [g/VMT]	**1.1**
E = Fugitive $PM_{2.5}$ Emission Factor at 25 mph [g/VMT][2]	**0.16**

Notes:
1. Road dust equation is based on the U.S. EPA AP-42 Chapter 13.2.2: Unpaved Roads. Parameter values were obtained from the 2016 California ARB Paved Entrained Road Dust methodology using major roadways silt loading, annual Morgan Hill "wet" days, and statewide average vehicle fleet weight.
2. $PM_{2.5}$ emission factor was scaled from the PM_{10} value based on the ARB's guidance.
3. All unpaved road haul truck trips assume vehicle speeds of 25 mph.

Abbreviations:
ARB - Air Resources Board
g - grams
lb - pounds
m^2 - square meters
mph - miles per hour
PM - particulate matter
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
SCAQMD - South Coast Air Quality Management District
USEPA - United States Environmental Protection Agency
VMT - vehicle miles traveled

References:

USEPA. 2011. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 13.2.2, Unpaved Roads. Available online at: https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf

California ARB. 2018. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf

SCAQMD. 2007. Table XI-C Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 5-a
Fugitive Dust Emissions from Paved Road Dust
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Year	# Days	Total Trips[1]			Emissions (lb/yr)[2,3]	
		Worker	Vendor	Hauling	PM_{10}	$PM_{2.5}$
Year 1	272	20,400	1,632	4,500	58	8.7
Year 2	325	47,125	1,950	3,500	108	16
Year 3	325	50,375	1,950	7,500	128	19
Year 4	353	47,655	2,118	7,850	124	19
Year 5	325	61,750	1,950	7,850	152	23
Year 6	325	55,250	1,950	13,000	156	23
Year 7	294	48,510	1,764	16,900	156	23

Notes:

1. Construction trip rates were provided by Valley Water for each subphase.
2. Emissions from paved road dust were calculated using the total trips provided by Valley Water, calculated paved road emission factors, and trip lengths provided in Table 7-c.
3. A 26% reduction in the PM_{10} emission factor was taken for street sweeping of arterial/collector streets, based on SCAQMD's Fugitive Dust Table XI-C.

Abbreviations:

lb - pounds
PM - particulate matter
SCAQMD - South Coast Air Quality Management District
yr - year

References:

SCAQMD. 2007. Table XI-C Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Table 5-b
Fugitive Dust Emissions from Unpaved Road Dust
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Year	Trip Route	Route Length (mi)	# Days	Emissions (lb/yr)	
				PM_{10}	$PM_{2.5}$
Year 1	Dam to L	3.2	110	1.7	0.25
	Dam to Staging Area 1	0.66	110	0.070	0.010
	C to K North	2.9	110	1.2	0.19
Year 2	Dam to Staging Area 1	3.2	130	22	3.3
	Dam to C	0.57	130	6.7	1.0
	Dam to Staging Area 1	0.66	130	3.0	0.45
	Dam to K South	2.4	130	23	3.4
	Dam to RDA	0.68	130	2.7	0.40
	C to K North	2.9	130	40	6.0
	C to L	2.7	130	9.2	1.4
	B to RDA	0.76	130	5.7	0.86
Year 3	Dam to H	1.6	165	30	4.5
	Dam to L	3.2	165	14	2.1
	Dam to C	0.57	165	2.1	0.31
	Dam to K North	2.4	165	4.7	0.71
	Dam to K South	2.4	165	13	2.0
	Dam to RDA	0.68	165	8.6	1.3
	Dam to C	0.57	25	2.1	0.31
Year 4	Dam to C	0.57	75	5.5	0.82
	Dam to D	1.6	75	24	3.6
	Dam to RDA	0.68	75	1.1	0.16
	Dam to K North	2.4	75	8.5	1.3
	Dam to K South	0.47	15	0.050	0.0075
	Dam to C	0.57	90	5.8	0.87
	Dam to H	1.6	90	6.4	1.0
	Dam to D	0.68	90	10	1.5
	Dam to K North	2.4	90	8.0	1.2
	Dam to Staging Area 1	2.4	90	10	1.5
Year 5	Dam to H	1.6	150	24	3.6
	Dam to L	3.2	150	47	7.0
	Dam to K North	2.4	150	14	2.1
	Dam to B	0.38	150	3.7	0.56
	Dam to K South	2.4	150	11	1.7
	Dam to K North	2.4	150	11	1.7
	Dam to Staging Area 1	0.47	150	1.3	0.19
	Basalt Hill to Packwood Gravel	0.57	150	2.3	0.34
	Basalt Hill to RDA	0.95	150	13	1.9
Year 6	Dam to Basalt Hill	0.38	140	11	1.6
	Dam to K South	2.4	140	24	3.6
	Dam to E	0.66	140	2.9	0.44
	Dam to Packwood Gravel	0.95	140	4.8	0.72
	Dam to K North	2.4	140	14	2.1
	Dam to Staging Area 1	0.66	140	2.8	0.42

Table 5-b
Fugitive Dust Emissions from Unpaved Road Dust
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Notes:

1. Route lengths and days of use were provided by Valley Water for each year.
2. All unpaved road haul truck trips assume vehicle speeds of 25 mph.
3. A 55% reduction in the PM emission factor was taken for watering of unpaved roads twice per day, based on SCAQMD's Fugitive Dust Table XI-D.

Abbreviations:

lb - pounds
mi - miles
mph - miles per hour
PM - particulate matter
SCAQMD - South Coast Air Quality Management District
yr - year

References:

SCAQMD. 2007. Table XI-D Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Table 5-c
Fugitive Dust Emissions from Grading Activity
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year	Construction Activity	Total Work Days	Maximum Area Disturbed[1]	VMT[2]	Uncontrolled PM_{10} Emission Factor[3]	Uncontrolled $PM_{2.5}$ Emission Factor[4]	Emissions[5] PM_{10}		$PM_{2.5}$	
		Days	acre/day	mile/day	lb/VMT	lb/VMT	lb/day	lb/yr	lb/day	lb/yr
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	118	1.3	0.86	1.5	0.17	0.52	61	0.056	6.6
Year 2	Stage 1a excavation (incl. work at stockpile areas & reservoir disposal)	168	3.1	2.1	1.5	0.17	1.3	217	0.14	23
Year 2	Demolish accl bld, inst., dam crest paving, exst intake&outlet struct	103	0.63	0.43	1.5	0.17	0.26	27	0.028	2.9
Year 3	Stage 1b excavation (incl. work at stockpile areas & reservoir disposal)	195	3.1	2.1	1.5	0.17	1.3	252	0.14	27
Year 4	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	301	0.63	0.43	1.5	0.17	0.26	78	0.028	8.4
Year 4	Stage 2a excavation (incl. work at stockpile areas & reservoir disposal)	106	3.1	2.1	1.5	0.17	1.3	137	0.14	15
Year 4	Stage 2b Fill (incl. work at stockpile areas & reservoir disposal)	167	3.1	2.1	1.5	0.17	1.3	216	0.14	23
Year 5	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	274	0.63	0.43	1.5	0.17	0.26	71	0.028	7.6
Year 5	Stage 3a Fill (incl. work at stockpile areas & reservoir disposal)	169	3.1	2.1	1.5	0.17	1.3	218	0.14	24
Year 5	Preparation, excavation, blasting, and hauling of material	300	0.63	0.43	1.5	0.17	0.26	78	0.028	8.4
Year 5	Strip sediment, excavate test trenches	47	0.63	0.43	1.5	0.17	0.26	12	0.028	1.3
Year 6	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	274	0.63	0.43	1.5	0.17	0.26	71	0.028	7.6
Year 6	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	168	3.1	2.1	1.5	0.17	1.3	217	0.14	23
Year 6	Excavation, blasting, and hauling of material	116	0.63	0.43	1.5	0.17	0.26	30	0.028	3.2
Year 6	Excavation, hauling & moisture conditioning	116	0.63	0.43	1.5	0.17	0.26	30	0.028	3.2
Year 7	Restoring parking areas and construction of permanent access roads	247	1.3	0.86	1.5	0.17	0.52	128	0.056	14
Year 7	Allowance - scope to be determined	247	0.63	0.43	1.5	0.17	0.26	64	0.028	6.9

Notes:

1. Maximum graded area is based on the number of crawler tractors, graders, rubber tired dozers, and scrapers used for each construction activity, as outlined in CalEEMod® User's Guide, Appendix A, Section 4.3.
2. VMT per day calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   VMT = A_S/W_b x (43,560 sqft/acre)/(5,280 ft/mile), where:
   A_S = A_S, acres graded per day (varies by sub-activity)
   12 = W_b, blade width of grading equipment (CalEEMod® default)
3. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $EF_{PM10} = 0.051 \times (S)^{2.0} \times F_{PM10}$, where:
   7.1 = S, mean vehicle speed (mph) (AP-42 default)
   0.6 = F_{PM10}, PM_{10} scaling factor (AP-42 default)
4. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $EF_{PM2.5} = 0.04 \times (S)^{2.5} \times F_{PM2.5}$, where:
   7.1 = S, mean vehicle speed (mph) (AP-42 default)
   0.031 = $F_{PM2.5}$, $PM_{2.5}$ scaling factor (AP-42 default)
5. Fugitive $PM_{2.5}$ emissions from grading will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
ft - foot
lb - pound
mph - miles per hour
PM - particulate matter
sqft - square foot
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 5-d
Fugitive Dust Emissions from Truck Loading Activity
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Subphase	Haul Trips	Material Loaded	Uncontrolled Emission Factor[1]		Annual Emissions[2]	
			PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	# trips	ton	lb/ton material		ton/yr	ton/yr
Year 1	4,500	90,000	8.93E-05	1.35E-05	1.57E-03	2.4E-04
Year 2 (Stage 1a)	3,500	70,000			1.22E-03	1.8E-04
Year 3 (Stage 1b)	7,500	150,000			2.61E-03	4.0E-04
Year 4 (Stage 2a)	7,850	157,000			2.73E-03	4.1E-04
Year 4 (Stage 2b)	7,850	157,000			2.73E-03	4.1E-04
Year 5 (Stage 3a)	13,000	260,000			4.53E-03	6.9E-04
Year 6 (Stage 3b)	16,900	338,000			5.89E-03	8.9E-04
Year 7	6,500	130,000			2.26E-03	3.4E-04

Notes:

1. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 13.2.4 for aggregate handling. The equation is:

$EF = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$, where the following default values are used:

0.35 = k_{PM10}, PM_{10} particle size multiplier
0.053 = $k_{PM2.5}$, $PM_{2.5}$ particle size multiplier
2.2 = mean wind speed (U), meters per second
4.9 = mean wind speed (U), miles per hour
12 = material moisture content (M), %

2. Fugitive $PM_{2.5}$ emissions from truck loading will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
lb - pound
PM - particulate matter
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 5-e
Fugitive Dust Emissions from Bulldozing Activity
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year	Construction Subphase	Equipment Work Hours[1]	Uncontrolled PM_{10} Emission Factor[2]	Uncontrolled $PM_{2.5}$ Emission Factor[3]	Annual Emissions[4]	
					PM_{10}	$PM_{2.5}$
		hr/day	lb/hr	lb/hr	ton/yr	ton/yr
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	9.0	0.75	0.41	0.16	0.086
Year 2 (Stage 1a)	Stage 1a excavation (incl. work at stockpile areas & reservoir disposal)	80.0			2.0	1.1
Year 2 (Stage 1a)	Demolish accl bld, inst., dam crest paving, exst intake&outlet struct	5.0			0.076	0.042
Year 3 (Stage 1b)	Stage 1b excavation (incl. work at stockpile areas & reservoir disposal)	80.0			2.3	1.3
Year 4	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	5.0			0.22	0.12
Year 4	Stage 2a excavation (incl. work at stockpile areas & reservoir disposal)	80.0			1.2	0.68
Year 4	Stage 2b Fill (incl. work at stockpile areas & reservoir disposal)	80.0			2.0	1.1
Year 5 (Stage 3a)	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	5.0			0.20	0.11
Year 5 (Stage 3a)	Stage 3a Fill (incl. work at stockpile areas & reservoir disposal)	70.0			1.7	1.0
Year 5 (Stage 3a)	Preparation, excavation, blasting, and hauling of material	2.0			0.088	0.048
Year 5 (Stage 3a)	Strip sediment, excavate test trenches	10.0			0.069	0.038
Year 6 (Stage 3b)	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	5.0			0.20	0.11
Year 6 (Stage 3b)	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	80.0			2.0	1.1
Year 6 (Stage 3b)	Excavation, blasting, and hauling of material	2.0			0.034	0.019
Year 6 (Stage 3b)	Excavation, hauling & moisture conditioning	10.0			0.17	0.094
Year 7	Restoring parking areas and construction of permanent access roads	7.0			0.25	0.14
Year 7	Allowance - scope to be determined	5.0			0.18	0.10

Notes:

1. Construction schedule is based on Project-specific estimate. Includes planned hours for all tracked dozers to be used during the given phase.
2. Emission factors were calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for bulldozing equipment. The equation is:
   $EF_{PM10} = C_{PM15} \times s^{1.5} / M^{1.4} \times F_{PM10}$, where the following default values are used:
   1.0 = C_{PM15}, arbitrary coefficient
   6.9 = s, material silt content (%)
   7.9 = M, material moisture content (%)
   0.75 = F_{PM10}, PM_{10} scaling factor
3. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for bulldozing equipment. The equation is:
   $EF_{PM2.5} = C_{TSP} \times s^{1.2} / M^{1.3} \times F_{PM2.5}$, where the following default values are used:
   5.7 = C_{TSP}, arbitrary coefficient
   6.9 = s, material silt content (%)
   7.9 = M, material moisture content (%)
   0.105 = $F_{PM2.5}$, $PM_{2.5}$ scaling factor
4. Fugitive $PM_{2.5}$ emissions from bulldozing will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
hr - hour
lb - pound
PM_{10} - particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 5-f
Fugitive Wind-Blown Dust from Stockpile Areas
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Source Name	Maximum Daily Wind Erodible Area[1]	Control Efficiency[3]	Emissions[2]	
			PM_{10}	$PM_{2.5}$
	acres		lb/day	lb/day
Stockpile H	14.37	90%	2.4	0.37
Stockpile I	2.19	90%	0.37	0.056
Stockpile J	6.58	90%	1.1	0.17
Stockpile K (North)	11.68	90%	2.0	0.30
Stockpile K (South)	16.73	90%	2.8	0.43
Stockpile B	8.09	90%	1.4	0.21
Stockpile C	9.29	90%	1.6	0.24
Stockpile M	45	90%	7.7	1.1
Stockpile E	4.10	90%	0.70	0.10
Stockpile L	23.06	90%	3.9	0.59
Staging Area 6	2.6	90%	0.44	0.066

Notes:

1. The maximum daily erodible area for each stockpile was conservatively taken to be the full area of the stockpile.
2. An emission factor of 1.7 lb/acre/day for stockpile erosion was taken from the BAAQMD Permit Handbook, per AP-42 Section 8.19. The $PM_{2.5}$ emissions factor was scaled from the PM_{10} value based on the ARB's guidance.
3. A 90% reduction in the PM emission factor was taken for watering of storage piles are at a rate of 1.4 gallons/hour-yard^2, based on SCAQMD's Fugitive Dust Table XI-D.

Abbreviations:

ARB - Air Resources Board
BAAQMD - Bay Area Air Quality Management District
lb - pounds
PM - particulate matter
SCAQMD - South Coast Air Quality Management District
yr - year

References:

SCAQMD. 2007. Table XI-D Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

BAAQMD Permit Handbook:
https://www.baaqmd.gov/permits/permitting-manuals/permit-handbook

Table 5-g
Fugitive Dust Emissions from Wind-Blown Dust
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Phase	Subphase	Emissions (lb/yr)[1,2,3]	
		PM_{10}	$PM_{2.5}$
Site Mobilization	Year 1	6,239	936
Stage 1 Dam Excavation	Year 2 (Stage 1a)	4,030	605
Stage 1 Dam Excavation	Year 3 (Stage 1b)	4,151	623
Stage 2 Excavation and Fill	Year 4 (Stage 2a)	2,502	375
Stage 2 Excavation and Fill	Year 4 (Stage 2b)	2,888	433
Stage 3 Dam Fill	Year 5 (Stage 3a)	4,085	613
Stage 3 Dam Fill	Year 6 (Stage 3b)	2,243	337
Site Restoration	Year 7	0	0

Notes:

1. The annual emissions from wind-blown dust were determined by summing over emissions for all stockpiles that are active for a given year.
2. An emission factor of 1.7 lb/acre/day for stockpile erosion was taken from the BAAQMD Permit Handbook, per AP-42 Section 8.19. The $PM_{2.5}$ emissions factor was scaled from the PM_{10} value based on the ARB's guidance.
3. A 90% reduction in the PM emission factor was taken for watering of storage piles at a rate of 1.4 gallons/hour-yard^2, based on SCAQMD's Fugitive Dust Table XI-D.

Abbreviations:

ARB - Air Resources Board
BAAQMD - Bay Area Air Quality Management District
lb - pounds
PM - particulate matter
SCAQMD - South Coast Air Quality Management District
yr - year

References:

SCAQMD. 2007. Table XI-D Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

BAAQMD Permit Handbook:
https://www.baaqmd.gov/permits/permitting-manuals/permit-handbook

Table 5-h
Fugitive Dust Emissions from Demolition Waste
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Activity Phase	Construction Activity	Number of Days	Total Waste[1]		Emission Factor - Mechanical or Explosive Dismemberment[2]		Emission Factor - Debris Loading[3]		Annual Emissions[4]	
					PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
		days	cy	ton	lb/ton		lb/ton		ton/yr	ton/yr
Year 2 (Stage 1a)	Demolish accl bld, inst., dam crest paving, exst intake&outlet struct	103	1,500	1,896					0.013	0.0020
Year 3 (Stage 1b)	Demolish existing spillway	247	12,500	15,802					0.11	0.016
Year 3 (Stage 1b)	Stage 1b excavation (incl. work at stockpile areas & reservoir disposal)	195	400	506	0.0011	1.7E-04	0.020	0.0031	0.0035	5.2E-04
Year 6 (Stage 3b)	Construct pipe supports, lining at Diversion Tunnel/LLOT intersection	60	400	506					0.0035	5.2E-04
Year 6 (Stage 3b)	Demolish diversion intake structure	32	550	695					0.0048	7.2E-04
Year 7	Restoring parking areas and construction of permanent access roads	247	665	841					0.0049	6.1E-04

Notes:

1. Conversion of building waste to tons assumes an average soil density of 1.5 grams per cubic centimeter, per the CalEEMod® User's Guide Truck Loading.
2. Emission factor calculated following guidance in the CalEEMod® User's Guide Mechanical or Explosive Dismemberment, which is based of AP 42 Section 13.2.4.3 for batch drop operations. The equation is:
   $EF = k*(0.0032)*(U/5)^{1.3}/(M/2)^{1.4}$ (lb/ton of debris)
   0.053 = $k_{PM2.5}$ Particle size multiplier (dimensionless)
   4.92 = U, mean wind speed (mph)
   2 = M, material moisture content (%)
3. Emission factor calculated following guidance in the CalEEMod® User's Guide Debris Loading, which is based of AP 42 Section 13.2. The equation is:
   $EF = k*EF_{L-TSP}$
   0.35 = k_{PM10} Particle size multiplier (dimensionless)
   0.053 = $k_{PM2.5}$ Particle size multiplier (dimensionless)
   0.058 = EF_{L-TSP}, lb/ton
4. Fugitive $PM_{2.5}$ emissions from demolition will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 36% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
cy - cubic yard
EF - emission factor
lb - pound
mph - miles per hour
PM - particulate matter
yr - years

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 6
Construction Asphalt Paving Off-Gassing Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year	Construction Subphase	Land Use	Roadway Length (m)	Asphalt-Paved Area[1]	Asphalt Paving ROG Off-Gassing Emission Factor[2]	ROG Off-Gassing Emissions
				acre	lb/acre	lb/subphase
Year 7	Restoring Parking Areas and Construction of Permanent Access Roads	Boat Ramp Parking Area	-	5.9	2.6	16
Year 7	Restoring Parking Areas and Construction of Permanent Access Roads	Dam Toe Parking Area	-	0.27	2.6	0.70
Year 7	Restoring Parking Areas and Construction of Permanent Access Roads	Staging Area 3	-	0.83	2.6	2.2
Year 7	Restoring Parking Areas and Construction of Permanent Access Roads	Year 7 Access Roads	7,970	24	2.6	62
					Total Year 7	**80**

Notes:

1. Asphalt-paved parking area was provided by Valley Water. For paved roads, roadway distance was provided by Valley Water, and paved roadway width was assumed to be 12 meters.
2. An VOC off-gassing emission factor of 2.62 lb/acre is taken from CalEEMod® User's Guide. VOC is assumed to be equivalent to ROG.

Abbreviations:

lb - pound
ROG - reactive organic gas
VOC - volatile organic compound

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 7-a
Onroad Construction Trips
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Subphase	Construction Subphase Lookup	Year	Number of Work Days	Construction One-way Trips[1]			
				Total Worker Trips[2]	Total Vendor Trips[2]	Total Haul Trips[2]	Total Shuttle Trips[3]
				(trips/day)	(trips/day)	(trips)	(trips)
Year 1	Site Mobilization	2024	272	75	6	4,500	30
Year 2 (Stage 1a)	Stage 1a	2025	325	145	6	3,500	50
Year 3 (Stage 1b)	Stage 1b	2026	325	155	6	7,500	50
Year 4 (Stage 2a)	Stage 2a	2027	178	135	6	7,850	50
Year 4 (Stage 2b)	Stage 2b	2027	175	190	6	7,850	50
Year 5 (Stage 3a)	Stage 3a	2028	325	170	6	13,000	60
Year 6 (Stage 3b)	Stage 3b	2029	325	165	6	16,900	60
Year 7	Site Restoration	2030	294	55	6	6,500	20

Notes:
1. Construction trip rates were provided by Valley Water for each subphase.
2. CalEEMod® default fleet mixes were used for Worker (LD_Mix), Vendor (MHDT/HHDT), and Hauling (HHDT) trips. LD_Mix was assumed to be 100% gasoline vehicles and MHDT/HHDT and HHDT were assumed to be 100% diesel vehicles.
3. Shuttle trips are provided by Valley Water from designated parking areas to the construction site. Total trip rates for shuttles were provided by Valley Water for each subphase.

Abbreviations:
CalEEMod® - California Emissions Estimator Model
HHDT - heavy-heavy duty trucks
LD_Mix - light duty mix
MHDT - medium-heavy duty trucks

References:
CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 7-b
Offroad Construction Trips
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Phase	Construction Subphase	Road	Number of Work Days	Total Hauling Trips[1] (trips)
Site Mobilization	Site Mobilization	Dam to SA-L (Zone 1/4)	110	500
		Dam to SA-1/SA-E (Zone 2/3)	110	100
		SA-C to SA-K(N) (Zone 5a)	110	400
Dam Excavation	Year 2 (Stage 1a)	Dam to SA-L (Zone 1/4)	130	6,500
		Dam to SA-C (Zone 1/4)	130	11,200
		Dam to SA-1/SA-E (Zone 2/3)	130	4,300
		Dam to SA-K(S) (Zone 2/3)	130	9,200
		Dam to RDA (waste)	130	3,700
		SA-C to SA-K(N) (Zone 5a)	130	12,900
		SA-C to SA-L (Zone 5)	130	3,300
		SA-B to RDA (waste)	130	7,200
	Year 3 (Stage 1b)	Dam to SA-H (Zone 1/4)	165	17,700
		Dam to SA-L (Zone 1/4)	165	4,100
		Dam to SA-C (Zone 1/4)	165	3,500
		Dam to SA-K(N) (LFF)	165	1,900
		Dam to SA-K(S) (Zone 2/3)	165	5,400
		Dam to RDA (waste)	165	12,000
Excavation and Fill	Year 3 (Stage 1b Fill)	From SA-C to u/s dam (shell/soil)	25	3,500
	Year 4 (Stage 2a)	Dam to SA-C (Zone 1/4)	75	9,200
		Dam to SA-D (Zone 2/3)	75	14,200
		Dam to RDA (waste)	75	1,500
		Dam to SA-K(N) (LFF)	75	3,400
		Dam to SA-K(S) (Zone 2/3)	15	100
	Year 4 (Stage 2b)	SA-C to Dam (Zone 5)	90	9,700
		SA-H to Dam (Zone 5)	90	3,800
		SA-D to Dam (Zone 7)	90	13,800
		SA-K(N) to Dam (Zone 5a)	90	3,200
		SA-1 to Dam (Zone 8/9)	90	4,000
Dam Fill	Year 5 (Stage 3a)	SA-H to Dam (Zone 5)	150	14,200
		SA-L to Dam (Zone 5)	150	13,800
		SA-K(N) to Dam (Zone 5)	150	5,700
		SA-B to Dam (Zone 5)	150	9,400
		SA-K(S) to Dam (Zone 7)	150	4,600
		SA-K(N) to Dam (Zone 5a)	150	4,500
		SA-1 to Dam (Zone 8/9)	150	2,600
		BHBA to PGBP Access	150	3,800
		BHBA to RDA	150	12,700
	Year 6 (Stage 3b)	BHBA to Dam (Zone 5)	140	26,500
		SA-K(S) to Dam (Zone 7)	140	9,700
		SA-E to Dam (Zone 7)	140	4,200
		PGBP to Dam (Zone 7)	140	4,800
		SA-K(N) to Dam (Zone 5a)	140	5,500
		SA-1 to Dam (Zone 8/9)	140	4,000

Notes:

1. Construction trip rates were provided by Valley Water for each subphase.

Table 7-c
Construction Trip Lengths
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Trip Type	One-Way Trip Length (mi)
Worker[1]	11.7
Vendor[2]	8.4
Haul[3]	20.0

Notes:

1. Consistent with CalEEMod® methodology, worker trip length is based on the default nonresidential Home-to-Work trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

2. Consistent with CalEEMod® methodology, vendor trip length is based on the default nonresidential Work-to-Other trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

3. Consistent with CalEEMod® methodology, haul trip length is based on the default length of 20 miles as reported in the CalEEMod® user guide, Appendix C.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
mi - mile
MPO - Metropolitan Planning Organizations

References:

CalEEMod® User's Guide, Appendix C:
Available online at: https://caleemod.com/documents/user-guide/04_Appendix%20C.pdf

CalEEMod® User's Guide, Appendix G:
Available online at: https://caleemod.com/documents/user-guide/08_Appendix%20G_v2022.1.1.3.xlsx

Table 8
Construction Gasoline Truck Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Phase	Construction Subphase	Year	Onsite Truck Use[1]		Onsite Truck Emissions[2,3]									
			(hours/year)	(vehicles/year)	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
					(lb)						(MT)			
Year 1	Miscellaneous Activities	2024	2,520	6.0	6.0	19	117	1.0	8.4	3.0	48	4.3E-04	5.4E-04	48
	Construction of the Haul Roads and Preparation of Stockpile Areas	2024	2,800	8.0	6.6	21	130	1.2	9.4	3.3	53	4.7E-04	6.0E-04	53
	Dredging at Dam Toe	2024	2,100	3.0	5.0	16	98	0.86	7.0	2.5	40	3.5E-04	4.5E-04	40
	Upstream Shaft excavation	2024	2,240	6.0	5.3	17	104	0.92	7.5	2.6	42	3.8E-04	4.8E-04	42
	Excavate upstream portal	2024	560	4.0	1.3	4.2	26	0.23	1.9	0.66	11	9.5E-05	1.2E-04	11
	Tunnel excavation	2024	1,680	5.0	4.0	13	78	0.69	5.6	2.0	32	2.8E-04	3.6E-04	32
	Tunnel lining	2024	840	9.0	2.0	6.3	39	0.35	2.8	1.0	16	1.4E-04	1.8E-04	16
Year 2	Miscellaneous Activities	2025	3,360	6.0	7.2	23	150	1.4	11	4.0	63	5.1E-04	6.6E-04	63
	Construct cofferdam	2025	560	6.0	1.2	3.8	25	0.23	1.9	0.66	10	8.5E-05	1.1E-04	10
	Construct bypass pump system and diversion extension pipe	2025	700	4.0	1.5	4.7	31	0.28	2.3	0.83	13	1.1E-04	1.4E-04	13
	Conveying bypass flows to the Stage 1 Diversion Systems	2025	0	0	0	0	0	0	0	0	0	0	0	0
	Excavate downstream portal	2025	1,120	4.0	2.4	7.5	50	0.45	3.7	1.3	21	1.7E-04	2.2E-04	21
	Installation and operating the Water Treatment System	2025	3,360	2.0	7.2	23	150	1.4	11	4.0	63	5.1E-04	6.6E-04	63
	Stage 1a excavation (incl. work at stockpile areas & reservoir disposal)	2025	11,760	12	25	79	525	4.8	39	14	219	0.0018	0.0023	220
	Tunnel excavation	2025	1,120	5.0	2.4	7.5	50	0.45	3.7	1.3	21	1.7E-04	2.2E-04	21
	Tunnel lining	2025	1,260	9.0	2.8	8.5	56	0.51	4.2	1.5	23	1.9E-04	2.5E-04	24
	Construction of intake structure following LLOT lining	2025	560	6.0	1.2	3.8	25	0.23	1.9	0.66	10	8.5E-05	1.1E-04	10
	Demolish accl bld, inst., dam crest paving, exst intake&outlet struct	2025	980	6.0	2.1	6.6	44	0.40	3.3	1.2	18	1.5E-04	1.9E-04	18
	Miscellaneous Activities	2026	3,360	6.0	6.4	20	141	1.3	11	4.0	62	4.4E-04	6.0E-04	62
Year 3	Stage 1b excavation (incl. work at stockpile areas & reservoir disposal)	2026	11,760	11	22	71	494	4.7	39	14	216	0.0015	0.0021	217
	Construction of the tie-back wall at Cochrane Road	2026	700	5.0	1.3	4.2	29	0.28	2.3	0.82	13	9.2E-05	1.2E-04	13
	Demolish existing spillway	2026	2,520	6.0	4.8	15	106	1.0	8.4	3.0	46	3.3E-04	4.5E-04	46
	Excavation and foundation preparation	2026	840	6.0	1.6	5.0	35	0.34	2.8	1.0	15	1.1E-04	1.5E-04	15
	HLOW and Access Adit portal excavation	2026	1,680	4.0	3.2	10	71	0.67	5.6	2.0	31	2.2E-04	3.0E-04	31
	HLOW Tunnel and Access Adit Tunnel excavation	2026	3,360	6.0	6.4	20	141	1.3	11	4.0	62	4.4E-04	6.0E-04	62
	HLOW Tunnel and Access Adit lining	2026	4,200	9.0	8.0	25	176	1.7	14	4.9	77	5.5E-04	7.5E-04	77
	Construction of intake structure, concrete encasement	2026	1,680	9.0	3.2	10	71	0.67	5.6	2.0	31	2.2E-04	3.0E-04	31
	Gate Shaft excavation	2026	1,120	6.0	2.1	6.7	47	0.45	3.7	1.3	21	1.5E-04	2.0E-04	21
	Gate Shaft lining	2026	700	6.0	1.4	4.2	29	0.28	2.3	0.82	13	9.2E-05	1.2E-04	13
	Installation and operating the Water Treatment System	2026	3,360	1.0	6.3	20	141	1.3	11	4.0	62	4.4E-04	6.0E-04	62
	Miscellaneous Activities	2027	3,360	6.0	5.8	18	136	1.3	11	3.9	61	3.9E-04	5.5E-04	61
Year 4	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	2027	1,400	1.0	2.4	7.5	57	0.55	4.7	1.6	25	1.6E-04	2.3E-04	25
	Stage 2a excavation (incl. work at stockpile areas & reservoir disposal)	2027	8,820	16	15	47	358	3.5	29	10	160	0.0010	0.0014	160
	Stage 2b Fill (incl. work at stockpile areas & reservoir disposal)	2027	15,400	22	26	83	625	6.1	51	18	279	0.0018	0.0025	280
	Excavation and foundation preparation	2027	3,360	6.0	5.8	18	136	1.3	11	3.9	61	3.9E-04	5.5E-04	61
	Construction of spillway structure	2027	6,300	14	11	34	256	2.5	21	7.4	114	7.4E-04	0.0010	115
	Pipe, mechanical and electrical installation	2027	2,240	8.0	3.9	12	91	0.88	7.5	2.6	41	2.6E-04	3.7E-04	41
	Installation and operating the Water Treatment System	2027	3,360	1.0	5.7	18	136	1.3	11	3.9	61	3.9E-04	5.5E-04	61
	Miscellaneous Activities	2028	3,360	6.0	5.3	16	132	1.3	11	3.9	60	3.5E-04	5.0E-04	60

Table 8
Construction Gasoline Truck Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Phase	Construction Subphase	Year	Onsite Truck Use[1] (hours/year)	(vehicles/year)	Onsite Truck Emissions[2,3] ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
					(lb)							(MT)		
Year 5	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	2028	1,400	1.0	2.2	6.8	55	0.55	4.7	1.6	25	1.5E-04	2.1E-04	25
	Stage 3a Fill (incl. work at stockpile areas & reservoir disposal)	2028	20,160	24	31	97	791	7.9	67	24	362	0.0021	0.0030	363
	Preparation, excavation, blasting, and hauling of material	2028	3,080	6.0	4.8	15	121	1.2	10	3.6	55	3.2E-04	4.6E-04	55
	Strip sediment, excavate test trenches	2028	210	1.0	0.33	1.0	8.2	0.082	0.70	0.25	3.8	2.2E-05	3.1E-05	3.8
	Construction of spillway structure	2028	3,500	14	5.5	17	137	1.4	12	4.1	63	3.7E-04	5.2E-04	63
	Excavate sloping intake structure (upper half)	2028	420	4.0	0.68	2.5	17	0.16	1.4	0.49	7.5	4.4E-05	6.3E-05	7.6
	Construction of sloping intake structure (upper half)	2028	2,800	9.0	4.4	16	110	1.1	9.3	3.3	50	2.9E-04	4.2E-04	50
	Construction of CIP tunnel and outlet structure	2028	4,200	14	6.6	24	165	1.6	14	4.9	75	4.4E-04	6.3E-04	76
	Excavate downstream portal trench and outlet structure foundation	2028	840	4.0	1.3	4.9	33	0.33	2.8	1.0	15	8.9E-05	1.3E-04	15
	Pipe, mechanical and electrical installation	2028	1,400	10	2.2	8.3	55	0.55	4.7	1.6	25	1.5E-04	2.1E-04	25
	Connection of the Pipeline and Force Main to the LLOW outlet structure	2028	420	5.0	0.68	2.5	17	0.16	1.4	0.49	7.5	4.5E-05	6.3E-05	7.6
	Installation and operating the Water Treatment System	2028	3,360	1.0	5.2	19	132	1.3	11	3.9	60	3.5E-04	5.0E-04	60
	Miscellaneous Activities	2029	3,360	6.0	4.8	18	128	1.3	11	3.9	60	3.2E-04	4.6E-04	60
Year 6	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	2029	1,400	1.0	2.0	7.3	53	0.54	4.7	1.6	25	1.3E-04	1.9E-04	25
	Construct bypass pump system	2029	280	4.0	0.42	1.6	11	0.11	0.93	0.33	5.0	2.7E-05	3.9E-05	5.0
	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	2029	13,440	14	19	71	512	5.2	45	16	239	0.0013	0.0019	240
	Excavation, blasting, and hauling of material	2029	1,120	6.0	1.6	6.0	43	0.43	3.7	1.3	20	1.1E-04	1.5E-04	20
	Excavation, hauling & moisture conditioning	2029	560	1.0	0.79	3.0	21	0.22	1.9	0.66	10	5.3E-05	7.7E-05	10
	Excavate sloping intake structure (lower half)	2029	280	4.0	0.42	1.6	11	0.11	0.93	0.33	5.0	2.7E-05	3.9E-05	5.0
	Construction of sloping intake structure (lower half)	2029	1,680	9.0	2.4	9.0	64	0.65	5.6	2.0	30	1.6E-04	2.3E-04	30
	Pipe, mechanical and electrical installation	2029	1,120	8.0	1.6	6.1	43	0.43	3.7	1.3	20	1.1E-04	1.5E-04	20
	Demolish diversion intake structure	2029	280	6.0	0.43	1.6	11	0.11	0.93	0.33	5.0	2.7E-05	3.9E-05	5.0
	Construct pipe supports, lining at Diversion Tunnel/LLOT intersection	2029	840	9.0	1.2	4.6	32	0.33	2.8	1.0	15	8.0E-05	1.2E-04	15
	Pipe, mechanical and electrical installation	2029	2,240	10	3.2	12	85	0.87	7.5	2.6	40	2.1E-04	3.1E-04	40
	Excavation and foundation preparation	2029	840	5.0	1.2	4.5	32	0.33	2.8	1.0	15	8.0E-05	1.2E-04	15
	Installation and operating the Water Treatment System	2029	3,360	1.0	4.7	18	128	1.3	11	3.9	60	3.2E-04	4.6E-04	60
Year 7	Miscellaneous Activities	2030	2,520	6.0	3.3	12	94	1.0	8.4	3.0	44	2.2E-04	3.2E-04	45
	Construction of concrete lined channel	2030	6,300	10	8.3	31	236	2.4	21	7.4	111	5.5E-04	8.1E-04	111
	Restoring parking areas and construction of permanent access roads	2030	5,040	10	6.6	25	189	1.9	17	5.9	89	4.4E-04	6.5E-04	89
	Allowance - scope to be determined	2030	2,520	5.0	3.3	12	94	1.0	8.4	3.0	44	2.2E-04	3.2E-04	45

Notes:

1. The number of gasoline vehicles and schedule were provided by Valley Water.
2. Work trucks are assumed to be similar to light-heavy duty trucks (LHDT2) as defined in EMFAC2021. Emission factors are from EMFAC2021 ("Emission Rates" mode) for LHDT2 gasoline vehicles (aggregated model year) in Santa Clara County. RUNEX emission factors are specific to vehicle speed of 15 mph. All other emission factor types are for aggregated speed. Emission factors were multiplied by the appropriate usage parameter based on the units. Emission factors in units of g/trip, g/mi, and g/vehicle/day, were multiplied by trips, miles, and total vehicles, respectively, in order to obtain mass emissions.
3. Global warming potentials used in the calculation of CO_2e are 1, 25, and 298 for CO_2, CH_4, and N_2O, respectively.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
g - gram
lb - pound
mi - mile
mph - miles per hour
MT - metric tonne
N_2O - nitrous oxide
NOx - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ROG - reactive organic gases
SOx - sulfur oxides

References:

California Air Resources Board. EMFAC2021. Available online at: https://arb.ca.gov/emfac/emissions-inventory

Table 9
Construction Gasoline Truck TOG-Speciated Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year	Construction Activity	Emission (ton/yr)[1]															
		1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	n-hexane	Methanol	Methyl Ethyl Ketone	Naphthalene	Propene	Styrene	Toluene	Xylenes	DPM	$PM_{2.5}$
Year 1	Miscellaneous Activities	3.3E-02	1.7E-02	7.8E-03	1.5E-01	6.5E-02	9.5E-02	1.2E-01	7.2E-03	1.2E-03	3.0E-03	1.8E-01	7.2E-03	3.7E-01	3.0E-01	8.4E+00	3.0E+00
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	3.7E-02	1.9E-02	8.7E-03	1.7E-01	7.3E-02	1.1E-01	1.3E-01	8.0E-03	1.3E-03	3.4E-03	2.1E-01	8.0E-03	4.2E-01	3.3E-01	9.4E+00	3.3E+00
Year 1	Dredging at Dam Toe	2.8E-02	1.4E-02	6.5E-03	1.3E-01	5.4E-02	7.9E-02	1.0E-01	6.0E-03	1.0E-03	2.5E-03	1.5E-01	6.0E-03	3.1E-01	2.5E-01	7.0E+00	2.5E+00
Year 1	Upstream Shaft excavation	3.0E-02	1.5E-02	7.0E-03	1.4E-01	5.8E-02	8.5E-02	1.1E-01	6.4E-03	1.1E-03	2.7E-03	1.6E-01	6.4E-03	3.3E-01	2.7E-01	7.5E+00	2.6E+00
Year 1	Excavate upstream portal	7.4E-03	3.8E-03	1.7E-03	3.5E-02	1.5E-02	2.1E-02	2.7E-02	1.6E-03	2.7E-04	6.7E-04	4.1E-02	1.6E-03	8.4E-02	6.7E-02	1.9E+00	6.6E-01
Year 1	Tunnel excavation	2.2E-02	1.1E-02	5.2E-03	1.0E-01	4.4E-02	6.4E-02	8.1E-02	4.8E-03	8.1E-04	2.0E-03	1.2E-01	4.8E-03	2.5E-01	2.0E-01	5.6E+00	2.0E+00
Year 1	Tunnel lining	1.1E-02	5.7E-03	2.6E-03	5.2E-02	2.2E-02	3.2E-02	4.1E-02	2.4E-03	4.0E-04	1.0E-03	6.2E-02	2.4E-03	1.3E-01	1.0E-01	2.8E+00	9.9E-01
Year 2	Miscellaneous Activities	3.9E-02	2.0E-02	9.3E-03	1.8E-01	7.8E-02	1.1E-01	1.5E-01	8.6E-03	1.4E-03	3.6E-03	2.2E-01	8.6E-03	4.5E-01	3.6E-01	1.1E+01	4.0E+00
Year 2	Construct cofferdam	6.6E-03	3.4E-03	1.6E-03	3.1E-02	1.3E-02	1.9E-02	2.5E-02	1.4E-03	2.4E-04	6.0E-04	3.7E-02	1.4E-03	7.5E-02	6.0E-02	1.9E+00	6.6E-01
Year 2	Construct bypass pump system and diversion extension pipe	8.2E-03	4.2E-03	1.9E-03	3.9E-02	1.6E-02	2.4E-02	3.1E-02	1.8E-03	3.0E-04	7.5E-04	4.6E-02	1.8E-03	9.4E-02	7.4E-02	2.3E+00	8.3E-01
Year 2	Excavate downstream portal	1.3E-02	6.7E-03	3.1E-03	6.2E-02	2.6E-02	3.8E-02	4.9E-02	2.9E-03	4.8E-04	1.2E-03	7.3E-02	2.9E-03	1.5E-01	1.2E-01	3.7E+00	1.3E+00
Year 2	Installation and operating the Water Treatment System	3.9E-02	2.0E-02	9.3E-03	1.8E-01	7.8E-02	1.1E-01	1.5E-01	8.6E-03	1.4E-03	3.6E-03	2.2E-01	8.6E-03	4.5E-01	3.6E-01	1.1E+01	4.0E+00
Year 2	Stage 1a excavation (incl. work at stockpile areas & reservoir disposal)	1.4E-01	7.0E-02	3.3E-02	6.4E-01	2.7E-01	4.0E-01	5.1E-01	3.0E-02	5.0E-03	1.3E-02	7.7E-01	3.0E-02	1.6E+00	1.2E+00	3.9E+01	1.4E+01
Year 2	Tunnel excavation	1.3E-02	6.7E-03	3.1E-03	6.2E-02	2.6E-02	3.8E-02	4.9E-02	2.9E-03	4.8E-04	1.2E-03	7.3E-02	2.9E-03	1.5E-01	1.2E-01	3.7E+00	1.3E+00
Year 2	Tunnel lining	1.5E-02	7.5E-03	3.5E-03	6.9E-02	2.9E-02	4.3E-02	5.5E-02	3.2E-03	5.4E-04	1.3E-03	8.2E-02	3.2E-03	1.7E-01	1.3E-01	4.2E+00	1.5E+00
Year 2	Construction of intake structure following LLOT lining	6.6E-03	3.4E-03	1.6E-03	3.1E-02	1.3E-02	1.9E-02	2.5E-02	1.4E-03	2.4E-04	6.0E-04	3.7E-02	1.4E-03	7.5E-02	6.0E-02	1.9E+00	6.6E-01
Year 2	Demolish accl bld, inst., dam crest paving, exst intake&outlet struct	1.2E-02	5.9E-03	2.7E-03	5.4E-02	2.3E-02	3.3E-02	4.3E-02	2.5E-03	4.2E-04	1.0E-03	6.4E-02	2.5E-03	1.3E-01	1.0E-01	3.3E+00	1.2E+00
Year 3	Miscellaneous Activities	3.3E-02	1.7E-02	7.8E-03	1.6E-01	6.6E-02	9.5E-02	1.3E-01	7.2E-03	1.2E-03	3.0E-03	1.8E-01	7.2E-03	3.8E-01	3.0E-01	1.1E+01	4.0E+00
Year 3	Stage 1b excavation (incl. work at stockpile areas & reservoir disposal)	1.2E-01	5.9E-02	2.7E-02	5.5E-01	2.3E-01	3.3E-01	4.4E-01	2.5E-02	4.2E-03	1.1E-02	6.5E-01	2.5E-02	1.3E+00	1.1E+00	3.9E+01	1.4E+01
Year 3	Construction of the tie-back wall at Cochrane Road	6.9E-03	3.5E-03	1.6E-03	3.3E-02	1.4E-02	2.0E-02	2.7E-02	1.5E-03	2.5E-04	6.3E-04	3.9E-02	1.5E-03	8.0E-02	6.3E-02	2.3E+00	8.2E-01
Year 3	Demolish existing spillway	2.5E-02	1.3E-02	5.9E-03	1.2E-01	4.9E-02	7.1E-02	9.5E-02	5.4E-03	9.0E-04	2.3E-03	1.4E-01	5.4E-03	2.9E-01	2.3E-01	8.4E+00	3.0E+00
Year 3	Excavation and foundation preparation	8.3E-03	4.2E-03	2.0E-03	3.9E-02	1.7E-02	2.4E-02	3.2E-02	1.8E-03	3.0E-04	7.6E-04	4.6E-02	1.8E-03	9.6E-02	7.6E-02	2.8E+00	9.9E-01
Year 3	HLOW and Access Adit portal excavation	1.7E-02	8.4E-03	3.9E-03	7.8E-02	3.3E-02	4.8E-02	6.3E-02	3.6E-03	6.0E-04	1.5E-03	9.2E-02	3.6E-03	1.9E-01	1.5E-01	5.6E+00	2.0E+00
Year 3	HLOW Tunnel and Access Adit Tunnel excavation	3.3E-02	1.7E-02	7.8E-03	1.6E-01	6.6E-02	9.5E-02	1.3E-01	7.2E-03	1.2E-03	3.0E-03	1.8E-01	7.2E-03	3.8E-01	3.0E-01	1.1E+01	4.0E+00
Year 3	HLOW Tunnel and Access Adit lining	4.1E-02	2.1E-02	9.8E-03	2.0E-01	8.2E-02	1.2E-01	1.6E-01	9.0E-03	1.5E-03	3.8E-03	2.3E-01	9.0E-03	4.8E-01	3.8E-01	1.4E+01	4.9E+00
Year 3	Construction of intake structure, concrete encasement	1.7E-02	8.5E-03	3.9E-03	7.8E-02	3.3E-02	4.8E-02	6.4E-02	3.6E-03	6.0E-04	1.5E-03	9.2E-02	3.6E-03	1.9E-01	1.5E-01	5.6E+00	2.0E+00
Year 3	Gate Shaft excavation	1.1E-02	5.6E-03	2.6E-03	5.2E-02	2.2E-02	3.2E-02	4.3E-02	2.4E-03	4.0E-04	1.0E-03	6.2E-02	2.4E-03	1.3E-01	1.0E-01	3.7E+00	1.3E+00
Year 3	Gate Shaft lining	6.9E-03	3.5E-03	1.6E-03	3.3E-02	1.4E-02	2.0E-02	2.7E-02	1.5E-03	2.5E-04	6.3E-04	3.9E-02	1.5E-03	8.0E-02	6.3E-02	2.3E+00	8.2E-01
Year 3	Installation and operating the Water Treatment System	3.3E-02	1.7E-02	7.8E-03	1.6E-01	6.6E-02	9.5E-02	1.3E-01	7.2E-03	1.2E-03	3.0E-03	1.8E-01	7.2E-03	3.8E-01	3.0E-01	1.1E+01	4.0E+00
Year 4	Miscellaneous Activities	2.9E-02	1.5E-02	6.9E-03	1.4E-01	5.8E-02	8.4E-02	1.1E-01	6.4E-03	1.1E-03	2.7E-03	1.6E-01	6.4E-03	3.4E-01	2.7E-01	1.1E+01	3.9E+00
Year 4	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	1.2E-02	6.2E-03	2.9E-03	5.7E-02	2.4E-02	3.5E-02	4.7E-02	2.6E-03	4.4E-04	1.1E-03	6.8E-02	2.6E-03	1.4E-01	1.1E-01	4.7E+00	1.6E+00
Year 4	Stage 2a excavation (incl. work at stockpile areas & reservoir disposal)	7.7E-02	3.9E-02	1.8E-02	3.6E-01	1.5E-01	2.2E-01	3.0E-01	1.7E-02	2.8E-03	7.0E-03	4.3E-01	1.7E-02	8.9E-01	7.0E-01	2.9E+01	1.0E+01
Year 4	Stage 2b Fill (incl. work at stockpile areas & reservoir disposal)	1.3E-01	6.8E-02	3.2E-02	6.3E-01	2.7E-01	3.8E-01	5.2E-01	2.9E-02	4.9E-03	1.2E-02	7.4E-01	2.9E-02	1.5E+00	1.2E+00	5.1E+01	1.8E+01
Year 4	Excavation and foundation preparation	2.9E-02	1.5E-02	6.9E-03	1.4E-01	5.8E-02	8.4E-02	1.1E-01	6.4E-03	1.1E-03	2.7E-03	1.6E-01	6.4E-03	3.4E-01	2.7E-01	1.1E+01	3.9E+00
Year 4	Construction of spillway structure	5.5E-02	2.8E-02	1.3E-02	2.6E-01	1.1E-01	1.6E-01	2.1E-01	1.2E-02	2.0E-03	5.0E-03	3.0E-01	1.2E-02	6.3E-01	5.0E-01	2.1E+01	7.4E+00
Year 4	Pipe, mechanical and electrical installation	1.9E-02	9.9E-03	4.6E-03	9.2E-02	3.9E-02	5.6E-02	7.6E-02	4.2E-03	7.1E-04	1.8E-03	1.1E-01	4.2E-03	2.3E-01	1.8E-01	7.5E+00	2.6E+00
Year 4	Installation and operating the Water Treatment System	2.9E-02	1.5E-02	6.9E-03	1.4E-01	5.8E-02	8.4E-02	1.1E-01	6.4E-03	1.1E-03	2.6E-03	1.6E-01	6.4E-03	3.4E-01	2.7E-01	1.1E+01	3.9E+00
Year 5	Miscellaneous Activities	2.6E-02	1.3E-02	6.0E-03	1.2E-01	5.1E-02	7.3E-02	1.0E-01	5.6E-03	9.3E-04	2.3E-03	1.4E-01	5.6E-03	3.0E-01	2.3E-01	1.1E+01	3.9E+00
Year 5	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	1.1E-02	5.4E-03	2.5E-03	5.0E-02	2.1E-02	3.1E-02	4.3E-02	2.3E-03	3.9E-04	9.7E-04	5.9E-02	2.3E-03	1.2E-01	9.7E-02	4.7E+00	1.6E+00
Year 5	Stage 3a Fill (incl. work at stockpile areas & reservoir disposal)	1.5E-01	7.8E-02	3.6E-02	7.3E-01	3.1E-01	4.4E-01	6.1E-01	3.3E-02	5.6E-03	1.4E-02	8.5E-01	3.3E-02	1.8E+00	1.4E+00	6.7E+01	2.4E+01
Year 5	Preparation, excavation, blasting, and hauling of material	2.3E-02	1.2E-02	5.5E-03	1.1E-01	4.7E-02	6.7E-02	9.4E-02	5.1E-03	8.5E-04	2.1E-03	1.3E-01	5.1E-03	2.7E-01	2.1E-01	1.0E+01	3.6E+00
Year 5	Strip sediment, excavate test trenches	1.6E-03	8.1E-04	3.8E-04	7.6E-03	3.2E-03	4.6E-03	6.5E-03	3.5E-04	5.8E-05	1.5E-04	8.9E-03	3.5E-04	1.9E-02	1.5E-02	7.0E-01	2.5E-01
Year 5	Construction of spillway structure	2.7E-02	1.4E-02	6.3E-03	1.3E-01	5.3E-02	7.7E-02	1.1E-01	5.8E-03	9.7E-04	2.4E-03	1.5E-01	5.8E-03	3.1E-01	2.4E-01	1.2E+01	4.1E+00
Year 5	Excavate sloping intake structure (upper half)	3.2E-03	1.6E-03	7.6E-04	1.5E-02	6.4E-03	9.2E-03	1.3E-02	7.0E-04	1.2E-04	2.9E-04	1.8E-02	7.0E-04	3.8E-02	2.9E-02	1.4E+00	4.9E-01
Year 5	Construction of sloping intake structure (upper half)	2.1E-02	1.1E-02	5.0E-03	1.0E-01	4.3E-02	6.1E-02	8.6E-02	4.6E-03	7.7E-04	1.9E-03	1.2E-01	4.6E-03	2.5E-01	1.9E-01	9.3E+00	3.3E+00
Year 5	Construction of CIP tunnel and outlet structure	3.2E-02	1.6E-02	7.6E-03	1.5E-01	6.4E-02	9.2E-02	1.3E-01	7.0E-03	1.2E-03	2.9E-03	1.8E-01	7.0E-03	3.7E-01	2.9E-01	1.4E+01	4.9E+00
Year 5	Excavate downstream portal trench and outlet structure foundation	6.4E-03	3.3E-03	1.5E-03	3.0E-02	1.3E-02	1.8E-02	2.6E-02	1.4E-03	2.3E-04	5.8E-04	3.6E-02	1.4E-03	7.5E-02	5.9E-02	2.8E+00	9.9E-01
Year 5	Pipe, mechanical and electrical installation	1.1E-02	5.4E-03	2.5E-03	5.1E-02	2.1E-02	3.1E-02	4.3E-02	2.3E-03	3.9E-04	9.7E-04	5.9E-02	2.3E-03	1.3E-01	9.8E-02	4.7E+00	1.6E+00
Year 5	Connection of the Pipeline and Force Main to the LLOW outlet structure	3.2E-03	1.6E-03	7.6E-04	1.5E-02	6.4E-03	9.2E-03	1.3E-02	7.0E-04	1.2E-04	2.9E-04	1.8E-02	7.0E-04	3.8E-02	3.0E-02	1.4E+00	4.9E-01
Year 5	Installation and operating the Water Treatment System	2.6E-02	1.3E-02	6.0E-03	1.2E-01	5.1E-02	7.3E-02	1.0E-01	5.6E-03	9.3E-04	2.3E-03	1.4E-01	5.6E-03	3.0E-01	2.3E-01	1.1E+01	3.9E+00

Table 9
Construction Gasoline Truck TOG-Speciated Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year	Construction Activity	Emission (ton/yr)[1]															
		1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	n-hexane	Methanol	Methyl Ethyl Ketone	Naphthalene	Propene	Styrene	Toluene	Xylenes	DPM	$PM_{2.5}$
Year 6	Miscellaneous Activities	2.3E-02	1.1E-02	5.3E-03	1.1E-01	4.5E-02	6.5E-02	9.2E-02	4.9E-03	8.2E-04	2.0E-03	1.3E-01	4.9E-03	2.7E-01	2.1E-01	1.1E+01	3.9E+00
Year 6	Hauling filter and drain material to the site and stockpiling in Staging Area 1E	9.4E-03	4.8E-03	2.2E-03	4.5E-02	1.9E-02	2.7E-02	3.8E-02	2.0E-03	3.4E-04	8.5E-04	5.2E-02	2.0E-03	1.1E-01	8.6E-02	4.7E+00	1.6E+00
Year 6	Construct bypass pump system	1.9E-03	9.7E-04	4.5E-04	9.1E-03	3.8E-03	5.5E-03	8.0E-03	4.1E-04	6.9E-05	1.7E-04	1.1E-02	4.1E-04	2.3E-02	1.7E-02	9.3E-01	3.3E-01
Year 6	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	9.0E-02	4.6E-02	2.1E-02	4.3E-01	1.8E-01	2.6E-01	3.7E-01	2.0E-02	3.3E-03	8.2E-03	5.0E-01	2.0E-02	1.1E+00	8.3E-01	4.5E+01	1.6E+01
Year 6	Excavation, blasting, and hauling of material	7.5E-03	3.8E-03	1.8E-03	3.6E-02	1.5E-02	2.2E-02	3.1E-02	1.6E-03	2.7E-04	6.8E-04	4.2E-02	1.6E-03	8.9E-02	6.9E-02	3.7E+00	1.3E+00
Year 6	Excavation, hauling & moisture conditioning	3.8E-03	1.9E-03	8.9E-04	1.8E-02	7.5E-03	1.1E-02	1.5E-02	8.2E-04	1.4E-04	3.4E-04	2.1E-02	8.2E-04	4.4E-02	3.4E-02	1.9E+00	6.6E-01
Year 6	Excavate sloping intake structure (lower half)	1.9E-03	9.7E-04	4.5E-04	9.1E-03	3.8E-03	5.5E-03	8.0E-03	4.1E-04	6.9E-05	1.7E-04	1.1E-02	4.1E-04	2.3E-02	1.7E-02	9.3E-01	3.3E-01
Year 6	Construction of sloping intake structure (lower half)	1.1E-02	5.8E-03	2.7E-03	5.4E-02	2.3E-02	3.2E-02	4.7E-02	2.5E-03	4.1E-04	1.0E-03	6.3E-02	2.5E-03	1.3E-01	1.0E-01	5.6E+00	2.0E+00
Year 6	Pipe, mechanical and electrical installation	7.5E-03	3.8E-03	1.8E-03	3.6E-02	1.5E-02	2.2E-02	3.1E-02	1.6E-03	2.7E-04	6.9E-04	4.2E-02	1.6E-03	8.9E-02	6.9E-02	3.7E+00	1.3E+00
Year 6	Demolish diversion intake structure	1.9E-03	9.7E-04	4.5E-04	9.2E-03	3.9E-03	5.5E-03	8.2E-03	4.2E-04	6.9E-05	1.7E-04	1.1E-02	4.2E-04	2.3E-02	1.8E-02	9.3E-01	3.3E-01
Year 6	Construct pipe supports, lining at Diversion Tunnel/LLOT intersection	5.7E-03	2.9E-03	1.3E-03	2.7E-02	1.1E-02	1.6E-02	2.4E-02	1.2E-03	2.1E-04	5.2E-04	3.2E-02	1.2E-03	6.7E-02	5.2E-02	2.8E+00	9.8E-01
Year 6	Pipe, mechanical and electrical installation	1.5E-02	7.7E-03	3.6E-03	7.2E-02	3.0E-02	4.3E-02	6.2E-02	3.3E-03	5.5E-04	1.4E-03	8.4E-02	3.3E-03	1.8E-01	1.4E-01	7.5E+00	2.6E+00
Year 6	Excavation and foundation preparation	5.7E-03	2.9E-03	1.3E-03	2.7E-02	1.1E-02	1.6E-02	2.3E-02	1.2E-03	2.1E-04	5.1E-04	3.1E-02	1.2E-03	6.7E-02	5.2E-02	2.8E+00	9.8E-01
Year 6	Installation and operating the Water Treatment System	2.2E-02	1.1E-02	5.3E-03	1.1E-01	4.5E-02	6.5E-02	9.2E-02	4.9E-03	8.2E-04	2.0E-03	1.3E-01	4.9E-03	2.6E-01	2.1E-01	1.1E+01	3.9E+00
Year 7	Miscellaneous Activities	1.5E-02	7.8E-03	3.6E-03	7.3E-02	3.1E-02	4.4E-02	6.4E-02	3.3E-03	5.6E-04	1.4E-03	8.5E-02	3.3E-03	1.8E-01	1.4E-01	8.4E+00	3.0E+00
Year 7	Construction of concrete lined channel	3.8E-02	1.9E-02	9.0E-03	1.8E-01	7.7E-02	1.1E-01	1.6E-01	8.3E-03	1.4E-03	3.5E-03	2.1E-01	8.3E-03	4.5E-01	3.5E-01	2.1E+01	7.4E+00
Year 7	Restoring parking areas and construction of permanent access roads	3.1E-02	1.6E-02	7.2E-03	1.5E-01	6.1E-02	8.8E-02	1.3E-01	6.7E-03	1.1E-03	2.8E-03	1.7E-01	6.7E-03	3.6E-01	2.8E-01	1.7E+01	5.9E+00
Year 7	Allowance - scope to be determined	1.5E-02	7.8E-03	3.6E-03	7.3E-02	3.1E-02	4.4E-02	6.4E-02	3.3E-03	5.6E-04	1.4E-03	8.5E-02	3.3E-03	1.8E-01	1.4E-01	8.4E+00	3.0E+00

Notes:
1. TOG was speciated according to the profile provided by BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards.
2. All PM_{10} is taken to be DPM for the purpose of health risk assessment.

Abbreviations:
BAAQMD - Bay Area Air Quality Management District
DPM - diesel particulate matter
PM - particulate matter
TOG - total organic gases
yr - year

References:
BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards:
Available Online at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf

Table 10
Construction Boats Emission Factor Derivation
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Input Parameters[1]

Equipment Type	Fuel Type	Power Rating (HP)	Classification	Engine Type[2]	Model Year[2]	HP Bin
Boat - 30' Work Boat	Gasoline	400	Pleasure Craft - Vessels W/ Outboard Engines	G2-CARB	2010	500
Boat - 16' Whaler	Gasoline	115	Pleasure Craft - Vessels W/ Outboard Engines	G2-CARB	2010	120
Boat - 16' Skiff	Gasoline	40	Pleasure Craft - Vessels W/ Outboard Engines	G2-CARB	2010	50

Exhaust Emission Factors[3]

Equipment Type	NO_x	ROG	PM	CO_2	CH_4	N_2O[4]
	g/hp-hr					
Boat - 30' Work Boat	0.23	12	7.1	636	12	0.023
Boat - 16' Whaler	2.8	10	7.1	636	10	0.023
Boat - 16' Skiff	2.6	11	7.1	636	11	0.023

ROG Evaporative Emission Factors[3]

Equipment Type	Hotsoak	Diurnal	Resting Loss	Running Loss
	g/event	g/day	g/day	g/hr
Boat - 30' Work Boat	16	24	15	2.1
Boat - 16' Whaler	16	24	15	2.1
Boat - 16' Skiff	16	24	15	2.1

Abbreviations:

CARB - California Air Resources Board
CH_4 - methane
CO_2 - carbon dioxide
g - gram
G2-CARB - 2-stroke fuel injection engine
HC - total hydrocarbons
HP - horsepower
hr - hour
N_2O - nitrous oxide
NOx - nitrogen oxides
PC - Pleasure Craft
PM - particulate matter
ROG - reactive organic gases
USEPA - United States Environmental Protection Agency

Notes:

1. Input parameters were provided by Valley Water and matched to their respective gasoline-fueled boat classifications in CARB's Pleasure Craft (PC) Model Database.
2. Since no boat engine type was provided, the most conservative engine type (2-stroke fuel-injected) was selected. Valley Water has indicated that they will use boats newer than 2010.
3. Zero-hour emission factors for NOx, ROG, PM, CO, CO_2, and CH_4 were derived from the PC Model Database. ROG emission factors were converted from total hydrocarbon emission factors based on values from the PC model.
4. N_2O emission factors sourced from the USEPA Emission Factors for Greenhouse Gas Emission Inventories, Table 5 for 2-stroke gasoline fueled ships and boats.

References:

CARB. Pleasure Craft (PC) Model Database. 2014. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road-0. Accessed January 2022.

Sea Grant Alaska. 2011. Saving Fuel on Your Recreational or Charter Boat. Available at: https://nsgl.gso.uri.edu/aku/akug11009.pdf. Accessed January 2022.

U.S. Environmental Protection Agency (USEPA). Emission Factors for Greenhouse Gas Emission Inventories. Available at: https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf. Accessed January 2022.

Table 11
Project Construction Boat Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Input Parameters[1]

Equipment Type	Fuel Type	Power Rating (HP)	Classification	Engine Type[2]	Model Year[2]	HP Bin
Boat - 30' Work Boat	Gasoline	400	Pleasure Craft - Vessels W/ Outboard Engines	G2-CARB	2010	500
Boat - 16' Whaler	Gasoline	115	Pleasure Craft - Vessels W/ Outboard Engines	G2-CARB	2010	120
Boat - 16' Skiff	Gasoline	40	Pleasure Craft - Vessels W/ Outboard Engines	G2-CARB	2010	50

Exhaust Emissions[3]

Equipment Type	NO_x	ROG	PM	CO_2	CH_4	N_2O
	ton/yr					
Boat - 30' Work Boat	0.13	6.5	4.0	356	6.4	0.013
Boat - 16' Whaler	0.44	1.6	1.1	102	1.5	0.0037
Boat - 16' Skiff	0.15	0.60	0.40	36	0.59	0.0013

ROG Evaporative Emissions[3]

Equipment Type	Hotsoak[4]	Diurnal	Resting Loss	Running Loss
	g/yr			
Boat - 30' Work Boat	11,752	1,035	1,322	3,385
Boat - 16' Whaler	11,752	1,035	1,322	3,385
Boat - 16' Skiff	11,752	1,035	1,322	3,385

Boat Emissions

Equipment Type	NO_x	ROG	PM_{10}[4]	$PM_{2.5}$[4]	CO_2	CH_4	N_2O
	ton/yr						
Boat - 30' Work Boat	0.13	6.5	3.6	2.7	356	6.4	0.013
Boat - 16' Whaler	0.44	1.6	1.0	0.78	102	1.5	0.0037
Boat - 16' Skiff	0.15	0.62	0.36	0.27	36	0.59	0.0013
Total	**0.72**	**8.7**	**5.0**	**3.7**	**494**	**8.6**	**0.018**

Abbreviations:

CARB - California Air Resources Board
CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
g - gram
G2-FI - 2-stroke fuel injection engine
HC - total hydrocarbons
HP - horsepower
hp-hr - horsepower-hour
N_2O - nitrous oxide
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
SO_2 - sulfur dioxide
SOx - sulfur oxides
USEPA - United States Environmental Protection Agency

Notes:

1. Input parameters were provided by Valley Water and matched to their respective gasoline-fueled boat classifications in CARB's Pleasure Craft (PC) Model Database.
2. Valley Water has committed to using boats of model year 2010 or newer.
3. ROG emissions were calculated following the methodology used by CARB's Pleasure Craft Model Database, which matches the OFFROAD equipment methodology. The number of engine starts was conservatively assumed to be four times per day to account for transport to and from the work area, including a lunch break, based on the workdays given by the provided construction duration and utilization.
4. PM_{10} and $PM_{2.5}$ emissions were calculated as a fraction of total PM emissions using speciation fractions of 0.9 and 0.68, respectively; these fractions were sourced from the PC Model database.

References:

CARB. Pleasure Craft (PC) Model Database. 2014. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road-0. Accessed January 2022.

Table 12
Boat TOG-Speciated Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Chemical[1]	Emission (ton/yr)		
	Boat - 30' Work Boat	Boat - 16' Whaler	Boat - 16' Skiff
1,3-Butadiene	0.043	0.010	0.0040
Acetaldehyde	0.022	0.0053	0.0020
Acrolein	0.010	0.0024	9.4E-04
Benzene	0.19	0.047	0.018
Ethylbenzene	0.083	0.020	0.0076
Formaldehyde	0.12	0.030	0.011
n-hexane	0.13	0.030	0.012
Methanol	0.0094	0.0023	8.7E-04
Methyl Ethyl Ketone	0.0016	3.8E-04	1.5E-04
Naphthalene	0.0039	9.4E-04	3.6E-04
Propene	0.24	0.058	0.022
Styrene	0.0094	0.0023	8.7E-04
Toluene	0.45	0.11	0.042
Xylenes	0.38	0.091	0.035
DPM	3.6	1.0	0.36
$PM_{2.5}$	2.7	0.78	0.27

Notes:

1. TOG was speciated according to the profile provided by BAAQMD's Recommended Methods For Screening and Modeling Local Risks and Hazards.
2. All PM_{10} is taken to be DPM for the purpose of emissions.

Abbreviations:

DPM - diesel particulate matter
PM - particulate matter
TOG - total organic gases
yr - year

References:

BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards. Available Online at:https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf

Table 13
Blasting Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

	Unmitigated Emissions						Mitigated Emissions[2]						
Year	**TSP**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**NO_X**	**SO_2**	**TSP**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**NO_X**	**SO_2**
	ton						ton						
Year 5	3.6	1.9	1.9	1.9	0.48	0.057	1.5	0.80	0.80	1.9	0.48	0.057
Year 6	13	6.9	6.9	7.2	1.8	0.22	5.8	3.0	3.0	7.2	1.8	0.22
Total	**17**	**8.7**	**8.7**	**9.1**	**2.3**	**0.27**	**7.3**	**3.8**	**3.8**	**9.1**	**2.3**	**0.27**

Notes:

1. Emissions represent the combined sum of emissions from blast hole drilling, entrained blasting dust, and criteria emisssions from blasting. Emissions assume wet drilling operation.
2. Particulate matter emissions are assumed to be controlled by 75% with complete coverage of the blasting site by wind screens, consistent with Mojave Desert Air Quality Management District Emissions Inventory Guidance.

Abbreviations:

ANFO - Amonium Nitrate/Fuel Oil
AQMD - Air Quality Management District
CO - carbon monoxide
NO_X - nitrogen oxides
PM_{10} - particulate matter with diameter of 10 micrometers or less
$PM_{2.5}$ - particulate matter with diameter of 2.5 micrometers or less
SO_2 - sulfur dioxide
TSP - total suspended particulates
USEPA - United States Environmental Protection Agency

References:

Mojave Desert AQMD. Mojave Desert AQMD Emissions Inventory Guidance for Mineral Handling and Processing Industries. November 4, 1999. Available at: https://www.mdaqmd.ca.gov/home/showpublisheddocument/768/636305689272570000. Accessed April 2023.

Mojave Desert Air Quality Management District Emissions Inventory Guidance. Section D. Bulldozing, Scraping and Grading of Materials. Available at: https://www.mdaqmd.ca.gov/home/showpublisheddocument/768/636305689272570000. Accessed April 2023.

USEPA. AP-42: Compilation of Air Emissions Factors. Section 11.9 Western Surface Coal Mining. 2010. Available at https://www.epa.gov/sites/default/files/2020-10/documents/c11s09.pdf. Accessed April 2023.

USEPA. AP-42: Compilation of Air Emissions Factors. Section 13.3 Explosives Detonation. 2010. Available at https://www.epa.gov/sites/default/files/2020-10/documents/13.3_explosives_detonation.pdf. Accessed April 2023.

Table 14-a
Emissions from Blast Hole Drilling
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Year	Number of Holes Drilled[1]	Emission Factors[2]			Unmitigated Emissions[4]			Mitigated Emissions[3,4]		
		TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
		lb/hole			ton			ton		
Year 5	5,400	1.3	0.68	0.68	3.5	1.8	1.8	0.88	0.46	0.46
Year 6	20,200				13	6.9	6.9	3.3	1.7	1.7
Total	**25,600**				**17**	**8.7**	**8.7**	**4.2**	**2.2**	**2.2**

Notes:

1. Valley Water provided blasting information that included the annual number of blast holes drilled.
2. The emission factor for TSP was selected from USEPA AP-42 Table 11.9-4. Emission factors for PM_{10} and $PM_{2.5}$ were selected from the Mojave Desert AQMD Emissions Inventory Guidance for Mineral Handling and Processing Industries, as AP-42 does not provide PM_{10} and $PM_{2.5}$ emission factors.
3. Particulate matter emissions are assumed to be controlled by 75% with complete coverage of the blasting site by wind screens, consistent with Mojave Desert Air Quality Management District Emissions Inventory Guidance.
4. This emission methodology does not include exhaust emissions from drilling equipment and assumes a wet drilling operation.

Abbreviations:

AQMD - Air Quality Management District
lb - pound
PM_{10} - particulate matter with diameter of 10 micrometers or less
$PM_{2.5}$ - particulate matter with diameter of 2.5 micrometers or less
TSP - total suspended particulates
USEPA - United States Environmental Protection Agency

References:

Mojave Desert AQMD. Mojave Desert AQMD Emissions Inventory Guidance for Mineral Handling and Processing Industries. November 4, 1999. Available at: https://www.mdaqmd.ca.gov/home/showpublisheddocument/768/636305689272570000. Accessed April 2023.

USEPA. AP-42: Compilation of Air Emissions Factors. Section 11.9 Western Surface Coal Mining. 2010. Available at https://www.epa.gov/sites/default/files/2020-10/documents/c11s09.pdf. Accessed April 2023.

Table 14-b
Blasting Dust Entrainment
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Year	Number of Blasts[1]	Area Shifted by Blasting[2]	PM Size Factor			Unmitigated Emissions[3]			Mitigated Emissions[3,4]		
			TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
		sq. ft. per blast	Unitless			ton			ton		
Year 5	66	2,953	1.00	0.52	0.52	2.6	1.4	1.4	0.66	0.34	0.34
Year 6	246					10	5.1	5.1	2.5	1.3	1.3
Total	**312**					**13**	**6.5**	**6.5**	**3.1**	**1.6**	**1.6**

Notes:

1. The number of blasts was conservatively assumed to be based on a six-foot distance between blast holes, spanning one-half the distance of the Basalt Hill Borrow Area. Total number of blast holes was provided by Valley Water.
2. Area shifted per blast was determined assuming a 6x6 foot area disturbed per blast hole.
3. Blasting dust entrainment calculations are based on the "Most Complex" Mojave Desert AQMD Guidance Methodology B for dust entrainment from blasting, consistent with guidance in USEPA AP-42 Table 11.9-2.
3. Particulate matter emissions are assumed to be controlled by 75% with complete coverage of the blasting site by wind screens, consistent with Mojave Desert Air Quality Management District Emissions Inventory Guidance.

Abbreviations:

AQMD - Air Quality Management District
PM_{10} - particulate matter with diameter of 10 micrometers or less
$PM_{2.5}$ - particulate matter with diameter of 2.5 micrometers or less
sq. ft. - square foot
TSP - total suspended particulates
USEPA - United States Environmental Protection Agency

References:

Mojave Desert AQMD. Mojave Desert AQMD Emissions Inventory Guidance for Mineral Handling and Processing Industries. November 4, 1999. Available at: https://www.mdaqmd.ca.gov/home/showpublisheddocument/768/636305689272570000. Accessed April 2023.

USEPA. AP-42: Compilation of Air Emissions Factors. Section 11.9 Western Surface Coal Mining. 2010. Available at https://www.epa.gov/sites/default/files/2020-10/documents/c11s09.pdf. Accessed April 2023.

Table 14-c
Blasting Criteria Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Year	Explosive Type[1]	Amount of Explosives Detonated[1]	Emission Factor[2]			Emissions		
			CO	NO_x	SO_2	CO	NO_x	SO_2
		ton		lb/ton			ton	
Year 5	ANFO	57	67	17	2.0	1.9	0.48	0.057
Year 6	ANFO	215				7.2	1.8	0.22
Total	**--**	**272**				**9.1**	**2.3**	**0.27**

Notes:

1. Valley Water provided blasting information that included the type and amount of explosives detonated in each year.
2. Emission factors were selected from the Mojave Desert AQMD Guidance for criteria emissions from blasting, which correspond to USEPA AP-42 Table 13.3-1. VOC emissions are considered negligible for all exlosives. TSP, PM_{10}, and $PM_{2.5}$ emissions are subsumed within the dust entrainment emissions.

Abbreviations:

ANFO - Amonium Nitrate/Fuel Oil
AQMD - Air Quality Management District
CO - carbon monoxide
lb - pound
NO_X - nitrogen oxides
PM_{10} - particulate matter with diameter of 10 micrometers or less
$PM_{2.5}$ - particulate matter with diameter of 2.5 micrometers or less
SO_2 - sulfur dioxide
USEPA - United States Environmental Protection Agency
VOC - volatile organic compounds

References:

Mojave Desert AQMD. Mojave Desert AQMD Emissions Inventory Guidance for Mineral Handling and Processing Industries. November 4, 1999. Available at: https://www.mdaqmd.ca.gov/home/showpublisheddocument/768/636305689272570000. Accessed April 2023.

USEPA. AP-42: Compilation of Air Emissions Factors. Section 11.9 Western Surface Coal Mining. 2010. Available at https://www.epa.gov/sites/default/files/2020-10/documents/c11s09.pdf. Accessed April 2023.

USEPA. AP-42: Compilation of Air Emissions Factors. Section 13.3 Explosives Detonation. 2010. Available at https://www.epa.gov/sites/default/files/2020-10/documents/13.3_explosives_detonation.pdf. Accessed April 2023.

Table 15
Blasting PM_{10} Speciated Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Chemical[1]	Multi-Pathway Pollutant?	Composition (mg/kg)[1]	Emission (lb/yr)	
			Year 5	Year 6
Silver	No	0.26	4.2E-04	0.0016
Arsenic	Yes	7.4	0.012	0.044
Barium	No	206	0.33	1.2
Beryllium	Yes	0.71	0.0011	0.0042
Cadmium	Yes	0.49	7.9E-04	0.0030
Cobalt	No	41	0.065	0.24
Chromium (Hexavalent)	Yes	315	0.025	0.094
Copper	No	77	0.12	0.46
Mercury	No	0.11	1.7E-04	6.4E-04
Molybdenum	No	2.6	0.0042	0.016
Nickel	Yes	968	1.6	5.8
Lead	Yes	8.9	0.014	0.053
Vanadium	No	70	0.11	0.42
Zinc	No	453	0.73	2.7

Notes:

1. PM_{10} was speciated according to a speciation profile based on the median and 95% UCL of data collected from onsite sampling data of soil composition for chronic and acute impacts, respectively.

2. Speciation is of PM_{10} released through blasting dust entrainment and blast hole drilling.

3. Hexavalent chromium was taken to be 5% of the total chromium composition, consistent with guidance for aggregate piles provided by the San Joaquin Valley Air Pollution Control District.

Abbreviations:

kg - kilogram
lb - pound
mg - milligram
PM - particulate matter
UCL - upper confidence level
yr - year

References:

SJVAPCD. AB 2588 Hot Spots Air Toxics Profiles. March 2017.

Table 16
Unmitigated Construction CAP Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		ton/yr			
Year 1	2024	54	19	5.6	4.3
Year 2	2025	14	162	5.4	5.2
Year 3	2026	13	151	5.1	4.9
Year 4	2027	16	179	6.0	5.7
Year 5	2028	13	150	5.0	4.7
Year 6	2029	14	159	4.9	4.7
Year 7	2030	1.6	12	0.33	0.29

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		lb/day			
Year 1	2024	**398**	**137**	41	32
Year 2	2025	**88**	**996**	33	32
Year 3	2026	**82**	**932**	32	30
Year 4	2027	**92**	**1,013**	34	32
Year 5	2028	**83**	**920**	30	29
Year 6	2029	**86**	**981**	30	29
Year 7	2030	11	**83**	2.3	2.0
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 17
Mitigated Construction CAP Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		ton/yr			
Year 1	2024	9.1	3.6	5.1	3.8
Year 2	2025	4.6	36	0.83	0.81
Year 3	2026	4.6	24	0.79	0.75
Year 4	2027	5.6	38	1.0	1.0
Year 5	2028	4.9	29	0.87	0.82
Year 6	2029	4.9	42	0.92	0.89
Year 7	2030	0.46	3.1	0.10	0.086

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		lb/day			
Year 1	2024	**67**	27	37	28
Year 2	2025	28	**223**	5.1	5.0
Year 3	2026	28	**148**	4.9	4.6
Year 4	2027	32	**213**	5.8	5.5
Year 5	2028	30	**176**	5.3	5.0
Year 6	2029	30	**259**	5.7	5.5
Year 7	2030	3.1	21	0.71	0.58
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 18
Unmitigated Construction GHG Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
			MT/yr		
Year 1	2024	4,080	46	0.071	5,257
Year 2	2025	26,286	1.0	0.23	26,381
Year 3	2026	26,639	1.0	0.25	26,741
Year 4	2027	34,465	1.3	0.35	34,604
Year 5	2028	29,170	1.1	0.30	29,287
Year 6	2029	29,723	1.2	0.32	29,847
Year 7	2030	4,032	0.14	0.064	4,054

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 19
Mitigated Construction GHG Emissions
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
			MT/yr		
Year 1	2024	4,077	7.8	0.071	4,292
Year 2	2025	26,283	1.0	0.23	26,378
Year 3	2026	26,634	1.0	0.25	26,735
Year 4	2027	34,455	1.3	0.35	34,594
Year 5	2028	29,163	1.1	0.30	29,279
Year 6	2029	29,714	1.2	0.32	29,838
Year 7	2030	4,029	0.14	0.063	4,051

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 20
Construction Phasing Schedule
Ogier Ponds Conservation Measure
Santa Clara County, CA

Year	Construction Activity	Start Date	End Date	Calendar Year	Number of Days[2]
Year 6	Miscellaneous Activities	6/1/2029	12/31/2029	2029	152
	Clear and Grub	6/1/2029	9/1/2029	2029	66
	Construction of the Haul Roads and Preparation of Stockpile Areas	6/1/2029	9/1/2029	2029	66
	Construct creek bypass system	6/1/2029	7/1/2029	2029	21
	Dewater Pond 1	6/1/2029	9/1/2029	2029	66
	Pond 1 Fill Borrow Hill Excavation	8/1/2029	10/1/2029	2029	44
	Pond 1 Fill Import from Bassalt Hill Excavation	8/1/2029	1/1/2030	2029-2030	110
Year 7	Miscellaneous Activities	6/1/2030	12/31/2030	2030	152
	Excavate and Sort Creek Materials from Holiday Bench Excavation	6/1/2030	10/1/2030	2030	87
	Bypass Channel	6/1/2030	11/1/2030	2030	110
	Berms	6/1/2030	11/1/2030	2030	110
	Spillway	11/1/2030	1/1/2031	2030-2031	44
	Outlet Culverts	11/1/2030	1/1/2031	2030-2031	44
Year 8	Miscellaneous Activities	1/1/2031	9/1/2031	2031	174
	Spillway	1/1/2031	2/1/2031	2031	23
	Outlet Culverts	1/1/2031	2/1/2031	2031	23
	Planting	4/1/2031	9/1/2031	2031	110
	Allowance -scope to be determined	1/1/2031	9/1/2031	2031	174

Notes:
1. Construction schedule and phasing information were provided by Valley Water.
2. Project construction will generally occur on Mondays through Fridays between the hours of 6 AM and 6 PM. Equipment maintenance will occur on Saturdays.

Table 21
Construction Equipment List
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Miscellaneous Activities	Year 6	7	Medium excavator	Diesel	0.5	1	172	10
	Year 6	7	Loader	Diesel	0.5	1	298	10
	Year 6	7	Light truck - Forman	Gasoline	1	1	290	10
	Year 6	7	Light truck - Crew	Gasoline	1	1	290	10
Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	Medium Bulldozer	Diesel	0.9	1	354	10
	Year 6	3	Medium excavator	Diesel	0.9	1	273	10
	Year 6	3	Motor grader	Diesel	0.9	1	290	10
	Year 6	3	Track drill rig	Diesel	0.9	1	201	10
	Year 6	3	Light truck - Forman	Gasoline	0.9	2	290	10
	Year 6	3	Light truck - Crew	Gasoline	0.9	2	290	10
	Year 6	3	Articulated dump truck	Diesel	0.9	2	496	10
	Year 6	3	Water truck	Diesel	0.9	2	330	10
	Year 6	3	Pump for water trucks	Diesel	1	1	74	10
	Year 6	3	Loader	Diesel	0.9	1	298	10
Construct creek bypass system	Year 6	1	Long-reach excavator	Diesel	0.9	1	424	10
	Year 6	1	Generator (80 kW)	Diesel	1	1	152	10
	Year 6	1	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 6	1	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 6	1	Articulated dump truck	Diesel	0.9	1	496	10
	Year 6	1	Water truck	Diesel	0.9	1	330	10
	Year 6	1	Pump for water trucks	Diesel	0.9	1	74	10
	Year 6	1	Loader	Diesel	0.9	1	298	10
Dewater Pond 1	Year 6	3	Pump	Diesel	0.7	40	17	24
	Year 6	3	Long-reach excavator	Diesel	0.9	1	424	10
	Year 6	3	Generator (80 kW)	Diesel	1	1	152	10
	Year 6	3	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 6	3	Loader	Diesel	0.9	1	298	10
Clear and Grub	Year 6	0.5	Pile Drivers	Diesel	0.5	1	355	10
	Year 6	2	Bulldozer	Diesel	0.9	1	722	10
	Year 6	2	Long-reach excavator	Diesel	0.9	1	424	10
	Year 6	2	Loader	Diesel	0.9	2	298	10
	Year 6	2	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 6	2	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 6	2	Articulated dump truck	Diesel	0.9	2	496	10
	Year 6	2	Water truck	Diesel	0.9	0	330	10
	Year 6	2	Pump for water trucks	Diesel	0.9	0	74	10
Pond 1 Fill Borrow Hill Excavation	Year 6	2	Bulldozer	Diesel	0.9	1	722	10
	Year 6	2	Long-reach excavator	Diesel	0.9	1	424	10
	Year 6	2	Loader	Diesel	0.9	1	298	10
	Year 6	2	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 6	2	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 6	2	Articulated dump truck	Diesel	0.9	20	496	10
	Year 6	2	Water truck	Diesel	0.9	1	330	10
	Year 6	2	Pump for water trucks	Diesel	0.9	1	74	10
	Year 6	2	Conveyors	Diesel	0.9	1	110	10
	Year 6	2	Soil shakers and sifters	Diesel	0.9	1	202	10
Pond 1 Fill Import from Bassalt Hill Excavation	Year 6	2	Bulldozer	Diesel	0.9	0	722	10
	Year 6	2	Long-reach excavator	Diesel	0.9	0	424	10
	Year 6	2	Loader	Diesel	0.9	1	298	10
	Year 6	2	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 6	2	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 6	2	Articulated dump truck	Diesel	0.9	20	496	10
	Year 6	2	Water truck	Diesel	0.9	1	330	10
	Year 6	2	Pump for water trucks	Diesel	0.9	1	74	10
Miscellaneous Activities	Year 7	7	Medium excavator	Diesel	0.5	1	172	10
	Year 7	7	Loader	Diesel	0.5	1	298	10
	Year 7	7	Light truck - Forman	Gasoline	1	1	290	10
	Year 7	7	Light truck - Crew	Gasoline	1	1	290	10

Table 21
Construction Equipment List
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	Bulldozer	Diesel	0.9	2	722	10
	Year 7	4	Long-reach excavator	Diesel	0.9	1	424	10
	Year 7	4	Loader	Diesel	0.9	2	298	10
	Year 7	4	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 7	4	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 7	4	Articulated dump truck	Diesel	0.9	20	496	10
	Year 7	4	Water truck	Diesel	0.9	1	330	10
	Year 7	4	Pump for water trucks	Diesel	0.9	1	74	10
Bypass Channel	Year 7	5	Bulldozer	Diesel	0.7	2	722	10
	Year 7	5	Motor grader	Diesel	0.9	1	290	10
	Year 7	5	Long-reach excavator	Diesel	0.9	1	424	10
	Year 7	5	Tamping foot roller	Diesel	0.7	1	405	10
	Year 7	5	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 7	5	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 7	5	Articulated dump truck	Diesel	0.9	2	496	10
	Year 7	5	Water truck	Diesel	0.9	1	330	10
	Year 7	5	Pump for water trucks	Diesel	0.9	1	74	10
Berms	Year 8	5	Scrapers	Diesel	0.2	2	407	10
	Year 7	5	Bulldozer	Diesel	0.7	2	722	10
	Year 7	5	Motor grader	Diesel	0.9	1	290	10
	Year 7	5	Long-reach excavator	Diesel	0.9	1	424	10
	Year 7	5	Tamping foot roller	Diesel	0.7	1	405	10
	Year 7	5	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 7	5	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 7	5	Articulated dump truck	Diesel	0.9	2	496	10
	Year 7	5	Water truck	Diesel	0.9	1	330	10
	Year 7	5	Pump for water trucks	Diesel	0.9	1	74	10
Spillway	Year 7	2	Concrete pump truck	Diesel	0.7	1	500	10
	Year 7	2	Compressor	Diesel	0.7	1	173	10
	Year 7	2	Bobcat	Diesel	0.7	1	68	10
	Year 7	2	Loader	Diesel	0.7	1	298	10
	Year 7	2	Manlift	Diesel	0.7	2	67	10
	Year 7	2	Crane 150t	Diesel	0.7	0	300	10
	Year 7	2	Pump	Diesel	1	2	17	10
	Year 7	2	Welder	Diesel	0.7	2	66	10
	Year 7	2	Concrete vibrator	Gasoline	0.7	4	6.5	10
	Year 7	2	Generator (80 kW)	Diesel	1	1	152	10
	Year 7	2	Light truck - Forman	Gasoline	1	2	290	10
	Year 7	2	Light truck - Crew	Gasoline	1	1	290	10
	Year 7	2	Light truck - Carpenters	Gasoline	1	2	290	10
Outlet Culverts	Year 7	2	Concrete pump truck	Diesel	0.7	1	500	10
	Year 7	2	Compressor	Diesel	0.7	1	173	10
	Year 7	2	Bobcat	Diesel	0.7	1	68	10
	Year 7	2	Loader	Diesel	0.7	1	298	10
	Year 7	2	Manlift	Diesel	0.7	2	67	10
	Year 7	2	Crane 150t	Diesel	0.7	1	300	10
	Year 7	2	Pump	Diesel	1	2	17	10
	Year 7	2	Welder	Diesel	0.7	2	66	10
	Year 7	2	Concrete vibrator	Gasoline	0.7	4	6.5	10
	Year 7	2	Generator (80 kW)	Diesel	1	1	152	10
	Year 7	2	Light truck - Forman	Gasoline	1	2	290	10
	Year 7	2	Light truck - Crew	Gasoline	1	1	290	10
	Year 7	2	Light truck - Carpenters	Gasoline	1	2	290	10
Miscellaneous Activities	Year 8	8	Medium excavator	Diesel	0.5	1	172	10
	Year 8	8	Loader	Diesel	0.5	1	298	10
	Year 8	8	Light truck - Forman	Gasoline	1	1	290	10
	Year 8	8	Light truck - Crew	Gasoline	1	1	290	10

Table 21
Construction Equipment List
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Spillway	Year 8	1	Concrete pump truck	Diesel	0.7	1	500	10
	Year 8	1	Compressor	Diesel	0.7	1	173	10
	Year 8	1	Bobcat	Diesel	0.7	1	68	10
	Year 8	1	Loader	Diesel	0.7	1	298	10
	Year 8	1	Manlift	Diesel	0.7	2	67	10
	Year 8	1	Crane 150t	Diesel	0.7	0	300	10
	Year 8	1	Pump	Diesel	1	2	17	10
	Year 8	1	Welder	Diesel	0.7	2	66	10
	Year 8	1	Concrete vibrator	Gasoline	0.7	4	6.5	10
	Year 8	1	Generator (80 kW)	Diesel	1	1	152	10
	Year 8	1	Light truck - Forman	Gasoline	1	2	290	10
	Year 8	1	Light truck - Crew	Gasoline	1	1	290	10
	Year 8	1	Light truck - Carpenters	Gasoline	1	2	290	10
Outlet Culverts	Year 8	1	Concrete pump truck	Diesel	0.7	1	500	10
	Year 8	1	Compressor	Diesel	0.7	1	173	10
	Year 8	1	Bobcat	Diesel	0.7	1	68	10
	Year 8	1	Loader	Diesel	0.7	1	298	10
	Year 8	1	Manlift	Diesel	0.7	2	67	10
	Year 8	1	Crane 150t	Diesel	0.7	1	300	10
	Year 8	1	Pump	Diesel	1	2	17	10
	Year 8	1	Welder	Diesel	0.7	2	66	10
	Year 8	1	Concrete vibrator	Gasoline	0.7	4	6.5	10
	Year 8	1	Generator (80 kW)	Diesel	1	1	152	10
	Year 8	1	Light truck - Forman	Gasoline	1	2	290	10
	Year 8	1	Light truck - Crew	Gasoline	1	1	290	10
	Year 8	1	Light truck - Carpenters	Gasoline	1	2	290	10
Planting	Year 8	5	Bobcat	Diesel	1	2	68	10
	Year 8	5	Loader	Diesel	1	2	298	10
	Year 8	5	Light truck - Forman	Gasoline	1	2	290	10
	Year 8	5	Light truck - Crew	Gasoline	1	1	290	10
	Year 8	5	Light truck - Carpenters	Gasoline	1	2	290	10
Allowance -scope to be determined	Year 8	8	Articulated dump truck	Diesel	0.5	2	496	10
	Year 8	8	Medium excavator	Diesel	1	1	273	10
	Year 8	8	Bulldozer	Diesel	0.5	1	354	10
	Year 8	8	Loader	Diesel	1	1	298	10
	Year 8	8	Water truck	Diesel	0.5	1	330	10
	Year 8	8	Generator (80 kW)	Diesel	1	1	152	10
	Year 8	8	Light truck - Forman	Gasoline	1	1	290	10
	Year 8	8	Light truck - Crew	Gasoline	1	1	290	10

Abbreviations:
HP - horsepower
kW - kilowatt
t - ton

Table 22-a
Fugitive Dust Emissions from Paved Road Dust
Ogier Ponds Conservation Measure
Santa Clara County, CA

Phase	Subphase	# Days	Total Trips[1]			Emissions (lb/yr)[3]	
			Worker	Vendor	Hauling	PM_{10}	$PM_{2.5}$
Year 6	Site Mobilization	66	1,980	528	0	4.7	0.70
Year 6	Control of Water	21	420	105	0	1.0	0.15
Year 6	Demolition and Clear and Grub	66	1,980	528	0	4.7	0.70
Year 6	Pond 1 Fill Borrow Hill Excavation	44	1,320	352	12,676	46	6.9
Year 6	Pond 1 Fill Import from Bassalt Hill Excavation	110	3,300	880	31,526	115	17
Year 7	Import and Sort Creek Materials from Holiday Bench Excavation	87	2,610	696	17,588	66	10
Year 7	Bypass Channel	110	3,300	880	0	7.8	1.2
Year 7	Berms	110	3,300	880	0	7.8	1.2
Year 7	Spillway	43	1,290	344	0	3.0	0.46
Year 8	Spillway	23	690	184	0	1.6	0.24
Year 7	Outlet Culverts	43	1,290	344	0	3.0	0.46
Year 8	Outlet Culverts	23	690	184	0	1.6	0.24
Year 8	Planting	110	3,300	880	0	7.8	1.2
Year 8	Allowance - Scope to be Determined	174	5,220	1,392	0	12	1.9

Notes:

1. Construction trip rates were provided by Valley Water for each subphase.
2. Emissions from paved road dust were calculated using the total trips provided by Valley Water, calculated unpaved road emission factors, and trip lengths provided in Table 23-b.
3. A 26% reduction in the PM_{10} emission factor was taken for street sweeping of arterial/collector streets, based on SCAQMD's Fugitive Dust Table XI-C.

Abbreviations:

lb - pounds
PM - particulate matter
SCAQMD - South Coast Air Quality Management District
yr - year

References:

SCAQMD. 2007. Table XI-C Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Table 22-b
Fugitive Dust Emissions from Grading Activity
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Year	Construction Activity	Total Work Days	Maximum Area Disturbed[1]	VMT[2]	Uncontrolled PM_{10} Emission Factor[3]	Uncontrolled $PM_{2.5}$ Emission Factor[4]	Emissions[5] PM_{10}		$PM_{2.5}$	
		Days	acre/day	mile/day	lb/VMT	lb/VMT	lb/day	lb/yr	lb/day	lb/yr
Year 6	Clear and Grub	66	0.75	0.52	1.5	0.17	0.31	20	0.033	2.2
Year 6	Construction of the Haul Roads and Preparation of Stockpile Areas	66	1.5	1.03			0.62	41	0.067	4.4
Year 6	Pond 1 Fill Borrow Hill Excavation	44	0.75	0.52			0.31	14	0.033	1.5
Year 7	Excavate and Sort Creek Materials from Holiday Bench Excavation	87	1.5	1.03			0.62	54	0.067	5.8
Year 7	Bypass Channel	110	2.3	1.5			0.93	102	0.10	11
Year 7	Berms	110	2.3	1.5			0.93	102	0.10	11
Year 8	Allowance -scope to be determined	174	0.75	0.52			0.31	54	0.033	5.8

Notes:

1. Maximum graded area is based on the number of crawler tractors, graders, rubber tired dozers, and scrapers used for each construction activity, as outlined in CalEEMod® User's Guide, Section 4.3.
2. VMT per day calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $VMT = A_S/W_b \times (43{,}560 \text{ sqft/acre})/(5{,}280 \text{ ft/mile})$, where:
   $A_S = A_S$, acres graded per day (varies by sub-activity)
   $12 = W_b$, blade width of grading equipment (CalEEMod® default)
3. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $EF_{PM10} = 0.051 \times (S)^{2.0} \times F_{PM10}$, where:
   $7.1 = S$, mean vehicle speed (mph) (AP-42 default)
   $0.6 = F_{PM10}$, PM_{10} scaling factor (AP-42 default)
4. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $EF_{PM2.5} = 0.04 \times (S)^{2.5} \times F_{PM2.5}$, where:
   $7.1 = S$, mean vehicle speed (mph) (AP-42 default)
   $0.031 = F_{PM2.5}$, $PM_{2.5}$ scaling factor (AP-42 default)
5. Fugitive $PM_{2.5}$ emissions from grading will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
ft - foot
lb - pound
mph - miles per hour
PM - particulate matter
sqft - square foot
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide,
Available online at: https://www.caleemod.com/documents/user-guide

Table 22-c
Fugitive Dust Emissions from Truck Loading Activity
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Subphase	Construction Phase	Material Loaded	Uncontrolled Emission Factor[1]		Annual Emissions[2]			
			PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
		ton	lb/ton material		lb/day		ton/yr	
Year 6	Pond 1 Fill Borrow Hill Excavation	128,186	8.9E-05	1.4E-05	0.10	0.015	0.0022	3.4E-04
Year 6	Pond 1 Fill Import from Bassalt Hill Excavation	318,823			0.10	0.015	0.0056	8.4E-04
Year 7	Import and Sort Creek Materials from Holiday Bench Excavation	177,868			0.071	0.011	0.0031	4.7E-04

Notes:

1. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 13.2.4 for aggregate handling. The equation is:
   $EF = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$, where the following default values are used:
   - 0.35 = k_{PM10}, PM_{10} particle size multiplier
   - 0.053 = $k_{PM2.5}$, $PM_{2.5}$ particle size multiplier
   - 2.2 = mean wind speed (U), meters per second
   - 4.9 = mean wind speed (U), miles per hour
   - 12 = material moisture content (M), %
2. Fugitive $PM_{2.5}$ emissions from truck loading will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
lb - pound
PM - particulate matter
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 22-d
Fugitive Dust Emissions from Bulldozing Activity
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Year	Construction Subphase	Equipment Work Hours[1]	Uncontrolled PM_{10} Emission Factor[2]	Uncontrolled $PM_{2.5}$ Emission Factor[3]	Annual Emissions[4]	
					PM_{10}	$PM_{2.5}$
		hr/day	lb/hr	lb/hr	ton/yr	ton/yr
Year 6	Clear and Grub	10			0.10	0.053
Year 6	Construction of the Haul Roads and Preparation of Stockpile Areas	10			0.10	0.053
Year 6	Pond 1 Fill Borrow Hill Excavation	10			0.065	0.036
Year 7	Excavate and Sort Creek Materials from Holiday Bench Excavation	20	0.75	0.41	0.26	0.14
Year 7	Bypass Channel	20			0.32	0.18
Year 7	Berms	20			0.32	0.18
Year 8	Allowance -scope to be determined	10			0.26	0.14

Notes:

1. Construction schedule is based on Project-specific estimate. Includes planned hours for all tracked dozers to be used during the given phase.
2. Emission factors were calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for bulldozing equipment. The equation is:
   $EF_{PM10} = C_{PM15} \times s^{1.5} / M^{1.4} \times F_{PM10}$, where the following default values are used:

   1.0 = C_{PM15}, arbitrary coefficient
   6.9 = s, material silt content (%)
   7.9 = M, material moisture content (%)
   0.75 = F_{PM10}, PM_{10} scaling factor
3. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for bulldozing equipment. The equation is:
   $EF_{PM2.5} = C_{TSP} \times s^{1.2} / M^{1.3} \times F_{PM2.5}$, where the following default values are used:

   5.7 = C_{TSP}, arbitrary coefficient
   6.9 = s, material silt content (%)
   7.9 = M, material moisture content (%)
   0.105 = $F_{PM2.5}$, $PM_{2.5}$ scaling factor
4. Fugitive $PM_{2.5}$ emissions from bulldozing will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
hr - hour
lb - pound
PM_{10} - particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 23-a
Onroad Construction Trips
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Subphase	Year	Number of Work Days	Construction One-way Trips[1]		
			Total Worker Trips[2]	Total Vendor Trips[2]	Total Haul Trips[2]
			(trips/day)	(trips/day)	(trips)
Site Mobilization	2029	66	30	8	0
Control of Water	2029	21	20	5	0
Demolition and Clear and Grub	2029	66	30	8	0
Pond 1 Fill Borrow Hill Excavation	2029	44	30	8	12,676
Pond 1 Fill Import from Basalt Hill Excavation	2029	110	30	8	31,526
Import and Sort Creek Materials from Holiday Bench Excavation	2030	87	30	8	17,588
Bypass Channel	2030	110	30	8	0
Berms	2030	110	30	8	0
Spillway	2030	43	30	8	0
Spillway	2031	23	30	8	0
Outlet Culverts	2030	43	30	8	0
Outlet Culverts	2031	23	30	8	0
Planting	2031	110	30	8	0

Notes:

1. Construction trip rates were provided by Valley Water for each subphase.
2. CalEEMod® default fleet mixes were used for Worker (LD_Mix), Vendor (MHDT/HHDT), and Hauling (HHDT) trips. LD_Mix was assumed to be 100% gasoline vehicles and MHDT/HHDT and HHDT were assumed to be 100% diesel vehicles.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
HHDT - heavy-heavy duty trucks
LD_Mix - light duty mix
MHDT - medium-heavy duty trucks

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 23-b
Construction Trip Lengths
Ogier Ponds Conservation Measure
Santa Clara County, CA

Trip Type	One-Way Trip Length (mi)
Worker[1]	11.7
Vendor[2]	8.4
Haul[3]	20.0

Notes:

1. Consistent with CalEEMod® methodology, worker trip length is based on the default nonresidential Home-to-Work trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

2. Consistent with CalEEMod® methodology, vendor trip length is based on the default nonresidential Work-to-Other trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

3. Consistent with CalEEMod® methodology, haul trip length is based on the default length of 20 miles as reported in the CalEEMod® user guide, Appendix A.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
mi - mile
MPO - Metropolitan Planning Organizations

References:

CalEEMod® User's Guide, Appendix C:
Available online at: https://caleemod.com/documents/user-guide/04_Appendix%20C.pdf

CalEEMod® User's Guide, Appendix G:
Available online at: https://caleemod.com/documents/user-guide/08_Appendix%20G_v2022.1.1.3.xlsx

Table 24
Construction Gasoline Truck Emissions
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Phase	Construction Subphase	Year	Onsite Truck Use[1] (hours/year)	(vehicles/year)	Onsite Truck Emissions[2,3] ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
					(lb)						(MT)			
Year 6	Miscellaneous Activities	2029	2,782	2.0	3.9	3.2	106	1.1	9.3	3.3	49	2.6E-04	3.8E-04	50
	Clear and Grub	2029	720	2.0	1.0	0.84	27	0.28	2.4	0.84	13	6.8E-05	1.0E-04	13
	Construction of the Haul Roads and Preparation of Stockpile Areas	2029	2,160	4.0	3.1	2.5	82	0.84	7.2	2.5	38	2.0E-04	3.0E-04	39
	Construct creek bypass system	2029	360	2.0	0.52	0.42	14	0.14	1.2	0.42	6.4	3.4E-05	5.0E-05	6.4
	Dewater Pond 1	2029	540	1.0	0.77	0.63	21	0.21	1.8	0.63	10	5.1E-05	7.5E-05	10
	Pond 1 Fill Borrow Hill Excavation	2029	720	2.0	1.0	0.84	27	0.28	2.4	0.84	13	6.8E-05	1.0E-04	13
	Pond 1 Fill Import from Bassalt Hill Excavation	2029	720	2.0	1.0	0.84	27	0.28	2.4	0.84	13	6.8E-05	1.0E-04	13
Year 7	Miscellaneous Activities	2030	2,800	2.0	3.7	3.2	105	1.1	9.3	3.3	49	2.4E-04	3.6E-04	49
	Excavate and Sort Creek Materials from	2030	1,456	2.0	1.9	1.6	55	0.56	4.9	1.7	26	1.3E-04	1.9E-04	26
	Bypass Channel	2030	1,800	2.0	2.4	2.0	67	0.69	6.0	2.1	32	1.6E-04	2.3E-04	32
	Berms	2030	1,800	2.0	2.4	2.0	67	0.69	6.0	2.1	32	1.6E-04	2.3E-04	32
	Spillway	2030	2,045	5.0	2.7	2.3	77	0.79	6.8	2.4	36	1.8E-04	2.6E-04	36
	Outlet Culverts	2030	2,045	5.0	2.7	2.3	77	0.79	6.8	2.4	36	1.8E-04	2.6E-04	36
Year 8	Miscellaneous Activities	2031	3,164	2.0	3.9	3.5	117	1.2	11	3.7	55	2.5E-04	3.8E-04	55
	Spillway	2031	1,000	5.0	1.2	1.1	37	0.38	3.3	1.2	17	8.1E-05	1.2E-04	18
	Outlet Culverts	2031	1,000	5.0	1.2	1.1	37	0.38	3.3	1.2	17	8.1E-05	1.2E-04	18
	Planting	2031	5,000	5.0	6.1	5.5	185	1.9	17	5.9	87	4.0E-04	6.0E-04	88
	Allowance -scope to be determined	2031	3,164	2.0	3.9	3.5	117	1.2	11	3.7	55	2.5E-04	3.8E-04	55

Notes:

1. The number of LHDT2 vehicles and schedule were provided by Valley Water.
2. Work trucks are assumed to be similar to light-heavy duty trucks (LHDT2) as defined in EMFAC2021. Emission factors are from EMFAC2021 ("Emission Rates" mode) for LHDT2 diesel vehicles (aggregated model year) in Santa Clara County. RUNEX emission factors are specific to vehicle speed of 15 mph. All other emission factor types are for aggregated speed. Emission factors were multiplied by the appropriate usage parameter based on the units. Emission factors in units of g/trip, g/mi, and g/vehicle/day, were multiplied by trips, miles, and total vehicles, respectively, in order to obtain mass emissions.
3. Global warming potentials used in the calculation of CO_2e are 1, 25, and 298 for CO_2, CH_4, and N_2O, respectively.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
g - gram
lb - pound
mi - mile
mph - miles per hour
MT - metric tonne
N_2O - nitrous oxide
NOx - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ROG - reactive organic gases
SOx - sulfur oxides

References:

California Air Resources Board. EMFAC2021. Available online at: https://arb.ca.gov/emfac/emissions-inventory

Table 25
Construction Gasoline Truck TOG-Speciated Emissions
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Year	Construction Activity	Emission (ton/yr)[1]															
		1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	n-hexane	Methanol	Methyl Ethyl Ketone	Naphthalene	Propene	Styrene	Toluene	Xylenes	DPM[2]	$PM_{2.5}$
Year 6	Miscellaneous Activities	0.019	0.0095	0.0044	0.089	0.037	0.054	0.076	0.0041	6.8E-04	0.0017	0.10	0.0041	0.22	0.17	9.3	3.3
Year 6	Clear and Grub	0.0048	0.0025	0.0011	0.023	0.010	0.014	0.020	0.0011	1.8E-04	4.4E-04	0.027	0.0011	0.057	0.044	2.4	0.84
Year 6	Construction of the Haul Roads and Preparation of Stockpile Areas	0.014	0.0074	0.0034	0.069	0.029	0.042	0.059	0.0032	5.3E-04	0.0013	0.081	0.0032	0.17	0.13	7.2	2.5
Year 6	Construct creek bypass system	0.0024	0.0012	5.7E-04	0.012	0.0049	0.0070	0.010	5.3E-04	8.8E-05	2.2E-04	0.013	5.3E-04	0.029	0.022	1.2	0.42
Year 6	Dewater Pond 1	0.0036	0.0018	8.6E-04	0.017	0.0072	0.010	0.015	7.9E-04	1.3E-04	3.3E-04	0.020	7.9E-04	0.043	0.033	1.8	0.63
Year 6	Pond 1 Fill Borrow Hill Excavation	0.0048	0.0025	0.0011	0.023	0.010	0.014	0.020	0.0011	1.8E-04	4.4E-04	0.027	0.0011	0.057	0.044	2.4	0.84
Year 6	Pond 1 Fill Import from Bassalt Hill Excavation	0.0048	0.0025	0.0011	0.023	0.010	0.014	0.020	0.0011	1.8E-04	4.4E-04	0.027	0.0011	0.057	0.044	2.4	0.84
Year 7	Miscellaneous Activities	0.017	0.0086	0.0040	0.081	0.034	0.049	0.070	0.0037	6.2E-04	0.0015	0.094	0.0037	0.20	0.16	9.3	3.3
Year 7	Excavate and Sort Creek Materials from Holiday Bench Excavation	0.0088	0.0045	0.0021	0.042	0.018	0.025	0.037	0.0019	3.2E-04	8.0E-04	0.049	0.0019	0.10	0.081	4.9	1.7
Year 7	Bypass Channel	0.011	0.0056	0.0026	0.052	0.022	0.031	0.045	0.0024	4.0E-04	0.0010	0.061	0.0024	0.13	0.10	6.0	2.1
Year 7	Berms	0.011	0.0056	0.0026	0.052	0.022	0.031	0.045	0.0024	4.0E-04	0.0010	0.061	0.0024	0.13	0.10	6.0	2.1
Year 7	Spillway	0.012	0.0063	0.0029	0.059	0.025	0.036	0.052	0.0027	4.5E-04	0.0011	0.069	0.0027	0.15	0.11	6.8	2.4
Year 7	Outlet Culverts	0.012	0.0063	0.0029	0.059	0.025	0.036	0.052	0.0027	4.5E-04	0.0011	0.069	0.0027	0.15	0.11	6.8	2.4
Year 8	Miscellaneous Activities	0.017	0.0089	0.0041	0.084	0.035	0.050	0.074	0.0038	6.3E-04	0.0016	0.10	0.0038	0.21	0.16	11	3.7
Year 8	Spillway	0.0055	0.0028	0.0013	0.027	0.011	0.016	0.024	0.0012	2.0E-04	5.0E-04	0.031	0.0012	0.066	0.051	3.3	1.2
Year 8	Outlet Culverts	0.0055	0.0028	0.0013	0.027	0.011	0.016	0.024	0.0012	2.0E-04	5.0E-04	0.031	0.0012	0.066	0.051	3.3	1.2
Year 8	Planting	0.028	0.014	0.0065	0.13	0.055	0.079	0.12	0.0060	0.0010	0.0025	0.15	0.0060	0.33	0.25	17	5.9
Year 8	Allowance -scope to be determined	0.017	0.0089	0.0041	0.084	0.035	0.050	0.074	0.0038	6.3E-04	0.0016	0.10	0.0038	0.21	0.16	11	3.7

Notes:

1. TOG was speciated according to the profile provided by BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards.
2. All PM_{10} is taken to be DPM for the purpose of health risk assessment.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
DPM - diesel particulate matter
PM - particulate matter
TOG - total organic gases
yr - year

References:

BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards:
Available Online at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf

Table 26
Unmitigated Construction CAP Emissions
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		ton/yr			
Year 6	2029	5.2	30	1.9	1.3
Year 7	2030	3.7	30	3.6	2.1
Year 8	2031	1.4	10	1.0	0.64

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		lb/day			
Year 6	2029	40	**231**	15	10
Year 7	2030	29	**228**	28	16
Year 8	2031	11	**79**	8.0	4.9
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 27
Mitigated Construction CAP Emissions
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
			ton/yr		
Year 6	2029	1.5	12	0.71	0.47
Year 7	2030	1.0	7.9	1.3	0.72
Year 8	2031	0.41	2.8	0.39	0.23

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
			lb/day		
Year 6	2029	12	**89**	5.4	3.6
Year 7	2030	7.9	**60**	10	5.5
Year 8	2031	3.2	21	3.0	1.7
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 28
Unmitigated Construction GHG Emissions
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
			MT/yr		
Year 6	2029	14,932	0.55	0.32	15,042
Year 7	2030	9,840	0.37	0.16	9,897
Year 8	2031	3,859	0.15	0.034	3,873

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 29
Mitigated Construction GHG Emissions
Ogier Ponds Conservation Measure
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
			MT/yr		
Year 6	2029	14,909	0.55	0.32	15,018
Year 7	2030	9,831	0.37	0.16	9,888
Year 8	2031	3,859	0.15	0.034	3,873

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 30
Construction Phasing Schedule
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Year	Construction Activity	Start Date	End Date	Calendar Year	Number of Days[2]
Year 1	Site Mobilization	6/1/2024	8/31/2024	2024	65
	Construction of the Haul Roads and Preparation of Stockpile Areas	7/1/2024	7/31/2024	2024	23
	Clear and Grub	8/1/2024	8/31/2024	2024	22
	Construct creek Bypass system	9/1/2024	9/30/2024	2024	21
	Dewater	10/1/2024	10/31/2024	2024	23
	Roughened Ramp	11/1/2024	12/31/2024	2024	43
Year 2	Roughened Ramp	1/1/2025	7/31/2025	2025	152
	Planting	6/1/2025	8/30/2025	2025	65

Notes:

1. Construction schedule and phasing information were provided by Valley Water.
2. Project construction will generally occur on Mondays through Fridays between the hours of 6 AM and 6 PM. Equipment maintenance will occur on Saturdays.

Table 31
Construction Equipment
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Site Mobilization	Year 1	3	Medium excavator	Diesel	0.5	1	172	10
	Year 1	3	Loader	Diesel	0.5	1	298	10
	Year 1	3	Light truck - Forman	Gasoline	1	1	290	10
	Year 1	3	Light truck - Crew	Gasoline	1	1	290	10
Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	1	Medium Bulldozer	Diesel	0.9	1	354	10
	Year 1	1	Medium excavator	Diesel	0.9	1	273	10
	Year 1	1	Loader	Diesel	0.9	1	298	10
	Year 1	1	Motor grader	Diesel	0.9	1	290	10
	Year 1	1	Small backhoe	Diesel	1	1	70	10
	Year 1	1	Track drill rig	Diesel	0.9	2	201	10
	Year 1	1	Light truck - Forman	Gasoline	0.9	2	290	10
	Year 1	1	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 1	1	Articulated dump truck	Diesel	0.9	2	496	10
	Year 1	1	Water truck	Diesel	0.9	2	330	10
	Year 1	1	Pump for water trucks	Diesel	1	1	74	10
	Year 1	1	No Equipment - Crew	-	1	-	-	10
Clear and Grub	Year 1	1	Bulldozer	Diesel	0.9	1	722	10
	Year 1	1	Long-reach excavator	Diesel	0.9	1	424	10
	Year 1	1	Loader	Diesel	0.9	1	298	10
	Year 1	1	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 1	1	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 1	1	Articulated dump truck	Diesel	0.9	1	496	10
	Year 1	1	Water truck	Diesel	0.9	1	330	10
	Year 1	1	Pump for water trucks	Diesel	0.9	1	74	10
	Year 1	1	No Equipment - Crew	-	1	-	-	10
Construct creek Bypass system	Year 1	1	Long-reach excavator	Diesel	0.9	1	424	10
	Year 1	1	Generator (80 kW)	Diesel	1	1	152	10
	Year 1	1	Small backhoe	Diesel	1	1	70	10
	Year 1	1	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 1	1	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 1	1	Articulated dump truck	Diesel	0.9	1	496	10
	Year 1	1	Water truck	Diesel	0.9	1	330	10
	Year 1	1	Pump for water trucks	Diesel	0.9	1	74	10
	Year 1	1	Loader	Diesel	0.9	1	298	10
	Year 1	1	No Equipment - Crew	-	1	-	-	10
Dewater	Year 1	1	Pump	Diesel	0.7	4	17	24
	Year 1	1	Small backhoe	Diesel	1	1	70	10
	Year 1	1	Long-reach excavator	Diesel	0.9	1	424	10
	Year 1	1	Generator (80 kW)	Diesel	1	1	152	10
	Year 1	1	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 1	1	Loader	Diesel	0.9	1	298	10
	Year 1	1	No Equipment - Crew	-	1	-	-	10

Table 31
Construction Equipment
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Roughened Ramp	Year 1	2	Bulldozer	Diesel	0.9	1	722	10
	Year 1	2	Long-reach excavator	Diesel	0.9	1	424	10
	Year 1	2	Small backhoe	Diesel	1	1	70	10
	Year 1	2	Loader	Diesel	0.9	1	298	10
	Year 1	2	Bobcat	Diesel	0.9	1	68	10
	Year 1	2	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 1	2	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 1	2	Articulated dump truck	Diesel	0.9	2	496	10
	Year 1	2	Water truck	Diesel	0.9	1	330	10
	Year 1	2	Pump for water trucks	Diesel	0.9	1	74	10
	Year 1	2	No Equipment - Crew	-	1	-	-	10
	Year 2	7	Bulldozer	Diesel	0.9	1	722	10
	Year 2	7	Long-reach excavator	Diesel	0.9	1	424	10
	Year 2	7	Small backhoe	Diesel	1	1	70	10
	Year 2	7	Loader	Diesel	0.9	1	298	10
	Year 2	7	Bobcat	Diesel	0.9	1	68	10
	Year 2	7	Light truck - Forman	Gasoline	0.9	1	290	10
	Year 2	7	Light truck - Crew	Gasoline	0.9	1	290	10
	Year 2	7	Articulated dump truck	Diesel	0.9	2	496	10
	Year 2	7	Water truck	Diesel	0.9	1	330	10
	Year 2	7	Pump for water trucks	Diesel	0.9	1	74	10
	Year 2	7	No Equipment - Crew	-	1	-	-	10
Planting	Year 2	3	Bobcat	Diesel	1	2	68	10
	Year 2	3	Loader	Diesel	1	2	298	10
	Year 2	3	Bobcat	Diesel	0.9	1	68	10
	Year 2	3	Light truck - Forman	Gasoline	1	2	290	10
	Year 2	3	Light truck - Crew	Gasoline	1	1	290	10
	Year 2	3	Light truck - Carpenters	Gasoline	1	2	290	10
	Year 2	3	No Equipment - Crew	-	1	-	-	10

Notes:

1. A list of equipment was provided by Valley Water. In cases where equipment appeared on the most recent project description but did not appear on the equipment list, this equipment was added to the air quality analysis.

Abbreviations:

HP - horsepower
kW - kilowatts

Table 32-a
Fugitive Dust Emissions from Paved Road Dust
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Phase	Subphase	# Days	Total Trips[1]			Emissions (lb/yr)[2,3]	
			Worker	Vendor	Hauling	PM_{10}	$PM_{2.5}$
Year 1	Site Mobilization	65	650	130	1	1.5	0.22
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	23	863	173	20	2.0	0.30
Year 1	Clear and Grub	22	440	88	20	1.1	0.16
Year 1	Construct Creek Bypass System	21	473	95	50	1.2	0.19
Year 1	Dewater	23	518	104	10	1.2	0.18
Year 1	Roughened Ramp	43	1,183	860	660	5.8	0.87
Year 2	Roughened Ramp	152	4,180	3,040	2,334	21	3.1
Year 2	Planting	65	1,625	325	26	3.8	0.57

Notes:

1. Construction trip rates were provided by Valley Water for each subphase.
2. Emissions from paved road dust were calculated using the total trips provided by Valley Water, calculated unpaved road emission factors, and trip lengths provided in Table 33-b.
3. A 26% reduction in the PM_{10} emission factor was taken for street sweeping of arterial/collector streets, based on SCAQMD's Fugitive Dust Table XI-C.

Abbreviations:

lb - pounds
PM - particulate matter
SCAQMD - South Coast Air Quality Management District
yr - year

References:

SCAQMD. 2007. Table XI-C Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Table 32-b
Fugitive Dust Emissions from Grading Activity
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Year	Construction Activity	Total Work Days	Maximum Area Disturbed[1]	VMT[2]	Uncontrolled PM_{10} Emission Factor[3]	Uncontrolled $PM_{2.5}$ Emission Factor[4]	Emissions[5]			
							PM_{10}		$PM_{2.5}$	
		Days	acre/day	mile/day	lb/VMT	lb/VMT	lb/day	lb/yr	lb/day	lb/yr
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	23	1.5	1.0	1.5	0.17	0.62	14	0.067	1.5
Year 1	Clear and Grub	22	0.75	0.52			0.31	6.8	0.033	0.74
Year 1	Roughened Ramp	43	0.75	0.52			0.31	13	0.033	1.4
Year 2	Roughened Ramp	152	0.75	0.52			0.31	47	0.033	5.1

Notes:

1. Maximum graded area is based on the number of crawler tractors, graders, rubber tired dozers, and scrapers used for each construction activity, as outlined in CalEEMod® User's Guide, Section 4.3.
2. VMT per day calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $VMT = A_S/W_b \times (43{,}560 \text{ sqft/acre})/(5{,}280 \text{ ft/mile})$, where:
   A_S = A_S, acres graded per day (varies by sub-activity)
   12 = W_b, blade width of grading equipment (CalEEMod® default)
3. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $EF_{PM10} = 0.051 \times (S)^{2.0} \times F_{PM10}$, where:
   7.1 = S, mean vehicle speed (mph) (AP-42 default)
   0.6 = F_{PM10}, PM_{10} scaling factor (AP-42 default)
4. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $EF_{PM2.5} = 0.04 \times (S)^{2.5} \times F_{PM2.5}$, where:
   7.1 = S, mean vehicle speed (mph) (AP-42 default)
   0.031 = $F_{PM2.5}$, $PM_{2.5}$ scaling factor (AP-42 default)
5. Fugitive $PM_{2.5}$ emissions from grading will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
ft - foot
lb - pound
mph - miles per hour
PM - particulate matter
sqft - square foot
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 32-c
Fugitive Dust Emissions from Truck Loading Activity
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Phase	Construction Subphase	Material Loaded	Uncontrolled Emission Factor[1]		Annual Emissions[2]	
			PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
		ton	lb/ton material		ton/yr	ton/yr
Site Mobilization	Year 1	569	8.9E-05	1.4E-05	9.9E-06	1.5E-06
Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	1,429			2.5E-05	3.8E-06
Dewater	Year 1	1,517			2.6E-05	4.0E-06
Roughened Ramp	Year 1	7,728			1.3E-04	2.0E-05
Roughened Ramp	Year 2	27,319			4.8E-04	7.2E-05
Planting	Year 2	265			4.6E-06	7.0E-07

Notes:

1. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 13.2.4 for aggregate handling. The equation is:

$EF = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$, where the following default values are used:

0.35 = k_{PM10}, PM_{10} particle size multiplier
0.053 = $k_{PM2.5}$, $PM_{2.5}$ particle size multiplier
2.2 = mean wind speed (U), meters per second
4.9 = mean wind speed (U), miles per hour
12 = material moisture content (M), %

2. Fugitive PM emissions from truck loading will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
lb - pound
PM - particulate matter
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 32-d
Fugitive Dust Emissions from Bulldozing Activity
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Year	Construction Subphase	Equipment Work Hours[1]	Uncontrolled PM_{10} Emission Factor[2]	Uncontrolled $PM_{2.5}$ Emission Factor[3]	Annual Emissions[4]	
					PM_{10}	$PM_{2.5}$
		hr/day	lb/hr	lb/hr	ton/yr	ton/yr
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	9	0.75	0.41	0.030	0.017
Year 1	Clear and Grub	9			0.029	0.016
Year 1	Roughened Ramp	9			0.057	0.031
Year 2	Roughened Ramp	9			0.20	0.11

Notes:

1. Construction schedule is based on Project-specific estimate. Includes planned hours for all tracked dozers to be used during the given phase.
2. Emission factors were calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for bulldozing equipment. The equation is:
   $EF_{PM10} = C_{PM15} \times s^{1.5} / M^{1.4} \times F_{PM10}$, where the following default values are used:

   1.0 = C_{PM15}, arbitrary coefficient
   6.9 = s, material silt content (%)
   7.9 = M, material moisture content (%)
   0.75 = F_{PM10}, PM_{10} scaling factor
3. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 11.9 for bulldozing equipment. The equation is:
   $EF_{PM2.5} = C_{TSP} \times s^{1.2} / M^{1.3} \times F_{PM2.5}$, where the following default values are used:

   5.7 = C_{TSP}, arbitrary coefficient
   6.9 = s, material silt content (%)
   7.9 = M, material moisture content (%)
   0.105 = $F_{PM2.5}$, $PM_{2.5}$ scaling factor
4. Fugitive $PM_{2.5}$ emissions from bulldozing will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - emission factor
hr - hour
lb - pound
PM_{10} - particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 33-a
Onroad Construction Trips
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Subphase	Year	Number of Work Days	Construction One-way Trips[1] Total Worker Trips[2] (trips/day)	Total Vendor Trips[2] (trips/day)	Total Haul Trips[2] (trips)
Site Mobilization	2024	65	10	2	1
Construction of the Haul Roads and Preparation of Stockpile Areas	2024	23	38	8	20
Clear and Grub	2024	22	20	4	20
Construct creek Bypass system	2024	21	23	5	50
Dewater	2024	23	23	5	10
Roughened Ramp	2024	43	28	20	660
Roughened Ramp	2025	152	28	20	2,334
Planting	2025	65	25	5	26

Notes:

1. Worker, vendor and haul truck trips were provided by the Project Applicant.
2. CalEEMod® default fleet mixes were used for Worker (LD_Mix), Vendor (MHDT/HHDT), and Hauling (HHDT) trips. LD_Mix was assumed to be 100% gasoline vehicles and MHDT/HHDT and HHDT were assumed to be 100% diesel vehicles.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
HHDT - heavy-heavy duty trucks
LD_Mix - light duty mix
MHDT - medium-heavy duty trucks

References:

CalEEMod® User's Guide:
Available online at: https://caleemod.com/documents/user-guide/

Table 33-b
Construction Trip Lengths
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Trip Type	One-Way Trip Length (mi)
Worker[1]	11.7
Vendor[2]	8.4
Haul[3]	20.0

Notes:

1. Consistent with CalEEMod® methodology, worker trip length is based on the default nonresidential Home-to-Work trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

2. Consistent with CalEEMod® methodology, vendor trip length is based on the default nonresidential Work-to-Other trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

3. Consistent with CalEEMod® methodology, haul trip length is based on the default length of 20 miles as reported in the CalEEMod® user guide, Appendix A.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
mi - mile
MPO - Metropolitan Planning Organizations

References:

CalEEMod® User's Guide, Appendix C:
Available online at: https://caleemod.com/documents/user-guide/04_Appendix%20C.pdf

CalEEMod® User's Guide, Appendix G:
Available online at: https://caleemod.com/documents/user-guide/08_Appendix%20G_v2022.1.1.3.xlsx

Table 34
Construction Gasoline Truck Emissions
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Phase	Construction Subphase	Year	Onsite Truck Use[1] (hours/year)	(vehicles /year)	Onsite Truck Emissions[2,3] ROG (lb)	NOx (lb)	CO (lb)	SOx (lb)	PM_{10} (lb)	$PM_{2.5}$ (lb)	CO_2 (MT)	CH_4 (MT)	N_2O (MT)	CO_2e (MT)
Year 1	Site Mobilization	2024	1,182	2.0	2.8	8.9	55	0.49	3.9	1.4	22	2.0E-04	2.5E-04	22
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	2024	565	3.0	1.3	4.2	26	0.23	1.9	0.67	11	9.5E-05	1.2E-04	11
Year 1	Clear and Grub	2024	360	2.0	0.86	2.7	17	0.15	1.2	0.43	6.8	6.1E-05	7.7E-05	6.8
Year 1	Construct creek Bypass system	2024	344	2.0	0.82	2.6	16	0.14	1.1	0.41	6.5	5.8E-05	7.4E-05	6.5
Year 1	Dewater	2024	188	1.0	0.45	1.4	8.7	0.077	0.63	0.22	3.6	3.2E-05	4.0E-05	3.6
Year 1	Roughened Ramp	2024	704	2.0	1.7	5.3	33	0.29	2.4	0.83	13	1.2E-04	1.5E-04	13
Year 2	Roughened Ramp	2025	2,487	2.0	5.3	17	111	1.0	8.3	2.9	46	3.8E-04	4.9E-04	46
Year 2	Planting	2025	2,955	5.0	6.4	20	132	1.2	10	3.5	55	4.5E-04	5.8E-04	55

Notes:

1. The number of LHDT2 vehicles and schedule were provided by Valley Water.
2. Work trucks are assumed to be similar to light-heavy duty trucks (LHDT2) as defined in EMFAC2021. Emission factors are from EMFAC2021 ("Emission Rates" mode) for LHDT2 diesel vehicles (aggregated model year) in Santa Clara County. RUNEX emission factors are specific to vehicle speed of 15 mph. All other emission factor types are for aggregated speed. Emission factors were multiplied by the appropriate usage parameter based on the units. Emission factors in units of g/trip, g/mi, and g/vehicle/day, were multiplied by trips, miles, and total vehicles, respectively, in order to obtain mass emissions.
3. Global warming potentials used in the calculation of CO_2e are 1, 25, and 298 for CO_2, CH_4, and N_2O, respectively.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
g - gram
lb - pound
mi - mile
mph - miles per hour
MT - metric tonne
N_2O - nitrous oxide
NOx - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ROG - reactive organic gases
SOx - sulfur oxides

References:

California Air Resources Board. EMFAC2021. Available online at: https://arb.ca.gov/emfac/emissions-inventory

Table 35
Construction Gasoline Truck TOG-Speciated Emissions
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Year	Construction Activity	Emission (ton/yr)[1]															
		1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	n-hexane	Methanol	Methyl Ethyl Ketone	Naphthalene	Propene	Styrene	Toluene	Xylenes	DPM	$PM_{2.5}$
Year 1	Site Mobilization	0.016	0.0079	0.0037	0.073	0.031	0.045	0.057	0.0034	5.7E-04	0.0014	0.087	0.0034	0.18	0.14	3.9	1.4
Year 1	Construction of the Haul Roads and Preparation of Stockpile Areas	0.0074	0.0038	0.0018	0.035	0.015	0.021	0.027	0.0016	2.7E-04	6.8E-04	0.041	0.0016	0.084	0.067	1.9	0.67
Year 1	Clear and Grub	0.0048	0.0024	0.0011	0.022	0.0094	0.014	0.017	0.0010	1.7E-04	4.3E-04	0.026	0.0010	0.054	0.043	1.2	0.43
Year 1	Construct creek Bypass system	0.0045	0.0023	0.0011	0.021	0.0089	0.013	0.017	0.0010	1.6E-04	4.1E-04	0.025	0.0010	0.051	0.041	1.1	0.41
Year 1	Dewater	0.0025	0.0013	5.9E-04	0.012	0.0049	0.0071	0.0091	5.4E-04	9.0E-05	2.3E-04	0.014	5.4E-04	0.028	0.022	0.63	0.22
Year 1	Roughened Ramp	0.0093	0.0047	0.0022	0.043	0.018	0.027	0.034	0.0020	3.4E-04	8.4E-04	0.052	0.0020	0.10	0.084	2.4	0.83
Year 2	Roughened Ramp	0.029	0.015	0.0069	0.14	0.057	0.084	0.11	0.0064	0.0011	0.0027	0.16	0.0064	0.33	0.26	8.3	2.9
Year 2	Planting	0.035	0.018	0.0082	0.16	0.068	0.10	0.13	0.0076	0.0013	0.0032	0.19	0.0076	0.39	0.31	10	3.5

Notes:

1. TOG was speciated according to the profile provided by BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards.
2. All PM_{10} is taken to be DPM for the purpose of health risk assessment.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
DPM - diesel particulate matter
PM - particulate matter
TOG - total organic gases
yr - year

References:

BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards:
Available Online at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf

Table 36
Unmitigated Construction CAP Emissions
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		ton/yr			
Year 1	2024	0.35	2.9	0.47	0.28
Year 2	2025	0.46	3.9	0.69	0.43

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		lb/day			
Year 1	2024	4.6	39	6.2	3.7
Year 2	2025	5.3	45	7.9	5.0
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 37
Mitigated Construction CAP Emissions
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		ton/yr			
Year 1	2024	0.086	0.73	0.16	0.083
Year 2	2025	0.13	1.1	0.24	0.14

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		lb/day			
Year 1	2024	1.1	10	2.1	1.1
Year 2	2025	1.5	13	2.8	1.6
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 38
Unmitigated Construction GHG Emissions
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
			MT/yr		
Year 1	2024	779	0.028	0.013	783
Year 2	2025	1,186	0.040	0.027	1,196

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 39
Mitigated Construction GHG Emissions
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
		MT/yr			
Year 1	2024	778	0.028	0.012	782
Year 2	2025	1,184	0.040	0.027	1,193

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 40
Construction Phasing Schedule
Sediment Augmentation Program
Santa Clara County, CA

Year	Construction Activity	Start Date	End Date	Number of Days[2]
Year 8	Placement of sediment (500 cy)	6/1/2031	6/2/2031	2

Notes:

1. Construction schedule and phasing information for Year 8 were provided by Valley Water.

2. Project construction will generally occur on Mondays through Fridays between the hours of 6 AM and 6 PM. Equipment maintenance will occur on Saturdays.

Abbreviations:

cy - cubic yard

Table 41
Construction Equipment
Sediment Augmentation Program
Santa Clara County, CA

Construction Activity	Construction Year	Approximate Duration (months)	Equipment Type	Fuel Type	Utilization Factor	Equipment Quantity	Power Rating (HP)	Operating Hours/Day
Placement of sediment (500 cy)	Year 8	0.09	Loaders	Diesel	1	1	298	10

Notes:

1. Construction activities and construction equipment was provided by the Project Applicant for Year 8.

Abbreviations:

cy - cubic yard
HP - horsepower

Table 42-a
Fugitive Dust Emissions from Paved Road Dust
Sediment Augmentation Program
Santa Clara County, CA

Phase	Subphase	# Days	Total Trips[1]			Emissions (lb/yr)[2,3]	
			Worker	Vendor	Hauling	PM_{10}	$PM_{2.5}$
Year 8	Placement of sediment (500 cy)	2	30	32	16	0.16	0.024

Notes:

1. Construction trip rates were provided by Valley Water.

2. Emissions from paved road dust were calculated using the total trips provided by Valley Water, calculated unpaved road emission factors, and trip lengths provided in Table 43-b.

3. A 26% reduction in the PM_{10} emission factor was taken for street sweeping of arterial/collector streets, based on SCAQMD's Fugitive Dust Table XI-C.

Abbreviations:

cy - cubic yard
lb - pound
PM - particulate matter
SCAQMD - South Coast Air Quality Management District
yr - year

References:

SCAQMD. 2007. Table XI-C Mitigation Measure Examples:
Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Table 42-b
Fugitive Dust Emissions from Truck Loading Activity
Sediment Augmentation Program
Santa Clara County, CA

Construction Phase	Construction Subphase	Material Loaded	Uncontrolled Emission Factor[1]		Annual Emissions[2]	
			PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
		ton	lb/ton material		ton/yr	ton/yr
Placement of sediment (500 cy)	Year 8	632	8.93E-05	1.35E-05	1.1E-05	1.7E-06

Notes:

1. Emission factor calculated following guidance in the CalEEMod® User's Guide, which is based on AP-42, Section 13.2.4 for aggregate handling. The equation is:

   $EF = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$, where the following default values are used:

   0.35 = k_{PM10}, PM_{10} particle size multiplier
   0.053 = $k_{PM2.5}$, $PM_{2.5}$ particle size multiplier
   2.2 = mean wind speed (U), meters per second
   4.9 = mean wind speed (U), miles per hour
   12 = material moisture content (M), %

2. Fugitive $PM_{2.5}$ emissions from truck loading will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 61% per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
cy - cubic yard
EF - emission factor
lb - pound
PM - particulate matter
VMT - vehicle miles traveled
yr - year

References:

CalEEMod® User's Guide:
Available online at: https://www.caleemod.com/user-guide

Table 43-a
Onroad Construction Trips
Sediment Augmentation Program
Santa Clara County, CA

Construction Subphase	Year	Construction One-way Trips[1] Total Worker Trips[2] (trips/day)	Total Vendor Trips[2] (trips/day)	Total Haul Trips[2] (trips)
Placement of sediment (500 cy)	2031	15	16	16

Notes:
1. Construction trip rates were provided by Valley Water.
2. CalEEMod® default fleet mixes were used for Worker (LD_Mix), Vendor (MHDT/HHDT), and Hauling (HHDT) trips. LD_Mix was assumed to be 100% gasoline vehicles and MHDT/HHDT and HHDT were assumed to be 100% diesel vehicles.

Abbreviations:
CalEEMod® - California Emissions Estimator Model
cy - cubic yard
HHDT - heavy-heavy duty trucks
LD_Mix - light duty mix
MHDT - medium-heavy duty trucks

References:
CalEEMod® User's Guide:
Available online at: https://caleemod.com/documents/user-guide/

Table 43-b
Construction Trip Lengths
Sediment Augmentation Program
Santa Clara County, CA

Trip Type	One-Way Trip Length (mi)
Worker[1]	11.7
Vendor[2]	8.4
Haul[3]	20.0

Notes:

1. Consistent with CalEEMod® methodology, worker trip length is based on the default nonresidential Home-to-Work trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

2. Consistent with CalEEMod® methodology, vendor trip length is based on the default nonresidential Work-to-Other trip length for the Metropolitan Transportation Commission MPO as reported in the CalEEMod® user guide, Appendix G Table G-16.

3. Consistent with CalEEMod® methodology, haul trip length is based on the default length of 20 miles as reported in the CalEEMod® user guide, Appendix A.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
mi - mile
MPO - Metropolitan Planning Organizations

References:

CalEEMod® User's Guide, Appendix C:
Available online at: https://caleemod.com/documents/user-guide/04_Appendix%20C.pdf

CalEEMod® User's Guide, Appendix G:
Available online at: https://caleemod.com/documents/user-guide/08_Appendix%20G_v2022.1.1.3.xlsx

Table 44
Construction Gasoline Truck Emissions
Sediment Augmentation Program
Santa Clara County, CA

Construction Phase	Construction Subphase	Year	Onsite Truck Use[1] (hours/year)	(vehicles/year)	Onsite Truck Emissions[2,3] ROG (lb)	NOx (lb)	CO (lb)	SOx (lb)	PM_{10} (lb)	$PM_{2.5}$ (lb)	CO_2 (MT)	CH_4 (MT)	N_2O (MT)	CO_2e (MT)
Year 8	Placement of sediment (500 cy)	2031	40	2	0.059	0.15	1.5	0.015	0.13	0.047	0.70	3.4E-06	4.8E-06	0.70

Notes:
1. The number of gasoline vehicles and schedule were provided by Valley Water.
2. Work trucks are assumed to be similar to light-heavy duty trucks (LHDT2) as defined in EMFAC2021. Emission factors are from EMFAC2021 ("Emission Rates" mode) for LHDT2 diesel vehicles (aggregated model year) in Santa Clara County. RUNEX emission factors are specific to vehicle speed of 15 mph. All other emission factor types are for aggregated speed. Emission factors were multiplied by the appropriate usage parameter based on the units. Emission factors in units of g/trip, g/mi, and g/vehicle/day, were multiplied by trips, miles, and total vehicles, respectively, in order to obtain mass emissions.

3. Global warming potentials used in the calculation of CO_2e are 1, 25, and 298 for CO_2, CH_4, and N_2O, respectively.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
cy - cubic yard
g - gram
lb - pound
mi - mile
mph - miles per hour
MT - metric tonne
N_2O - nitrous oxide
NOx - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ROG - reactive organic gases
SOx - sulfur oxides

References:

California Air Resources Board. EMFAC2021. Available online at: https://arb.ca.gov/emfac/emissions-inventory

Table 45
Construction Gasoline Truck TOG-Speciated Emissions
Sediment Augmentation Program
Santa Clara County, CA

Construction Year	Construction Activity	Emission (ton/yr)[1]															
		1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	n-hexane	Methanol	Methyl Ethyl Ketone	Naphthalene	Propene	Styrene	Toluene	Xylenes	DPM	$PM_{2.5}$
Year 8	Placement of sediment (500 cy)	2.3E-04	1.2E-04	5.5E-05	0.0011	4.8E-04	6.7E-04	0.0011	5.1E-05	8.4E-06	2.1E-05	0.0013	5.1E-05	0.0029	0.0022	0.13	0.047

Notes:
1. TOG was speciated according to the profile provided by BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards.
2. All PM_{10} is taken to be DPM for the purpose of health risk assessment.

Abbreviations:
BAAQMD - Bay Area Air Quality Management District
cy - cubic yard
DPM - diesel particulate matter
PM - particulate matter
TOG - total organic gases
yr - year

References:
BAAQMD Recommended Methods For Screening and Modeling Local Risks and Hazards:
Available Online at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf

Table 46
Unmitigated Construction CAP Emissions
Sediment Augmentation Program
Santa Clara County, CA

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		ton/yr			
Year 8	2031	4.6E-04	0.0031	2.5E-04	1.2E-04

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		lb/day			
Year 8	2031	0.46	3.1	0.25	0.12
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District

CAP - criteria air pollutants

CEQA - California Environmental Quality Act

lb - pound

NOx - nitrogen oxides

PM - particulate matter

ROG - reactive organic gases

yr - year

Table 47
Mitigated Construction CAP Emissions
Sediment Augmentation Program
Santa Clara County, CA

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		ton/yr			
Year 8	2031	2.1E-04	0.0017	1.9E-04	7.4E-05

Construction Year		ROG	NOx	PM_{10}	$PM_{2.5}$
		lb/day			
Year 8	2031	0.21	1.7	0.19	0.074
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 48
Unmitigated Construction GHG Emissions
Sediment Augmentation Program
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
		MT/yr			
Year 8	2031	2.8	5.3E-05	1.4E-04	2.8

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 49
Mitigated Construction GHG Emissions
Sediment Augmentation Program
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
		MT/yr			
Year 8	2031	2.8	5.3E-05	1.4E-04	2.8

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 50
Unmitigated Construction CAP Emissions
Anderson Dam Seismic Retrofit Project & Conservation Measures
Santa Clara County, CA

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		ton/yr			
Year 1	2024	55	22	6.1	4.6
Year 2	2025	15	166	5.6	5.6
Year 3	2026	13	151	5.1	4.9
Year 4	2027	16	179	6.0	5.7
Year 5	2028	13	150	5.0	4.7
Year 6	2029	19	189	6.8	6.0
Year 7	2030	5.3	42	3.9	2.4
Year 8	2031	1.4	10	1.0	0.64

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		lb/day			
Year 1	2024	**401**	**159**	45	34
Year 2	2025	**91**	**1,020**	34	34
Year 3	2026	**82**	**932**	32	30
Year 4	2027	**92**	**1,013**	34	32
Year 5	2028	**83**	**920**	30	29
Year 6	2029	**118**	**1,166**	42	37
Year 7	2030	36	**285**	27	16
Year 8	2031	11	**79**	8.0	4.9
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 51
Mitigated Construction CAP Emissions
Anderson Dam Seismic Retrofit Project & Conservation Measures
Santa Clara County, CA

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		ton/yr			
Year 1	2024	9.2	4.3	5.2	3.9
Year 2	2025	4.7	37	0.87	0.95
Year 3	2026	4.6	24	0.79	0.75
Year 4	2027	5.6	38	1.0	1.0
Year 5	2028	4.9	29	0.87	0.82
Year 6	2029	6.4	54	1.6	1.4
Year 7	2030	1.5	11	1.4	0.81
Year 8	2031	0.41	2.8	0.39	0.23

Construction Year		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
		lb/day			
Year 1	2024	**68**	32	38	29
Year 2	2025	29	**230**	5.3	5.8
Year 3	2026	28	**148**	4.9	4.6
Year 4	2027	32	**213**	5.8	5.5
Year 5	2028	30	**176**	5.3	5.0
Year 6	2029	39	**330**	10	8.4
Year 7	2030	10	**75**	10	5.5
Year 8	2031	3.2	21	3.0	1.7
BAAQMD Threshold[1]		54	54	82	54

Notes:

1. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. For PM, this includes exhaust emissions only. Fugitive emissions are controlled by BAAQMD Best Management Practices.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAP - criteria air pollutants
CEQA - California Environmental Quality Act
lb - pound
NOx - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

Table 52
Unmitigated Construction GHG Emissions
Anderson Dam Seismic Retrofit Project & Conservation Measures
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
			MT/yr		
Year 1	2024	4,859	46	0.084	6,040
Year 2	2025	27,472	1.1	0.26	27,577
Year 3	2026	26,639	1.0	0.25	26,741
Year 4	2027	34,465	1.3	0.35	34,604
Year 5	2028	29,170	1.1	0.30	29,287
Year 6	2029	44,654	1.7	0.64	44,889
Year 7	2030	13,872	0.51	0.23	13,952
Year 8	2031	3,862	0.15	0.035	3,876

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 53
Mitigated Construction GHG Emissions
Anderson Dam Seismic Retrofit Project & Conservation Measures
Santa Clara County, CA

Construction Year		CO_2	CH_4	N_2O	CO_2e
		MT/yr			
Year 1	2024	4,855	7.8	0.083	5,075
Year 2	2025	27,467	1.1	0.26	27,571
Year 3	2026	26,634	1.0	0.25	26,735
Year 4	2027	34,455	1.3	0.35	34,594
Year 5	2028	29,163	1.1	0.30	29,279
Year 6	2029	44,623	1.7	0.64	44,856
Year 7	2030	13,860	0.51	0.22	13,939
Year 8	2031	3,862	0.15	0.034	3,876

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - CO_2-equivalent emissions
GHG - greenhouse gases
MT - metric tonne
N_2O - nitrous oxide
yr - year

Table 54
Exposure Parameters
Anderson Dam Seismic Retrofit Project and Conservation Measures
Santa Clara County, CA

Receptor Type	Receptor Age Group[1]	Exposure Parameters						
		Daily Breathing Rate (DBR)[2] (L/kg-day)	Annual Exposure Duration (ED)[3] (years)	Fraction of Time at Home (FAH) (unitless)	Exposure Frequency (EF)[4] (days/year)	Averaging Time (AT) (days)	Intake Factor, Inhalation (If_{inh}) (m^3/kg-day)	Age Sensitivity Factor (ASF)[5,6] (unitless)
Resident	3rd Trimester	361	1	1	350	25,550	0.0049	10
	Age 0 -<2 Years	1090	1	1			0.015	10
	Age 2 -<9 Years	631	1	1			0.0086	3

Notes:

1. Age bin 2 -<9 Years will be used where applicable.
2. Daily breathing rates for residents reflect default breathing rates from Cal/EPA 2015 as follows:
   95th percentile 24-hour daily breathing rate for age 3rd trimester and 0 -<2 years
   80th percentile 24-hour daily breathing rate for age 2 -<9 years
3. Annual exposure duration represents one full year.
4. Exposure frequency reflects default residential exposure frequency from Cal/EPA 2015.
5. Age sensitivity factors account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (Cal/EPA 2009) and current OEHHA guidance (Cal/EPA 2015). This approach is consistent with the cancer risk adjustment factor calculations recommended by BAAQMD (BAAQMD 2016).
6. Adjustment factor is applicable to each receptor type listed for the age group relevant to that receptor type.

Abbreviations:

ASF - age sensitivity factor
AT - averaging time
BAAQMD - Bay Area Air Quality Management District
Cal/EPA - California Environmental Protection Agency
DBR - daily breathing rate
ED - exposure duration
EF - exposure frequency
FAH - fraction of time at home
IF_{inh} - intake factor
kg - kilogram
L - liter
m^3 - cubic meter
OEHHA - Office of Environmental Health Hazard Assessment

Reference:

BAAQMD. 2016. Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines. January.
BAAQMD. 2020. Health Risk Assessment (HRA) Modeling Protocol. December.
Cal/EPA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table 55
Age Sensitivity Weighted Intake Factors by Year and Age Bin
Anderson Dam Seismic Retrofit Project and Conservation Measures
Santa Clara County, CA

Year[1]	Resident			
	Fraction of Year in Age Bin[2]			Age Sensitivity Weighted Intake Factor by Year, Inhalation[3,4]
	3rd Trimester	0-2	2-9	(m^3/kg-day)
Year 1	0.25	0.75		0.124
Year 2		1		0.149
Year 3		0.25	0.75	0.057
Year 4			1	0.026
Year 5			1	0.026
Year 6			1	0.026
Year 7			1	0.026
Year 8			1	0.026

Notes:
1. Exposure begins at the start of construction in Year 1.
2. The exposure duration for all years is 1, as the health risk assessment is based on annual emissions.
3. The Intake Factors have been multiplied by the Age Sensitivity Factors and weighted by the exposure duration for each age bin.
4. Intake Factors are based on exposure assumptions in Table 54.

Abbreviations:

IF - intake factor

kg - kilogram

m^3 - cubic meter

References:

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table 56
Construction Health Risk Results
Anderson Dam Seismic Retrofit Project
Santa Clara County, CA

Risk Type	PMI/MEI Risks[1,2] Cancer Risk [in a million]	Chronic HI	Acute HI	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Unmitigated	80	0.075	15	0.77
Mitigated	17	0.016	3.7	0.43
BAAQMD Threshold[2]	10	1	1	0.3
Above Threshold?	**Yes**	No	**Yes**	**Yes**

Risk Type	Unmitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	621,528	621,068	622,048	620,828
UTMy	4,114,015	4,113,995	4,113,655	4,113,995
Year of Max Risk	N/A	2027	2029	2027

Risk Type	Mitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	621,528	621,068	622,048	620,828
UTMy	4,114,015	4,113,995	4,113,655	4,113,995
Year of Max Impact	N/A	2027	2029	2027

Notes:

1. Cancer risk, non-cancer chronic hazard, and $PM_{2.5}$ concentration were analyzed at the location of the maximally exposed individual (MEI). Acute hazard was analyzed at the offsite point of maximum impact (PMI).

2. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - hazard index
MEI - maximally exposed individual
PM - particulate matter
PMI - point of maximum impact
UTM - Universal Transverse Mercator coordinate system
$\mu g/m^3$ - microgram per cubic meter

References:

2023 CEQA Statute and Guidelines. Available online at:
https://www.califaep.org/docs/CEQA_Handbook_2023_final.pdf

Table 57
Construction Health Risk Results
Ogier Ponds Conservation Measure
Santa Clara County, CA

Risk Type	PMI/MEI Risks[1,2] Cancer Risk [in a million]	Chronic HI	Acute HI	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Unmitigated	2.7	0.012	0.0039	0.19
Mitigated	0.77	0.0037	0.0039	0.064
BAAQMD Threshold[2]	10	1	1	0.3
Above Threshold?	No	No	No	No

Risk Type	Unmitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	616,048	617,028	617,028	616,048
UTMy	4,115,374	4,115,094	4,115,094	4,115,374
Year of Max Risk	N/A	2029	2029	2030

Risk Type	Mitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	616,048	617,028	617,028	616,048
UTMy	4,115,374	4,115,094	4,115,094	4,115,374
Year of Max Impact	N/A	2029	2029	2030

Notes:
1. Cancer risk, non-cancer chronic hazard, and $PM_{2.5}$ concentration were analyzed at the location of the maximally exposed individual (MEI). Acute hazard was analyzed at the offsite point of maximum impact (PMI).
2. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines.

Abbreviations:
BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - hazard index
MEI - maximally exposed individual
PM - particulate matter
PMI - point of maximum impact
UTM - Universal Transverse Mercator coordinate system
$\mu g/m^3$ - microgram per cubic meter

References:
2023 CEQA Statute and Guidelines. Available online at:
https://www.califaep.org/docs/CEQA_Handbook_2023_final.pdf

Table 58
Construction Health Risk Results
Phase 2 Coyote Percolation Dam Conservation Measure
Santa Clara County, CA

Risk Type	PMI/MEI Risks[1,2] Cancer Risk [in a million]	Chronic HI	Acute HI	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Unmitigated	2.7	0.0018	0.023	0.051
Mitigated	0.48	3.4E-04	0.023	0.016
BAAQMD Threshold[2]	10	1	1	0.3
Above Threshold?	No	No	No	No

Risk Type	Unmitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	609,648	609,648	609,928	609,648
UTMy	4,121,654	4,121,654	4,121,674	4,121,654
Year of Max Risk	N/A	2025	2024	2025

Risk Type	Mitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	609,648	609,648	609,928	609,648
UTMy	4,121,654	4,121,654	4,121,674	4,121,654
Year of Max Impact	N/A	2025	2024	2025

Notes:

1. Cancer risk, non-cancer chronic hazard, and $PM_{2.5}$ concentration were analyzed at the location of the maximally exposed individual (MEI). Acute hazard was analyzed at the offsite point of maximum impact (PMI).

2. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - hazard index
MEI - maximally exposed individual
PM - particulate matter
PMI - point of maximum impact
UTM - Universal Transverse Mercator coordinate system
$\mu g/m^3$ - microgram per cubic meter

References:

2023 CEQA Statute and Guidelines. Available online at:
https://www.califaep.org/docs/CEQA_Handbook_2023_final.pdf

Table 59
Construction Health Risk Results
Sediment Augmentation Program
Santa Clara County, CA

PMI/MEI Risks[1,2]				PM$_{2.5}$ Concentration ($\mu g/m^3$)
Risk Type	**Cancer Risk [in a million]**	**Chronic HI**	**Acute HI**	
Unmitigated	4.2E-04	3.0E-06	6.3E-05	3.6E-05
Mitigated	3.0E-04	2.1E-06	6.2E-05	2.6E-05
BAAQMD Threshold[2]	10	1	1	0.3
Above Threshold?	No	No	No	No

Unmitigated PMI/MEI Risk Location				PM$_{2.5}$
Risk Type	**Cancer**	**Chronic**	**Acute**	
UTMx	620,988	620,988	620,648	620,968
UTMy	4,114,015	4,114,015	4,113,975	4,114,015
Year of Max Risk	N/A	2031	2031	2031

Mitigated PMI/MEI Risk Location				PM$_{2.5}$
Risk Type	**Cancer**	**Chronic**	**Acute**	
UTMx	620,988	620,988	620,648	620,968
UTMy	4,114,015	4,114,015	4,113,975	4,114,015
Year of Max Impact	N/A	2031	2031	2031

Notes:

1. Cancer risk, non-cancer chronic hazard, and PM$_{2.5}$ concentration were analyzed at the location of the maximally exposed individual (MEI). Acute hazard was analyzed at the offsite point of maximum impact PMI).

2. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - hazard index
MEI - maximally exposed individual
PM - particulate matter
PMI - point of maximum impact
UTM - Universal Transverse Mercator coordinate system
$\mu g/m^3$ - microgram per cubic meter

References:

2023 CEQA Statute and Guidelines. Available online at:
https://www.califaep.org/docs/CEQA_Handbook_2023_final.pdf

Table 60
Construction Health Risk Results
Anderson Dam Seismic Retrofit Project and Conservation Measures
Santa Clara County, CA

Risk Type	PMI/MEI Risks[1,2] Cancer Risk [in a million]	Chronic HI	Acute HI	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Unmitigated	80	0.077	15	0.77
Mitigated	17	0.017	3.7	0.43
BAAQMD Threshold[2]	10	1	1	0.3
Above Threshold?	**Yes**	No	**Yes**	**Yes**

Risk Type	Mitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	621,528	621,108	622,048	620,828
UTMy	4,114,015	4,113,995	4,113,655	4,113,995
Year of Max Impact	N/A	2027	2029	2027

Risk Type	Unmitigated PMI/MEI Risk Location Cancer	Chronic	Acute	$PM_{2.5}$
UTMx	621,528	621,128	622,048	620,828
UTMy	4,114,015	4,113,995	4,113,655	4,113,995
Year of Max Impact	N/A	2027	2029	2027

Notes:

1. Cancer risk, non-cancer chronic hazard, and $PM_{2.5}$ concentration were analyzed at the location of the maximally exposed individual (MEI). Acute hazard was analyzed at the offsite point of maximum impact (PMI).

2. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - hazard index
MEI - maximally exposed individual
PM - particulate matter
PMI - point of maximum impact
UTM - Universal Transverse Mercator coordinate system
$\mu g/m^3$ - microgram per cubic meter

References:

2023 CEQA Statute and Guidelines. Available online at:
https://www.califaep.org/docs/CEQA_Handbook_2023_final.pdf

Table 61
Cumulative Construction Health Risk Results
Anderson Dam Seismic Retrofit Project and Conservation Measures
Santa Clara County, CA

Risk Type	Unmitigated MEI Risks[1,2,3] Cancer Risk [in a million]	Chronic HI	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Project	80	0.077	0.77
Stationary Sources[4]	0	0	0
Major Roadways[5]	0.49	0.0018	0.031
Major Railways[5]	0	0	0
Cumulative Risk	80	0.079	0.80
BAAQMD Threshold[2]	100	10	0.8
Above Threshold?	No	No	No

Risk Type	Mitigated MEI Risks[1,2,3] Cancer Risk [in a million]	Chronic HI	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Project Risk	17	0.017	0.43
Stationary Sources[4]	0	0	0
Major Roadways[5]	0.49	0.0018	0.031
Major Railways[5]	0	0	0
Cumulative Risk	18	0.018	0.47
BAAQMD Threshold[2]	100	10	0.8
Above Threshold?	No	No	No

Notes:

1. Cancer risk, non-cancer chronic hazard, and $PM_{2.5}$ concentration were analyzed at the location of the maximally exposed individual (MEI).
2. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines.
3. Project MEI locations are located greater than 1,000 feet away from any existing permitted stationary sources.
4. Stationary source data was obtained from a BAAQMD data request (dated 3/7/2022). No stationary sources are located within 1000 feet of the Project MEI locations.
5. Roadways and Railway risk values were obtained from BAAQMD's Roadway Screening Analysis Calculator. No railway is located near the Project MEI locations.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - hazard index
MEI - maximally exposed individual
PM - particulate matter
UTM - Universal Transverse Mercator coordinate system
$\mu g/m^3$ - microgram per cubic meter

References:

2023 CEQA Statute and Guidelines. Available online at: https://www.califaep.org/docs/CEQA_Handbook_2023_final.pdf

BAAQMD. 2022. Roadway Screening Analysis Calculator. December. Available at: https://data.bayareametro.gov/. Accessed April 6, 2023.

FIGURES

N

Percolation Dam Project Area

LEGEND

- Phase 2 Coyote Percolation Dam Work Area
- Sediment Augmentation Program Work Areas
- Seismic Retrofit Work Areas
- Ogier Ponds Conservation Measure Work Area

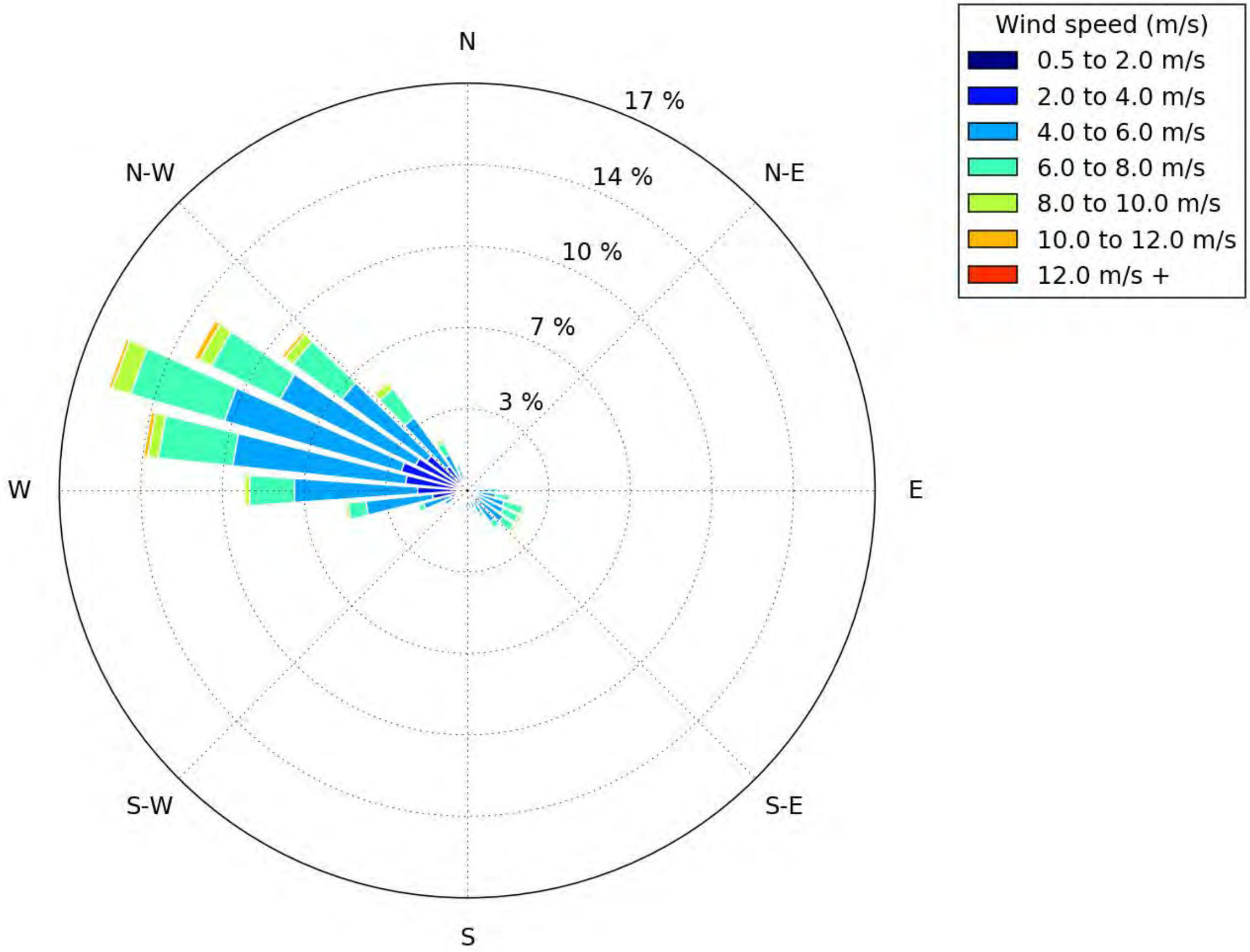
0 1,500 3,000 Meters

OVERVIEW OF PROJECT WORK AREAS

Anderson Dam Seismic Retrofit
Santa Clara County, California

FIGURE 01

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY



EVALUATION OF SITE WINDS

FIGURE 02

Anderson Dam Seismic Retrofit
Santa Clara County, California

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

N

LEGEND

- Basalt Hill Borrow Area
- Cofferdam
- Dredging
- Excavation
- Embankment
- Packwood Gravel Borrow Pit
- Reservoir Disposal Area
- Spillway
- Staging Area 1
- Staging Area 2
- Staging Area 3
- Staging Area 4
- Staging Area 5
- Staging Area 6
- Stockpile Area B
- Stockpile Area C
- Stockpile Area D
- Stockpile Area E
- Stockpile Area H
- Stockpile Area I
- Stockpile Area J
- Stockpile Area K (North)
- Stockpile Area K (South)
- Stockpile Area L
- Stockpile M
- Access/Hauling Road
- Highway Site Access
- Spillway Construction Access
- Generator

0 1,000 2,000 Meters

SEISMIC RETROFIT CONSTRUCTION MODELED SOURCES

Anderson Dam Seismic Retrofit
Santa Clara County, California

FIGURE 03

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

Service Layer Credits: World Imagery: County of Santa Clara, Santa Cruz County, Maxar

N

LEGEND

- Basalt Hill Borrow Area
- Cofferdam
- Dredging
- Excavation
- Embankment
- Packwood Gravel Borrow Pit
- Reservoir Disposal Area
- Spillway
- Staging Area 1
- Staging Area 2
- Staging Area 3
- Staging Area 4
- Staging Area 5
- Staging Area 6
- Stockpile Area B
- Stockpile Area C
- Stockpile Area D
- Stockpile Area E
- Stockpile Area H
- Stockpile Area I
- Stockpile Area J
- Stockpile Area K (North)
- Stockpile Area K (South)
- Stockpile Area L
- Stockpile M
- Access/Hauling Road
- Highway Site Access
- Spillway Construction Access
- Receptors
- Generator

0 1,000 2,000 Meters

SEISMIC RETROFIT MODELED RECEPTOR LOCATIONS

Anderson Dam Seismic Retrofit
Santa Clara County, California

FIGURE 04

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

Service Layer Credits: World Imagery: County of Santa Clara, Santa Cruz County, Earthstar Geographics

N

LEGEND

Haul Routes

Project Area

Receptors

Modeling Extent

0 250 500 Meters

OGIER PONDS CONSERVATION MEASURE MODELED SOURCES AND RECEPTORS

Anderson Dam Seismic Retrofit
Santa Clara County, California

FIGURE 05

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

N

LEGEND

Modeling Extent

Haul Routes

Project Area

Receptors

0 50 100 Meters

PHASE 2 COYOTE PERCOLATION DAM CONSERVATION MEASURE MODELED SOURCES AND RECEPTORS

Anderson Dam Seismic Retrofit
Santa Clara County, California

FIGURE 06

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

N

LEGEND

- Modeling Extent
- Receptors
- Staging Areas
- Sediment Augmentation Sites
- Haul Routes

0 500 1,000 Meters

SEDIMENT AUGMENTATION PROGRAM MODELED SOURCES AND RECEPTORS

Anderson Dam Seismic Retrofit
Santa Clara County, California

FIGURE 07

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

Service Layer Credits: World Imagery: Sanborn Map Company, Santa Clara County, Santa Cruz County, Earthstar Geographics

N

LEGEND

Mitigated Acute HI

Mitigated Cancer Risk

Mitigated Chronic HI

Mitigated PM2.5 Concentration

Unmitigated Acute HI

Unmitigated Cancer Risk

Unmitigated Chronic HI

Unmitigated PM2.5 Concentration

0 100 200 Meters

MAXIMALLY EXPOSED INDIVIDUALS

Anderson Dam Seismic Retrofit
Santa Clara County, California

FIGURE 08

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix F

Biological Resources – Fisheries Technical Appendix

This technical appendix was prepared as a technical report by Valley Water's EIR consultant team. Valley Water has independently reviewed its contents, and partially relied on the appendix contents in preparing the EIR section on Fisheries Section and Water Quality Section. In the event of any inconsistencies between the EIR text and this appendix, the EIR text was prepared by Valley Water later and takes precedence.

APPENDIX F–BIOLOGICAL RESOURCES FISHERIES TECHNICAL REPORT

Instream Flows during Construction - Sediment Transport

Introduction

This section provides the detailed sediment transport methods and analysis that supports the impact assessment summaries for the impacts of instream flows during construction on fisheries resources.

Methods

Of the species analyzed in this EIR, increases in suspended sediment during seismic retrofit construction is anticipated to impact **steelhead, Chinook salmon, and Pacific lamprey** because these species include life history stages and seasonal occurrence in Coyote Creek downstream of Anderson Dam, and these species have some sensitivities to suspended sediment levels. There are quantitative methods to analyze the impacts of changes in sediment on these species; they are considered quantitatively (semi-quantitatively for Pacific lamprey) in this Appendix and in the EIR impact analysis.

Sacramento hitch occur within Coyote Creek from the estuary to Anderson Dam, spawning in the clean gravel of riffles after increased flows resulting from spring rains (Moyle 2002). **Southern coastal roach** are also common throughout Coyote Creek Watershed, spawning in course substrate. Sacramento hitch and southern coastal roach are both adapted to the high disturbance regimes typical of lower reaches of central coast watersheds, including warm water, and periodic increases in flow and suspended sediment (Moyle and Daniels 1982; Moyle 2002). Therefore, impacts from changes in suspended sediment would not be substantial and are analyzed qualitatively in the EIR.

The estuarine species (**green sturgeon**, **white sturgeon**, and **longfin smelt**) are all species that tolerate high levels of suspended sediment and have the ability to behaviorally regulate their exposure in San Francisco Bay; therefore, impacts from changes in suspended sediment would not be substantial and are analyzed qualitatively in the EIR.

Riffle sculpin do not occur in Coyote Creek downstream of Anderson Dam so there would be no impact on riffle sculpin from changes in suspended sediment during seismic retrofit construction.

URS (2020a, 2020b) used two models to assess the impacts of reservoir drawdown and construction flows, as well as sediment transport during Seismic Retrofit construction in Coyote Creek. These model results were used to assess Project impacts of instream flows during construction on fisheries resources. The US EPA Environmental Fluid Dynamics Code (EFDC) model was used to simulate erosion, deposition, and transport of sediment in Anderson Reservoir. The prediction of flow and sediment concentrations leaving the reservoir were used as input into the Coyote Creek HEC-RAS sediment model. The HEC-RAS model was used to simulate the transport, erosion, and deposition of sediment in Coyote Creek between Anderson Reservoir and San Francisco Bay. In addition to Coyote Creek channel simulations, the HEC-RAS model output estimated deposition in the on-channel Ogier Ponds and Metcalf Pond. The models are described in detail in URS (2020a, 2020b).

A range of flow conditions were simulated in the sediment transport models, encompassing a range of water year types and annual return period intervals from an 18-year dataset extracted from a stochastic hydrology study (Schaaf & Wheeler and Black & Veatch 2019). The suspended sediment concentrations for the reservoir inflow were based on a rating curve developed using data from a gage upstream of Coyote Reservoir, near Gilroy, CA [USGS 11169800].

Fisher Creek (14.7 mi^2), Upper Silver Creek (5.7 mi^2), Lower Silver Creek (43.1 mi^2), Upper Penitencia Creek (23.8 mi^2), and Lower Penitencia Creek (29.1 mi^2) enter Coyote Creek downstream of Anderson Dam. For sediment transport modeling, assumptions were made regarding the streamflow and sediment load contributions from these tributaries. Based on upstream and downstream gage relations, it was assumed that when runoff enters Anderson Reservoir, an estimated corresponding runoff should be applied to the tributaries. Limited suspended sediment data from the tributaries (Balance 2018) was supplemented with data from the Milpitas gage (USGS 1117215) to develop sediment rating curves. The Milpitas gage data were also used to develop assumed sediment gradations at tributary inflows, ranging from 0.002 to 0.5 mm grain size (see Table 3-2 in URS 2020a, page 17).

The EIR Chapter 2. Project Description was compared with the URS model scenarios and the most representative scenario was selected for the various wet seasons and spring drawdowns (Table 1)[1]. Model Scenario 1 was relevant to the FOCP draw down which is not relevant to ADSRP and is not discussed further in this EIR technical appendix. Scenario 2 includes the first two wet seasons of ADSRP that use the Stage 1 Diversion completed under FOCP to dewater the reservoir for the dry season work window and the Stage 2 diversion would not be constructed yet.. Scenarios 3 and 4 are relevant to ADSRP or the Project proposed in this EIR and the construction years and seasons they represent are summarized in Table 1.

Each model simulation started with the same initial condition–the north and south arms (Las Animas and Packwood Creeks in the north, and Coyote Creek in the south) started with no flow. Each storm event included a period of simulated low flow in front of the storm to wet the creeks.

[1] During the dry season work window, relatively little flow would be bypassed through the drawn down reservoir. Flow immediately downstream of the dam through the Functional Cold Water Management Zone (FCWMZ) would come from flows bypassed through the reservoir as well as imported water released into the south channel by the Coyote Discharge Line (CDL), which will be chilled when necessary to improve temperature suitability in the FCWMZ. Imported water will also be released downstream of Ogier Ponds through the Central Valley Project Extension (CVPE) pipe. Because flows will be relatively low and include a larger proportion of imported water, sediment transport under the Project's instream flows during construction is not anticipated to change relative to Pre-FERC Order baseline; therefore, dry seasons are not analyzed in this Appendix.

1 **Table 1. Summary of Construction Years and Corresponding Sediment Transport Model Scenarios with Key Assumptions**

Construction year	Months	Target elevation (NAVD88)	Diversion system	URS model scenario*	Flow Assumptions	Notes	Construction activities
Year 1–wet season	January 1–April 14	492 feet	Existing Outlet and Stage 1 Diversion	Scenario 2	Restricted to 2,500 cfs (existing outlet = 500 cfs and Stage 1 Diversion = 2,000 cfs)	Model assumed reservoir maintained at 488 feet until April; rainy season so storms more likely; simulated 2-year event with double peak	Site mobilization not requiring further dewatering
Year 1–spring drawdown	April 15–May 14	465 feet	Existing Outlet and Stage 1 Diversion	Scenario 3	Restricted to 2,500 cfs (existing outlet = 500 cfs and Stage 1 Diversion = 2,000 cfs)	Scenario 3 assumed dewatering to 450 feet so impacts interpreted from the model are likely overestimates for Year 1; baseflows into reservoir likely minimal; most water downstream would be imported so most suspended sediment concentrations (SSC) not higher than baseline (1–65 cfs)	Partial dewatering from El. 492 feet to El. 465 feet; continued site mobilization; preparation of staging areas, access roads, in-reservoir stockpile areas, and borrow sites
Year 1–dry in-channel construction season	May 15–October 14	465 feet	Existing Outlet and Stage 1 Diversion	Not modeled	Low flow bypassed through reservoir with imported water releases at CDL and CVPE downstream of the dam	No change from Pre-FERC Order Baseline	Continued site mobilization; preparation of staging areas, access roads, in-reservoir stockpile areas, and borrow sites
Year 1/Year 2–wet season	October 15–April 14	492 feet	Existing Outlet and Stage 1 Diversion as needed	Scenario 2	Restricted to 2,500 cfs (existing outlet = 500 cfs and Stage 1 Diversion = 2,000 cfs)	Reservoir maintained at 488 feet until April; rainy season so storms more likely; simulated 2-year event with double peak	Continued site mobilization not requiring partial dewatering

Construction year	Months	Target elevation (NAVD88)	Diversion system	URS model scenario*	Flow Assumptions	Notes	Construction activities
Year 2–spring drawdown	April 15–May 14	460 feet	Existing Outlet and Stage 1 Diversion then	Scenario 3 for initial dewatering	Restricted to 2,500 during dewatering;	Dewatered to 450 feet; shoulder season/large storms unlikely but possible	Full dewatering; cofferdam and extension pipe construction; sediment check dam installation
Year 2–dry in-channel construction season	May 15–October 14	460 feet	Stage 1 Diversion or Bypass pumping around cofferdam into intake	Not modeled	1–65 cfs from pumping around cofferdam and imported water released from CDL and CVPE	Reservoir maintained at 450 feet; dry season/large storms and high flow unlikely	Conversion of existing Stage 1 Diversion to Stage 2 Diversion; dam excavation to interim dam with El. 565 feet crest; tunneling for high-level outlet works
Year 2/Year 3–wet season	October 15–April 14	467 feet	Stage 2 Diversion	Scenario 4	Restricted to 6,850 cfs; El. 488 feet not modeled; Scenario assumes 467 feet so impacts likely overestimated	Rainy season; larger storm and flow events likely; Modeled Constant inflow; 2-year Event; 5-year Event	Winterization of work site; out of channel work continues
Year 3–spring drawdown	April 15–May 14	453 feet	Stage 2 Diversion	Scenario 3 for dewatering	Restricted to 6,850 cfs but the model assumed 2,500 cfs during dewatering	Dewater to 450 feet; shoulder season/large storm events and flows unlikely but possible	Dam excavation to interim dam with crest El. 556 feet (Stage 1b Dam Excavation); construction of high-level outlet works and demolition of existing spillway
Year 3–dry in-channel construction season	May 15–October 14	453 feet	Stage 2 Diversion; extension pipe	Not modeled	1–65 cfs divert around cofferdam into extension pipe and imported water released from CDL and CVPE	Keep at 450 feet; dry season/large storms unlikely	Continued dam excavation to interim dam with crest El. 556 feet (Stage 1b Dam Excavation); construction of high-level outlet works and demolition of existing spillway

Construction year	Months	Target elevation (NAVD88)	Diversion system	URS model scenario*	Flow Assumptions	Notes	Construction activities
Year 3/Year 4–wet season	October 15–April 14	467 feet	Stage 2 Diversion	Scenario 4	Restricted to 6,850 cfs; El. 488 feet not modeled; Scenario assumes 467 feet so impacts likely overestimated	Rainy season; larger storm and flow events likely; Modeled Constant inflow; 2-year Event; 5-year Event	Winterization of work site; out of channel work continues
Year 4–spring drawdown	April 15–May 14	453 feet	Stage 2 Diversion	Scenario 3 for dewatering	Restricted to 6,850 but the model assumed 2,500 during dewatering	Dewater to 450 feet; shoulder season/large storm events and flows unlikely but possible	Dam excavation to remnant core (Stage 2a Dam Excavation) and dam fill to interim dam with crest El. 556 feet (Stage 2b Fill); and construction of spillway
Year 4–dry in-channel construction season	May 15–October 14	453 feet	Stage 2 Diversion; extension pipe	Not modeled	1–65 cfs divert around cofferdam into extension pipe and imported water released from CDL and CVPE	Keep at 450 feet; dry season/large storms unlikely	Continued dam excavation to remnant core (Stage 2a Dam Excavation) and dam fill to interim dam with crest El. 556 feet (Stage 2b Fill); and construction of spillway
Year 4/Year 5–wet season	October 1 – April 14	467 feet	Stage 2 Diversion	Scenario 4	Restricted to 6,850 cfs; El. 488 feet not modeled; Scenario assumes 467 feet so impacts likely overestimated	Rainy season; larger storm and flow events likely; Modeled Constant inflow; 2-year Event; 5-year Event	Winterization of work site; out of channel work continues
Year 5–spring drawdown	April 15–May 14	453 feet	Stage 2 Diversion	Scenario 3 for dewatering	Restricted to 6,850 but the model assumed 2,500 during dewatering	Dewater to 450 feet; shoulder season/large storm events and flows unlikely but possible	Dam fill to interim dam with crest El. 565 feet (Stage 3a Dam Fill); construction of the spillway; and construction of the low-level outlet structure
Year 5–dry in-channel construction season	May 15–October 14	453 feet	Stage 2 Diversion; extension pipe	Not modeled	1–65 cfs divert around cofferdam into extension pipe and imported water released from CDL and CVPE	Keep at 450 feet; dry season/large storms unlikely	Continued dam fill to interim dam with crest El. 565 feet (Stage 3a Dam Fill); construction of the spillway; and construction of the low-level outlet structure

Construction year	Months	Target elevation (NAVD88)	Diversion system	URS model scenario*	Flow Assumptions	Notes	Construction activities
Year 5/Year 6 wet season	October 15–April 14	467 feet	Stage 2 Diversion	Scenario 4	Restricted to 6,850 cfs; El. 488 feet not modeled; Scenario assumes 467 feet so impacts likely overestimated	Rainy season; larger storm and flow events likely; Modeled Constant inflow; 2-year Event; 5-year Event	Winterization of work site; out of channel work continues
Year 6–spring drawdown	April 15–May 14	460 feet	Stage 2 Diversion	Scenario 3 for dewatering	Restricted to 6,850 but the model assumed 2,500 during dewatering	Dewater to 450 feet; shoulder season/large storm events and flows unlikely but possible	Dam fill to new dam crest El. 657 (Stage 3b Dam Fill); completion of low-level outlet works, including sloping intake structure and outlet structure; completion of spillway, including the unlined chute
Year 6–dry in-channel construction	May 15–October 14	460 feet	Stage 2 Diversion; extension pipe	Not modeled	1–65 cfs divert around cofferdam into extension pipe and imported water released from CDL and CVPE	Keep at 450 feet; dry season/large storms unlikely	Continued dam fill to new dam crest El. 657 (Stage 3b Dam Fill); completion of low-level outlet works, including sloping intake structure and outlet structure; completion of spillway, including the unlined chute
Year 6/Year 7	October 15 in Year 6–December 31 in Year 7	657 feet	Not Applicable	Not Modeled	NA	NA	Reservoir allowed to refill up to new elevation and implementation of post-construction instream flow operations (FAHCE rule curves) once reservoir is operable; permanent roadways and site restoration; repaving Cochrane Road; Revegetation/Restoration

1 *Source URS 2020a and 2020b, EIR Chapter 2. Project Description, Valley Water 2023

Scenario 2

Under Scenario 2, the model assumed a the reservoir to be drawn down to 488 feet and the Stage 1 diversion would have been constructed under FOCP and would be functional. Between the Stage 1 diversion and the existing outlet, up to 2,500 cfs could pass from the reservoir downstream to Coyote Creek. The scenario assumed a 2,850 acre-foot pool of water for suspended sediment to settle in. Inflows were assumed to pass directly through the reservoir, erode sediment, and then pass through the Stage 1 Diversion system or the existing outlet, transporting suspended sediment into Coyote Creek downstream of the dam. Back to back 2-year storm events were simulated for this scenario.

Scenario 3

Under Scenario 3, the reservoir would be drawn down to 450 feet and there would be a diversion extension pipe extending from the ADSRP diversion intake to upstream of the ADSRP cofferdam, allowing up to 1,000 cfs to pass directly through the diversion system. The scenario assumed no pool of water for suspended sediment to settle in, nor to provide exposed sediment cover preventing erosion and mobilization. Inflows were assumed to pass directly through the reservoir and the Stage 2 Diversion system, transporting suspended sediment directly into Coyote Creek downstream of the dam.

Large storm events (e.g., larger than 2-year) would fill the reservoir to a level that inundates most of the erodible reservoir sediments in less than 1 day and most suspended sediment would be discharged when the reservoir is draining.

URS ran Scenario 3 with a constant inflow rate of 180 cfs to represent a “worst case scenario” of constant inflow erosion. They also modeled a 2-year storm event under Scenario 3 assumptions. The half of a 2-year event was modeled to predict what would happen with a smaller storm that does not fill the reservoir and would pass sediment directly to Coyote Creek downstream of the dam.

Scenario 3 was modeled by URS (2020b), with a duration of 12 days, to capture baseline suspended sediment and the predicted increase in sediment during the modeled flow events.

For the purpose of assessing impacts on fisheries resources, the baseline sediment concentrations were extended in this analysis to consider a three-month period of potential effects following the first construction season.

Scenario 4

Scenario 4 represents the wet seasons during ADSRP construction. The model scenario assumed a small pool of about 590 AF at elevation 467 feet maintained through the wet season. The ADSRP diversion system will have a capacity of about 6,850 cfs at reservoir elevation 565 feet. However, current construction plans involve allowing the reservoir to be maintained at elevation 488 feet so Scenario 4 likely overestimates the actual anticipated SSC during the wet season that would occur when maintaining the reservoir at the higher elevation.

Under Scenario 4, three events were simulated, a constant “worst case” inflow of 180 cfs, a 2-year event, and a 5-year event. This scenario was modeled by URS (2020b) with a duration of 12 days, to capture baseline suspended sediment and the predicted increase in sediment during the modeled high flow event.

For the purpose of assessing impacts on fisheries resources, the baseline sediment concentrations were extended in this analysis to consider a 6-month period of potential effects, from October 15 through April 15.

Sediment Transport Modeling–Coyote Creek Estuary

To assess the effects of sediment transport during Seismic Retrofit construction in the Coyote Creek Estuary and San Francisco Bay on fisheries resources, URS (2021) used a simple suspended sediment transport model of the estuary that was used to calculate the mixing of suspended sediment discharged to the estuary with tidal waters from San Francisco Bay. This model did not include erosion and deposition in the estuary. A simple deposition model was used to estimate the potential deposition depths in quiescent areas of the estuary for scenarios with significant sediment loads (AECOM 2021).

Assessing Seismic Retrofit Construction Phase Sediment Impacts on Fisheries Resources

The downstream transport of sediment, currently stored in reservoir deposits, can affect downstream habitats as both suspended sediment and bedload deposition. Elevated suspended sediment concentration (SSC) may affect fish directly by changing their behavior, causing physiological stress, clogging or abrading the gills and/or the associated turbidity may prevent fish from foraging efficiently (see reviews by Newcombe and MacDonald 1991, Newcombe and Jensen 1996; Kemp et al. 2011; Kjelland et al. 2015). Sometimes the turbidity from relatively high suspended sediment benefits fish by making them less visible to predators. As the transported sand and fine sediment settles on the streambed, it can reduce the survival of incubating eggs and developing alevins[2] in salmonid redds[3] through reduced oxygenation of intergravel flow. Sediment deposition can also fill in pools reducing rearing habitat and reduce the interstitial spaces within cobbles used by benthic macroinvertebrates, thus reducing food availability. The effects of bedload deposition can last weeks or years, depending on the ability of subsequent erosive flows to scour or clean the substrate. However, coarse sediment and gravel bedload supply and transport are vital to the creation and maintenance of functional aquatic habitat. Natural river dynamics include transportation of coarse sediment (e.g., sand, gravel, cobble, and boulder) downstream. Natural sediment pulses that result from heavy rainfall and snowmelt events are incorporated by stream and river processes into spawning beds, gravel bars, side channels, pools, riffles, and floodplains that provide habitat and support food chains of aquatic species. These periodic inputs and movement of coarse sediment are necessary for the long-term maintenance of aquatic habitats.

Increased suspended fine sediment typically has a more direct impact on fish than coarser bedload sediment. Impacts on fish vary from minor behavior changes to major mortality events. Based on a review of the scientific literature focusing on impacts on salmonids, including Chinook salmon and steelhead, the

[2] Alevins are newly hatched salmon or trout that have broken free from the soft shell of the egg but still carry the yolk sac which provides nutrients. Alevins usually remain in the spawning gravels of the "redd" until they have absorbed the yolk sac and developed into fry.

[3] Redds are a gravel nest constructed by steelhead within which eggs are deposited.

most commonly observed adverse effects of suspended sediment include the following: (1) avoidance of turbid waters in homing adult anadromous salmonids, (2) avoidance or alarm reactions by juvenile salmonids, (3) displacement of juvenile salmonids, (4) reduced feeding and growth, (5) physiological stress and respiratory impairment, (6) damage to gills, (7) reduced tolerance to disease and toxicants, (8) reduced survival, and (9) direct mortality (Newcombe and Jensen 1996).

Information on both concentration and duration of suspended sediment is important for understanding the severity of its effects on salmonids (Newcombe and MacDonald 1991). Herbert and Merkens (1961) stated that "there is no doubt that many species of fresh-water fish can withstand extremely high concentrations of suspended solids for short periods, but this does not mean that much lower concentrations are harmless to fish which remain in contact with them for a very long time." Effects of suspended sediment on fish can also be exacerbated by other stressors (e.g., high water temperature and disease).

Alternatively, turbidity can function as cover to reduce predation at some life stages, not only in riverine, but also in estuarine and nearshore marine environments (Gregory and Levings 1998; Wilber and Clarke 2001; Gadomski and Parsley 2005) or to provide cover concealing them from prey species during foraging. Some species have been shown to be attracted to turbid water over clear water, which may reflect its use as cover (Gradall and Swenson 1982; Cyrus and Blaber 1992, both as cited in Wilber and Clarke 2001).

Determining the concentrations that cause direct adverse impacts on fish has generally been based on laboratory studies experimenting with exposures to concentrations of suspended sediment over 1,000 ppm[4] and usually much higher. According to Sigler et al. (1984), "yearling and older salmonids can survive high concentrations of suspended sediment for considerable periods, and acute lethal effects generally occur only if concentrations exceed 20,000 ppm (see reviews by Cordone and Kelly 1961, Sorenson et al. 1977)." For 36-hour exposures, using juvenile Chinook and Sockeye Salmon (*Oncorhynchus nerka*), Newcomb and Flagg (1983) reported 10% mortality at concentrations of 1,400 ppm, 50% mortality at 9,400 ppm, and 90% mortality at 39,400 ppm. Concentrations of 82,000 ppm resulted in 60% mortality after 6 hours of exposure. Estimated concentrations of 207,000 ppm resulted in 100% mortality in one hour. Stober et al. (1981) reported mortality rates of 50% for juvenile Chinook and coho Salmon (*Oncorhynchus kisutch*) exposed to 500–1,000 ppm for 96 hours. From the results of these and other studies, it appears that relatively short-term exposures to increases in suspended sediment concentration under 500–600 ppm will not likely result in substantial direct mortality to either juvenile or adult fish in Coyote Creek. If the duration of exposure were extended, however, some direct mortality could occur. Exposures of 19 days to SSC of 90–270 ppm and higher have been reported as resulting in mortality to juvenile rainbow trout by Herbert and Merkens (1961). Less information is available on the effects of suspended sediment or turbidity on newly emerged salmonid fry (Sigler et al. 1984).

Potential population-level effects of suspended sediment released from reservoir construction activities for a given species not only depend on their abundance, distribution, and life stages present, but also on the timing, duration, and concentration of suspended sediment released. In this analysis, the results of Newcombe and Jensen (1996) were used to assess impacts of suspended sediment on special-status fish

[4] Parts per million (ppm) is equivalent to mg/L.

based on modeled exposure concentrations and durations from URS (2020b). Newcombe and Jensen (1996) reviewed and synthesized 80 published reports of fish responses to suspended sediment in streams and estuaries and established a set of equations to calculate “severity of ill effect (SEV)” indices (Table 2) for various species and life stages based on the duration of exposure and concentration of suspended sediment present.

Table 2. Scale of the severity of ill effects associated with excess suspended sediment (based on Newcombe and Jensen 1996).

Category of effect	Severity	Description
Nil effect	0	No behavioral effects
Behavioral effects	1	Alarm reaction
	2	Abandonment of cover
	3	Avoidance response
	4	Short-term reduction in feeding rates Short-term reduction in feeding success
Sublethal effects	5	Minor physiological stress: Increase in rate of coughing* Increased respiration rate
	6	Moderate physiological stress
	7	Moderate habitat degradation Impaired homing
	8	Indications of major physiological stress: Long-term reduction in feeding rate Long-term reduction in feeding success Poor condition
Lethal and paralethal effects	9	Reduced growth rate: Delayed hatching Reduced fish density
	10	Increased predation of affected fish 0–20% mortality
	11	>20–40% mortality
	12	>40–60% mortality
	13	>60–80% mortality
	14	>80–100% mortality

* "Coughing" for a fish is a behavior that involves opening its mouth wide and forcing water through the gills at higher velocities in an attempt to dislodge any particles from the gills.

The SEV index provides a ranking of the effects of SSC on fish species, as calculated by any of six equations that address various taxonomic groups of fishes, life stages of species within those groups, and particle sizes of suspended sediments. Newcombe and Jensen (1996) collected data on fish effects (on the SEV scale), suspended sediment concentration (C, mg/L), and suspended sediment exposure time (D, hr), from a large number of papers dealing with many fishes at various life stages.

For salmonids, they fit models of the form $\mathrm{SEV} = b_0 + b_1 \log C + b_2 \log D$ to these data for adults, juveniles, and eggs/alevins life stages, where "*b*" are terms for regression coefficients based on selection of the best performing model. These data all consider constant concentration values. However, for this application the effects of concentration levels which change over the exposure period are evaluated. Projected impacts on steelhead and Chinook salmon were reported on the SEV scale of Newcombe and Jensen (1996), and calculated using relationships between SEV, SSC, and duration of exposure derived from data in Newcombe and Jensen (1996). Following Newcombe and MacDonald (1991), these take the form of a dose-response model:

$$\text{SEV} = b_0 + b_1 \text{Ln}(C \times D)$$

where C is the suspended sediment concentration and D is the duration of exposure.

For salmonid fishes, with concentration in mg/L and exposure duration in hours, fitting the Newcombe and Jensen (1996) data by linear regression yields the coefficients in Table 3.

Table 3. Coefficients from Newcombe and Jensen Linear Regression

Life history stage	b0	b1
Adults	2.030034	0.611013
Juveniles	0.977603	0.681386
Eggs and alevins	7.200215	0.436067

This model depends only on the product of concentration and duration. This property allows the model to be applied to time-varying levels of exposure, as:

$$\text{SEV} = b_0 + b_1 \text{Ln}(\int_{t_1}^{t_2} C(t)dt)$$

The duration of exposure analyzed for adult migrating steelhead and Chinook salmon was 14 days, and 6 months for incubating eggs and fry and juvenile rearing. An example calculation for a hypothetical juvenile steelhead exposure of 6 hours based on example calculations shown in Table 4 would appear as:

0.9776+0.6814*Ln(22,961)= SEV of 3.9

Table 4. Example Calculations for a Hypothetical 6-hour Exposure of a Juvenile Steelhead to Varying Concentrations of Suspended Sediment

Date/Time	C (mg/L)	D (hr)	C × D (mg-hr/L)
1/5/2019 08:00	1,961	1	1,961
1/5/2019 09:00	2,000	1	2,000
1/5/2019 10:00	4,000	1	4,000
1/5/2019 11:00	10,000	1	10,000
1/5/2019 12:00	4,000	1	4,000
1/5/2019 13:00	1,000	1	1,000
CD = Sum (C × D)			22,961

The result of this approach is a life stage-specific prediction of the SEV on steelhead and Chinook salmon in Coyote Creek for each of the model simulations based on the suspended sediment predictions of URS (2020a and 2020b).

Because of their relative importance within the watershed, impacts of SSC on hitch, roach, longfin smelt, and green sturgeon were also assessed. However, little scientific literature exists regarding the effects of elevated SSC specifically on these species. The models developed by Newcombe and Jensen (1996) for assessing impacts on non-salmonids were used in this analysis to assess effects on these species, in conjunction with all available literature as well as discussions with experts in the field regarding the potential impacts.

Results

Scenario 2–Wet Season Overview

Under Scenario 2, maximum flows out of the reservoir would be much smaller than inflows from a small storm event (a 2-year event peak inflow is 6,100) so the reservoir fills during any significant storm events and the pool extends farther up each arm of the reservoir reducing the area subject to erosion and diluting suspended sediments (Figure 1). Therefore, larger storm events would not result in discharge of higher levels of suspended sediment because they would fill the reservoir even faster.

URS ran Scenario 2 with a simulated back to back 2-year storm events. During the two events the modeled suspended sediment concentration downstream of the reservoir remains over 5,000 mg/L for around two days and then decreases to about 200 mg/L after 3.5 days as sediment is either diluted by the Coyote Creek inflows or settles out.

Figure 1. Predicted Suspended Sediment concentration at a cross section ("XS") upstream of Ogier Ponds for Scenario 2 with back-to-back two-year interval events (URS 2020a). Total suspended solids or TSS is a measure of suspended sediment concentration (SSC).

Impacts on Steelhead

Table 5. Predicted Suspended Sediment Impacts on Steelhead from Anderson Dam to Ogier Ponds under Scenario 2, assuming back to back 2-year flow events (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg/L)	SEV	Effects
Adult	14	223,853	5.3	Minor physiological stress: Increase in rate of coughing Increased respiration rate
Eggs and alevins	182	2,466,581	10.0	0–20% mortality
Fry and juveniles			5.3	Minor physiological stress: Increase in rate of coughing Increased respiration rate

Under Scenario 2 with back to back 2-year flow events, upstream migrating steelhead adults are predicted to experience an SEV of 5.3 during December through March of the migratory period (December through April) from Anderson Dam to Ogier Ponds (Table 14). An SEV of 6 is associated with moderate physiological stress, resulting in an increased rate of coughing and respiration. This level of effect over a short duration (hours) is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. Fry and juveniles are also predicted to experience minor physiological stress and sublethal effects. For most constructed redds that occur between December through March, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of embryos, delayed hatching, smaller fry, and 0-20% mortality. Timing of an increase in suspended sediment has a large influence on the potential impacts. For example, an event in December would likely expose very few redds because most steelhead spawning has not yet occurred. The same event in March could expose the majority of that year's incubating steelhead eggs/embryos. Multiple storm events could also expose larger percentages of the population; therefore, this level of effect would likely decrease spawning production about every 2 years. Adults or redds exposed further downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half), and experience less of an impact (i.e., less reduced growth of embryos, delayed hatching, smaller fry, less than 20% mortality, and less physiological stress for juveniles and adults).

Impacts on Chinook Salmon

Table 6. Predicted Suspended Sediment Impacts on Chinook salmon from Anderson Dam to Ogier Ponds under Scenario 2, assuming back to back 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult	14	223,853	5.3	Minor physiological stress: Increase in rate of coughing Increased respiration rate
Eggs and alevins	91	1,251,770	9.9	0-20% mortality
Fry and juveniles			5.1	Minor physiological stress: Increase in rate of coughing Increased respiration rate

Under Scenario 2 with back to back 2-year flow events, upstream migrating Chinook salmon adults are predicted to experience an SEV of 5.3 and fry and juveniles are predicted to experience an SEV of 5.1 in the FCWMZ (Table 6). An SEV of 5.3 for adults and 5.1 for fry and juveniles is associated with minor physiological stress, resulting in an increased rate of coughing and respiration. This level of effect over a short duration is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. Also, back to back 2-year events would not occur every year and would be less likely to occur before mid-December. Chinook salmon adults can start migrating starting in October in this system so many Chinook salmon adults would migrate before the time that back to back 2-year storm events would be likely to occur. For most constructed redds, incubating eggs would experience an SEV of 9.9, translating to potentially reduced growth of embryos, delayed hatching, smaller fry, and 0-20% mortality. Timing of an increase in suspended sediment has a large influence on the potential impacts. For example, an event in December would likely expose a smaller number of Chinook salmon eggs/embryos because Chinook salmon spawning often occurs in October and November. The same event in February would likely expose very few Chinook salmon redds because most incubation would be completed by then. Multiple storm events could also expose larger percentages of the population. This would result in decreased spawning production during ADSRP. Adults or redds exposed further downstream of Ogier Ponds, where most Chinook salmon spawning occurs, would be exposed to lower levels of suspended sediment (down to about half) and experience less of an impact (i.e., less reduced growth of embryos, delayed hatching, smaller fry, 0- 20% mortality, and less physiological stress for juveniles and adults).

Impacts on Pacific Lamprey

Under Scenario 2 with back to back 2-year flow events, effects to Pacific lamprey would be similar to impacts to steelhead, since they have similar spatial distribution, adult migration timing, and prolonged larval and juvenile rearing. Upstream migrating and holding Pacific lamprey adults are predicted to experience an SEV of 5.5 during January through March of the migratory period (January through June) from Anderson Dam to Ogier Ponds (Table 7). An SEV of 5.5 is associated with moderate physiological stress. This level of effect is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration.

Table 7. Predicted Suspended Sediment Impacts on Pacific lamprey from Anderson Dam to Ogier Ponds under Scenario 2, assuming a 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult migration and holding	30	437,446	5.5	Moderate physiological stress
Larval rearing	180	2,466,581	10.0	0-20% mortality
Spring outmigration	14	223,853	4.6	Minor physiological stress: Increase in rate of coughing Increased respiration rate

Suspended sediment resulting from the Project could impact multiple year-classes of the larva population. Lamprey are reported to have an intermediate level of tolerance to increased sedimentation and turbidity (Zaroban et al. 1999), but it is not known how changes in suspended sediment affect larva survival. Based on impacts to salmonids, an SEV of 10 is predicted for larval rearing under Scenario 2 with back to back a 2-year flow events. An SEV of 10 for juvenile salmonids is predicted to result in 0-20% mortality, but because Pacific lamprey larvae can rear in burrows in fine sediment (Stillwater 2014), they may tolerate spikes in suspended sediment resulting from the Project, although excessive sedimentation from the settling out of suspended fines could possibly smother larvae in some areas. Pacific lamprey larvae are filter-feeders (Stillwater 2014), so reduced growth rates might be expected from elevated suspended sediment. However, the broad spatial distribution of Pacific lamprey in the Coyote Creek Watershed, including Upper Penitencia Creek, should mean that a large portion of the rearing larva population would not be impacted by the Project. In addition, larvae that rear downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half) as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress). Juvenile spring downstream migrants are anticipated to experience only minor physiological stress for a short duration during migration.

Impacts on Instream Habitat

The stream reach between Anderson Dam and Ogier Ponds is primarily erosional but there are a few locations of deposition, mainly downstream of bridges (AECOM 2021). Flows under Scenario 2 are predicted to result in a net 3,476 tons of erosion if a 2-year flow event or greater occurs. This magnitude of erosion will be driven by higher than usual flows downstream of Anderson Dam during Scenario 2 and is predicted to increase pool depths but reduce spawning gravel quantity, and potentially reduce access to low-terrace floodplain habitat for steelhead, Chinook salmon, and Pacific lamprey. Deposition is predicted to occur in limited areas, including around 7.6 inches of deposition near the Serpentine Trail Crossing, around 1.1 inches downstream of the Sycamore Avenue crossing, and around 3.0 inches near the U.S. Highway 101 Bridge (AECOM 2021). For the limited areas predicted to experience deposition, this magnitude of deposition could reduce the quality of steelhead, Chinook salmon, and Pacific lamprey spawning habitat and reduce BMI production as food supply for rearing steelhead and Chinook but is not likely to be substantial enough to reduce pool habitat for rearing anadromous species. This deposition is predicted to reduce the survival of incubating eggs, and the growth of fry and juveniles rearing within these limited areas. However, Pacific lamprey larvae may benefit from new areas of deposition.

Scenario 3–Spring Drawdown Overview

During seismic retrofit construction, the Stage 2 Diversion will be operated to draw down the reservoir prior to the dry construction season and was modeled by URS (2020b) as Scenario 3. Constant flow and a 2-year inflow were modeled under Scenario 3. The Stage 2 Diversion will have a capacity of about 6,850 cfs at reservoir elevation 565 feet. Small events, such as a 2-year event, will enlarge the pool then drain quickly, and much of the eroded fine sediment is expected to pass through the reservoir because the pool volume and depth would be too small to greatly reduce the SSC prior to bypassing the water. Large events are very rare in April (<10 percent chance of occurring), so they were not modeled for Scenario 3.

Scenario 3–Spring Drawdown with Constant Inflow

Since the model assumes there is no pool of water to trap or reduce the erosion of sediment, even small flows could cause erosion and create high levels of suspended sediment (Figure 2). Because of small flows relative to the model grid, the sediment transport model would cycle between high and low flows, or between cells being wet then dry near the outlet. The sediment transport model represents these conditions with days of no flow, followed by days of high flow and high sediment. Since this was meant to represent a period of constant flow, results were averaged over a period where the average outflow rate equaled the inflow rate. For an inflow rate of 180 cfs ("worst case scenario" moderate flow that occurs in nearly all years for at least a few days per year), the average suspended sediment concentration was 5,200 mg/L, which for this analysis was assumed to occur for several days.

Figure 2. Predicted suspended sediment concentration at a cross section ("XS") upstream of Ogier Ponds for Scenario 3 with constant inflow (URS 2020b). Total suspended solids or TSS is a measure of suspended sediment concentration (SSC).

Impacts on Steelhead

Under Scenario 3 with constant inflow, upstream migrating steelhead adults (if present during the spring drawdown) are predicted to experience an SEV of 6 during the migratory period (December through April) between Anderson Dam and Ogier Ponds (FCWMZ) (Table 8). An SEV of 6 is associated with moderate physiological stress, resulting in an increased rate of coughing and respiration. This level of effect for up to two weeks is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. The drawdown occurs in early spring (April), near the end of the adult migration period when there is a low likelihood of adult migration to occur. For most constructed redds that occur into April, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of eggs, delayed hatching, smaller fry, and up to 20% mortality. This level of effect may result in a decrease in spawning production for redds constructed during late winter/early spring. Adults or redds exposed further downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half), and would experience less of an impact (i.e., less reduced growth of embryos, less delayed hatching, fewer smaller fry, less than 20% mortality for incubating eggs, and less physiological stress for juveniles and adults).

Table 8. Predicted Suspended Sediment Impacts on Steelhead from Anderson Dam to Ogier Ponds under Scenario 3, assuming constant 180 cfs inflow (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult	14	1,064,593	5.7	Moderate physiological stress
Eggs and alevins	91	4,926,104	10.1	0–20% mortality
Fry and juveniles			5.5	Moderate physiological stress

Under Scenario 3 with constant inflow, the effects on rearing steelhead fry and juveniles due to sediment discharged in flows from the empty reservoir, assuming constant inflow of 180 cfs during April, is predicted to be an SEV of 6, translating to moderate physiological stress and short-term reduction in feeding rates and feeding success. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing mostly because of the low level of impact and low likelihood of a long duration of effect. Steelhead fry and juvenile rearing downstream of Ogier Ponds is less common than upstream of Ogier Ponds. However, those individuals that do occur would be exposed to even lower levels of suspended sediment than within the FCWMZ as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress) than upstream of Ogier Ponds. Suspended sediment concentrations are modeled to be about half the concentration of those in the FCWMZ by the time flows reach Milpitas/Highway 237 so the reaches in between the FCWMZ and Milpitas would presumably have intermediate levels of suspended sediment concentration with presumably less concentration downstream of Ogier and Metcalf Ponds due to deposition in the ponds.

Impacts on Chinook Salmon

Although Chinook salmon are generally distributed lower in Coyote Creek Watershed than steelhead, for the purposes of providing a conservative assessment of the upper range of potential impacts, it is assumed that primary spawning and rearing for Chinook salmon is downstream of Anderson Dam to Ogier Ponds, where impacts would be greatest.

There are no predicted effects of Scenario 3 at constant inflow on adult Chinook salmon migration and spawning or incubation of eggs because these life history phases occur before April (Table 9). The effect on rearing fry and juveniles from Scenario 3 at constant inflow during April is predicted to be an SEV of 6, translating to moderate physiological stress and short-term reduction in feeding rates and feeding success (Table 9). This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing mostly because of the low level of impact, and low likelihood of a long duration of effect. Fry and juveniles that rear downstream of Ogier Ponds would be exposed to lower levels of the suspended sediment (down to about half) than within the FCWMZ as a result of dilution and deposition as explained for steelhead.

Table 9. Predicted Suspended Sediment Impacts on Chinook salmon from Anderson Dam to Ogier Ponds under Scenario 3, assuming constant 180 cfs inflow (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult, eggs, and alevins	No Exposure	0	0.0	No effect, based on timing of sediment release
Fry and juveniles	91	4,926,104	5.5	Moderate physiological stress

Impacts on Pacific Lamprey

Pacific lamprey occur in the mainstem of Coyote Creek, as far upstream as the base of Anderson Dam. There is no extensive literature on the effects of suspended sediment on lamprey. This analysis was based on the effects of suspended sediment on salmonids with the assumption that impacts on lamprey are likely less than or equal to those on salmonids because most life stages of Pacific lamprey are more resilient to poor water quality than salmonids (Zaroban et al. 1999), making the assessment for Pacific lamprey conservative.

Under Scenario 3 with constant inflow, effects to Pacific lamprey would be similar to impacts on steelhead, since they have similar spatial distribution, adult migration timing, and prolonged larval and juvenile rearing. Upstream migrating and holding Pacific lamprey adults are predicted to experience an SEV of 6 during the migratory period (January through June) within the FCWMZ (Table 10). An SEV of 6 is associated with moderate physiological stress, resulting in an increase in respiration rate. This level of effect is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration.

Table 10. Predicted Suspended Sediment Impacts on Pacific Lamprey from Anderson Dam to Ogier Ponds under Scenario 3, assuming constant 180 cfs inflow (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult migration and holding	30	1,866,985	5.9	Moderate physiological stress
Larval rearing	180	9,489,707	10.0	0–20% mortality
Spring outmigration	14	1,064,592	5.7	Moderate physiological stress

Pacific lamprey larvae rear for a variable number of years before outmigrating to the ocean; therefore, increased suspended sediment during seismic retrofit construction could impact multiple year classes of the population. Lamprey are reported to have an intermediate level of tolerance to increased sedimentation and turbidity (Zaroban et al. 1999), but it is not known how changes in suspended sediment affect larva survival. Based on impacts to salmonids, an SEV of 6 is predicted for larval rearing under Scenario 3 with constant inflow. Juvenile salmonids would have moderate physiological stress under an SEV of 6, but because Pacific lamprey larvae can rear in burrows in fine sediment (Stillwater 2014), they would have higher tolerance than steelhead. However, excessive sedimentation from the settling out of suspended fines could possibly smother larvae in some areas. Pacific lamprey larvae are filter feeders

(Stillwater 2014), so reduced growth rates might be expected from elevated suspended sediment between Anderson Dam and Ogier Ponds. However, the broad spatial distribution of Pacific lamprey in the Coyote Creek Watershed, including Upper Penitencia Creek, suggest that a large portion of the rearing larva population would not be impacted by the Project. In addition, Pacific lamprey larvae that rear downstream of Ogier Ponds would be exposed to lower levels (down to about half) of suspended sediment that within the FCWMZ as a result of dilution from additional sources of flow and sediment deposition within Ogier Ponds and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress). Juvenile spring downstream migrants are anticipated to only experience moderate physiological stress (up to an SEV of 6) for a short duration while migrating out of the system and most juveniles likely migrate during high flow events that occur more often earlier in the year (before April).

Impacts on Instream Habitat

The reach between Anderson Dam and Ogier Ponds is primarily erosional but there are a few locations of deposition, mainly downstream of bridges (AECOM 2021). Scenario 3 predicts a net 47 tons of erosion when assuming constant 180 cfs inflow, with about 0.12 inches of deposition downstream of the Coyote Creek Trail Crossing (AECOM 2021). For the limited areas predicted to experience erosion or deposition, this magnitude of morphological change is unlikely to substantially impact steelhead, Chinook salmon, or Pacific lamprey spawning habitat or BMI production.

Scenario 3–Spring Drawdown with 2-Year Flow Event

A 2-year flow event has a probability of occurring on average once every 2 years. The inflow hydrograph and outlet suspended sediment release for the 2-year inflow (~6,000 cfs) under Scenario 3 is shown in Figure 3. The initial spike in concentration is due to water flowing into the empty reservoir and eroding significant volumes of sediment causing peak SSC values ranging between 30,000 to 39,000 mg/L between Anderson Dam and Ogier Ponds. As the reservoir fills to elevation 502 feet, erosion decreases and the SSC decreases to less than 1,000 mg/L, as sediment in the reservoir settles and is diluted by the inflow. The SSC spikes to above 30,000 mg/L at the end of the simulation due to increased erosion as the reservoir empties, exposing the erodible sediments with no new inflow available to keep the erodible sediment inundated.

Figure 3. Predicted suspended sediment concentration at a cross section ("XS") upstream of Ogier Ponds for Scenario 3 with a 2-year flow event (URS 2020b). Total suspended solids or TSS is a measure of suspended sediment concentration (SSC).

Impacts on Steelhead

Under Scenario 3 with a 2-year flow event, upstream migrating steelhead adults are predicted to experience an SEV of 6 between Anderson Dam and Ogier Ponds (Table 11). An SEV of 6 is associated with moderate physiological stress, potentially resulting in an increased rate of coughing and respiration. This level of effect over a short duration (hours) is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. In addition, Scenario 3 would occur during early spring (April) near the end of the adult migration period. In addition, flows exceeding a 2-year magnitude are rare in April (<10% of years). For most constructed redds that occur into April, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of embryos, delayed hatching, smaller fry, and up to 20% mortality for eggs that are still incubating at that time. This would result in decreased spawning production for redds constructed during late winter/early spring. Adults or redds exposed further downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half), and experience less of an impact (i.e., less reduced growth of embryos, delayed hatching, smaller fry, and less than 20% mortality).

Table 11. Predicted Suspended Sediment Impacts on Steelhead from Anderson Dam to Ogier Ponds under Scenario 3, assuming a 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Impacts
Adult	14	740,401	5.6	Moderate physiological stress
Eggs and alevins	91	4,210,909	10.1	0–20% mortality
Fry and juveniles			5.5	Moderate physiological stress

The effect of Scenario 3 with a 2-year flow event on rearing fry and juveniles is predicted to be an SEV of 6, translating to moderate physiological stress and a short-term reduction in feeding rates and feeding success. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing, in part because of the low level of impact and the relatively short duration of spikes in SSC (1–2 hours). Steelhead fry and juvenile rearing downstream of Ogier Ponds is less common than upstream of Ogier Ponds. However, those individuals that do occur would be exposed to lower levels (down to about half) of suspended sediment that within the FCWMZ as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (less than moderate physiological stress).

Impacts on Chinook Salmon

Under Scenario 3 with a 2-year flow event, effects on Chinook salmon would be similar to impacts on steelhead but would be less frequent as a result of earlier run timing, spawning, and rearing lower in the watershed, and shorter freshwater rearing duration. Suspended sediment would increase in Coyote Creek when the reservoir reaches a low elevation (April at the earliest). This is after Chinook salmon migrate and spawn in Coyote Creek and thus, under Scenario 3, there would be no impact of increased suspended sediment on adult migrating Chinook salmon or incubating eggs (Table 12). In addition, flows exceeding a 2-year magnitude are rare in April (<10% of years).

Table 12. Predicted Suspended Sediment Impacts on Steelhead from Anderson Dam to Ogier Ponds under Scenario 3, assuming a 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult	14	0	0.0	No effect, based on life-history timing
Eggs and alevins	91	0	0.0	
Fry and juveniles		4,165,294	5.5	Moderate physiological stress

The effect of Scenario 3 with a 2-year flow event on rearing fry and juveniles during April is predicted to be an SEV of 6, translating to moderate physiological stress and short-term reduction in feeding rates and feeding success. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing because of the low SSC and short exposure duration. Fry and juveniles rearing downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half) as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than minor physiological stress).

Impacts on Pacific Lamprey

Under Scenario 3 with a 2-year flow event, effects to Pacific lamprey would be similar to impacts on steelhead, since they have similar spatial distribution, adult migration timing, and prolonged larval and juvenile rearing. Upstream migrating and holding Pacific lamprey adults are predicted to experience an SEV of 6 during April and May of their migratory period (January through June) from Anderson Dam to Ogier Ponds (Table 13). An SEV of 6 is associated with moderate physiological stress, resulting in an increase in respiration rate. This level of effect is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration.

Table 13. Predicted Suspended Sediment Impacts on Pacific Lamprey from Anderson Dam to Ogier Ponds under Scenario 3, assuming a 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult migration and holding	30	1,428,404	5.8	Moderate physiological stress
Larval rearing	180	8,270,628	5.7	Moderate physiological stress
Spring outmigration	14	740,401	5.0	Minor physiological stress

As described previously, suspended sediment resulting from the Project could impact multiple year-classes of the Pacific lamprey larva population. Lamprey are reported to have an intermediate level of tolerance to increased sedimentation and turbidity (Zaroban et al. 1999), but it is not known how changes in suspended sediment affect larva survival. Based on impacts to salmonids, an SEV of 5.7 is predicted for larval rearing under Scenario 3 with a 2-year flow event. An SEV of 5.7 for juvenile salmonids would cause moderate physiological stress, but because Pacific lamprey larvae can rear in burrows in fine sediment (Stillwater 2014), they may tolerate spikes in suspended sediment resulting from the Project, although excessive sedimentation from the settling out of suspended fines could possibly smother larvae in some areas. Pacific lamprey larvae are filter-feeders (Stillwater 2014), so reduced growth rates might be expected from elevated suspended sediment. However, the broad spatial distribution of Pacific lamprey in the Coyote Creek Watershed, including Upper Penitencia Creek, should mean a large portion of the rearing larva population would not be impacted by the Project. In addition, Pacific lamprey larvae that rear downstream of Ogier Ponds would be exposed to lower levels (down to about half) of suspended sediment as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress). Juvenile spring downstream migrants are anticipated to only experience minor physiological stress for a short duration during migration if they migrate in April, which would be less common than migrants that take advantage of the high flows January–March.

Impacts on Instream Habitat

The stream reach between Anderson Dam and Ogier Ponds is primarily erosional but there are a few locations of deposition, mainly downstream of bridges (AECOM 2021). If there is a 2-year event under

Scenario 3, the reach is predicted to experience a net 1,885 tons of erosion. This magnitude of erosion will be driven by higher than usual flows downstream of Anderson Dam and is predicted to increase pool depths, reduce spawning gravel quantity, and reduce access to low-terrace floodplain habitat. Deposition is predicted to occur in limited areas, with around 2.9 inches of deposition near the Serpentine Trail Crossing, around 4.6 inches downstream of the Sycamore Avenue crossing, and around 3.8 inches near the U.S. Highway 101 Bridge (AECOM 2021). For the limited areas predicted to experience deposition, this magnitude of deposition could reduce the quality of steelhead, Chinook salmon, and Pacific lamprey spawning habitat and reduce BMI production as food supply for rearing anadromous species but is not likely to be substantial enough to reduce pool habitat for rearing anadromous species. This deposition is predicted to reduce the survival of incubating eggs as well as the growth of fry and juveniles rearing within these limited areas. However, Pacific lamprey larvae may benefit from new areas of deposition.

Scenario 4–Wet Season Overview

During seismic retrofit construction, the Stage 2 Diversion will be operated for 4 wet seasons and was modeled by URS (2020b) as Scenario 4. Constant flow, 2-year inflow, and 5-year inflow events were modeled under Scenario 4. The Stage 2 Diversion will have a capacity of about 6,850 cfs at reservoir elevation 565 feet. Small events such as a 2-year event will enlarge the pool that will then drain quickly. During small events, much of the eroded fine sediment is expected to pass through the reservoir because the pool volume and depth would be too small to greatly reduce the SSC. Large events may create a pool of water that can initially reduce the SSC, but sediment may pass through after the storm peak has passed and the reservoir is draining.

Species-specific impacts of suspended sediment under Scenario 4 are discussed below for those species that are considered here and could occur within Coyote Creek and intertidal portions of the study area (steelhead, Chinook salmon, and Pacific lamprey).

Scenario 4–Wet Season with Constant Inflow

Since there is no pool of water to trap sediment or reduce the ability of flows to erode, even small flows could cause erosion and create high levels of suspended sediment. Because of the small flows relative to the model grid, the sediment transport model would cycle between high and low flows or between cells being wet then dry near the outlet. The sediment transport model represents these conditions with days of no flow, followed by days of high flow and high sediment. Since this was meant to represent a period of constant flow the results were averaged over a period where the average outflow rate equaled the inflow rate. For an inflow rate of 180 cfs ("worst case" moderate flow that occurs in nearly all years for at least a few days per year), the average suspended sediment concentration was 259 mg/L (Figure 4), which for this analysis was assumed to occur for several days.

Figure 4. Predicted suspended sediment concentration at a cross section ("XS") upstream of Ogier Ponds for Scenario 4 with constant inflow (URS 2020b). Total suspended solids or TSS is a measure of suspended sediment concentration (SSC).

Impacts on Steelhead

Under Scenario 4 with constant inflow of 180 for 14 days in the FCWMZ, upstream migrating steelhead adults are predicted to experience an SEV of 5 (Table 14). An SEV of 5 is associated with minor physiological stress, resulting in an increased rate of coughing and respiration. This level of effect over a short duration is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. For most constructed redds that occur between December through March, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of eggs, delayed hatching, smaller fry, and up to 20% mortality. Timing of an increase in suspended sediment has a large influence on the potential impacts. For example, an event in December would likely expose very few redds because most steelhead spawning has not yet occurred. The same event in March could expose the majority of that year's incubating steelhead eggs/embryos. Adults or redds exposed further downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half) and experience less of an impact (i.e., less reduced growth of embryos, less delayed hatching, fewer smaller fry, less than 20% mortality for incubating eggs, and less physiological stress for juveniles and adults).

Table 14. Predicted Suspended Sediment Impacts on Steelhead from Anderson Dam to Ogier Ponds under Scenario 4, assuming constant inflow (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Impacts
Adult	14	97,697	5.1	Minor physiological stress: Increase in rate of coughing Increased respiration rate
Eggs and alevins	91	646,178	9.9	0–20% mortality
Fry and juveniles	182	1,294,383	5.1	Minor physiological stress: Increase in rate of coughing Increased respiration rate

The effect of Scenario 4 with constant inflow on rearing fry and juveniles is predicted to be an SEV of 5, translating to minor physiological stress, increased coughing rate, and increased respiration rate. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing because of the concentration. Steelhead fry and juvenile rearing downstream of Ogier Ponds are less common than upstream of Ogier Ponds. However, those individuals that do occur would be exposed to lower levels of suspended sediment (down to about half) as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond down to about half the amount of SSC (URS 2020c), and thus would experience less of an impact (i.e., less than minor physiological stress) than upstream of Ogier.

Impacts on Chinook Salmon

Although Chinook salmon are generally distributed lower in Coyote Creek Watershed than steelhead, for the purposes of providing a conservative assessment of the upper range of potential impacts, it is assumed that primary spawning and rearing for Chinook salmon is downstream of Anderson Dam to Ogier Ponds, where impacts would be greatest.

Under Scenario 4 with constant inflow, effects to Chinook salmon would be an SEV of 5 during the migratory period (Table 15). However, a constant inflow of 180 cfs for 14 days would be a rare event for most of the migration season. An SEV of 5 is associated with minor physiological stress, resulting in increased coughing and respiration rates. This level of effect over a short duration is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. For most redds, incubating eggs would experience an SEV of 10 translating to reduced growth of embryos, delayed hatching, smaller fry, and up to 20% mortality. Adults or redds exposed further downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half), and experience less of an impact (i.e., less than moderate physiological stress for adults and less reduction in embryo growth, hatching delay, fry size, and less than 20% mortality of eggs, alevins, and fry). However, 180 cfs for the durations assumed would be rare for most of the Chinook salmon spawning and rearing seasons; therefore, this analysis represents a worst case scenario.

Table 15. Predicted Suspended Sediment Impacts on Chinook salmon from Anderson Dam to Ogier Ponds under Scenario 4, assuming constant inflow (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult	14	97,696	5.1	Minor physiological stress
Eggs and alevins	91	646,178	9.7	0–20% mortality
Fry and juveniles		646,178	4.9	Minor physiological stress

The effect of Scenario 4 with constant inflow on rearing fry and juveniles is predicted to be an SEV of 5, translating to minor physiological stress, increased coughing rate, and increased respiration rate. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing because of the SSC. Fry and juveniles that rear downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half) than within the FCWMZ as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than minor physiological stress).

Impacts on Pacific Lamprey

Pacific lamprey occur in the mainstem Coyote Creek, as far upstream as the base of Anderson Dam. There is not extensive literature on the effects of suspended sediment on lamprey. This analysis was based on the effects of suspended sediment on salmonids, with the assumption that impacts on lamprey are likely less than or equal to those on salmonids because most life stages of Pacific lamprey are more resilient to poor water quality than salmonids (Zaroban et al. 1999) making the assessment for Pacific lamprey conservative.

Under Scenario 4 with constant inflow, impacts on Pacific lamprey would be similar to impacts on steelhead, since they have similar spatial distribution, adult migration timing, and prolonged larval and juvenile rearing. Upstream migrating and holding Pacific lamprey adults are predicted to experience an SEV of 5 during January through March of the migratory period (January through June) within the FCWMZ (Table 16). An SEV of 5 is associated with minor physiological stress. This level of effect is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration.

Table 16. Predicted Suspended Sediment Impacts on Pacific lamprey from Anderson Dam to Ogier Ponds under Scenario 4, assuming constant inflow (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult migration and holding	30	211,666	5.3	Minor physiological stress
Larval rearing	180	1,280,136	5.8	Moderate physiological stress
Spring outmigration	14	97,696	5.1	Minor physiological stress

As described previously, suspended sediment resulting from the Project could impact multiple year-classes of the larva population. Lamprey are reported to have an intermediate level of tolerance to increased sedimentation and turbidity (Zaroban et al. 1999), but it is not known how changes in suspended sediment affect larva survival. Based on impacts to salmonids, an SEV of 6 would be predicted for larval rearing, under Scenario 4 with constant inflow. Juvenile salmonids would have moderate physiological stress under an SEV of 6, but, because Pacific lamprey larvae can rear in burrows in fine sediment (Stillwater 2014), they would have higher tolerance than steelhead. However, excessive sedimentation from the settling out of suspended fines could possibly smother larvae in some areas. Larvae are filter-feeders (Stillwater 2014), so reduced growth rates might be expected from elevated suspended sediment. However, the broad spatial distribution of Pacific lamprey in the Coyote Creek Watershed, including Upper Penitencia Creek, should mean that a large portion of the rearing larva population would not be impacted by the Project. In addition, larvae that rear downstream of Ogier Ponds would be exposed to lower levels (down to about half) of suspended sediment as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress). Juvenile spring downstream migrants are anticipated to only experience moderate physiological stress for a short duration during migration.

Impacts on Instream Habitat

The stream reach between Anderson Dam and Ogier Ponds is primarily erosional but there are a few locations of deposition, mainly downstream of bridges (AECOM 2021). Flows during Scenario 4 are predicted to result in a net 13 tons of erosion assuming constant 180 cfs inflow, with some deposition in limited areas including 0.05 inches downstream of the Serpentine Trail Crossing, 0.24 inches downstream of Sycamore Avenue Crossing, and 0.12 inches downstream of the Coyote Creek Trail Crossing (AECOM 2021). For the limited areas predicted to experience erosion or deposition, this magnitude of morphological change is unlikely to impact steelhead, Chinook salmon, or Pacific lamprey spawning habitat or BMI production.

Scenario 4–Wet Season with 2-Year Flow Event Overview

A 2-year flow event has a probability of occurring on average once every 2 years. During a 2-year flow event, SSC reaches a maximum value of about 30,000 mg/L ahead of the water level reaching a maximum at elevation 488 (Figure 5). The SSC in the outflow closely follows the inflow since the reservoir never fills up deep enough to prevent erosion. In Scenario 4 with a 2-year flow event, the inflow from Coyote Creek continues after the storm passes, so the SSC concentration in the outflow to Coyote Creek through Anderson Dam stabilizes at a value of about 230 mg/L.

Figure 5. Predicted suspended sediment concentration at a cross section ("XS") upstream of Ogier Ponds for Scenario 4 with 2-year flow event (URS 2020b). Total suspended solids or TSS is a measure of suspended sediment concentration (SSC).

Impacts on Steelhead

Under Scenario 4 with a 2-year flow event, upstream migrating steelhead adults are predicted to experience an SEV of 6 during December through March of the migratory period (December through April) from Anderson Dam to Ogier Ponds (Table 17). An SEV of 6 is associated with moderate physiological stress, resulting in an increased rate of coughing and respiration. This level of effect over a short duration (hours) is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. For most constructed redds that occur between December through March, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of embryos, delayed hatching, smaller fry, and up to 20% mortality. Timing of an increase in suspended sediment has a large influence on the potential impacts. For example, an event in December would likely expose very few redds because most steelhead spawning has not yet occurred. The same event in March could expose the majority of that year's incubating steelhead eggs/embryos. Multiple storm events could also expose larger percentages of the population; therefore, this level of effect would likely decrease spawning production about every 2 years. Adults or redds exposed further downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half), and experience less of an impact (i.e., less reduced growth of embryos, delayed hatching, smaller fry, less than 20% mortality, and less physiological stress for juveniles and adults).

Table 17. Predicted Suspended Sediment Impacts on Steelhead from Anderson Dam to Ogier Ponds under Scenario 4, assuming a 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Impacts
Adult	14	599,920	5.6	Moderate physiological stress
Eggs and alevins	91	2,818,112	10.1	0–20% mortality
Fry and juveniles	182	5,439,612	5.6	Moderate physiological stress

The effect of Scenario 4 with a 2-year flow event on rearing fry and juveniles is predicted to be an SEV of 6, translating to moderate physiological stress and a short-term reduction in feeding rates and feeding success. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing because of the low concentration of SSC and short duration of exposure. Steelhead fry and juvenile rearing downstream of Ogier Ponds is less common than upstream of Ogier Ponds. However, those individuals that do occur would be exposed to lower levels of suspended sediment (down to about half) as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress) than upstream of Ogier.

A 2-year event has a probability of occurring, on average, once every 2 years. Because the outlet would still be discharging flows and sediment at the same rate, during a larger storm event the reservoir would fill up, and SSCs would not have greater impacts. However, if multiple events of similar magnitude to a 2-year event were to occur in one season, impacts described above could occur more than once. Although infrequent, multiple peaks in high flows during the spawning season, for example, could culminate in mortality of incubating eggs.

Impacts on Chinook Salmon

Under Scenario 4 with a 2-year event, upstream migrating Chinook salmon adults are predicted to experience an SEV of 6 during the migratory period (Table 18). An SEV of 6 is associated with moderate physiological stress, resulting in an increase in rate of coughing and respiration. This level of effect over a short duration (hours) is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. Also, a 2-year event would be expected to happen about 3 times during ADSRP construction and Chinook salmon migrating before mid-December would be unlikely to experience a 2-year storm event. For most constructed redds, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of embryos, delayed hatching, smaller fry, and up to 20% mortality. Timing of an increase in suspended sediment has a large influence on the potential impacts. For example, an event in December would likely expose Chinook salmon eggs/larvae within redds because Chinook salmon spawning often occurs in October and November. The same event in February would likely expose very few redds because most incubation would be completed by then. Multiple storm events could also expose larger percentages of the population. This level of effect may result in a decrease in spawning production for Chinook salmon during ADSRP wet seasons. Adults or redds exposed further downstream of Ogier Ponds, where most spawning occurs, would be exposed to lower levels of suspended sediment (down to about half), and experience less of an impact (i.e., less than moderate physiological stress for adults and less reduction in embryo growth, hatching delay, fry size, and less than 20% mortality of eggs, alevins, and fry).

Table 18. Predicted Suspended Sediment Impacts on Chinook salmon from Anderson Dam to Ogier Ponds under Scenario 4, assuming a 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult	14	599,919	5.6	Moderate physiological stress
Eggs and alevins	91	2,818,112	10.0	0–20% mortality
Fry and juveniles			5.4	Minor physiological stress

The effect of Scenario 4 with a 2-year event on rearing Chinook salmon fry and juveniles is predicted to be an SEV of 5, translating to minor physiological stress. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing because of low SSC and short exposure duration. Fry and juveniles rearing downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half) than within the FCWMZ as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than minor physiological stress).

A 2-year event has a probability of occurring, on average, once every 2 years. Because the outlet would still be discharging at the same rate, during a larger storm event the reservoir would fill up, and SSC would not have greater impacts. However, if multiple events of similar magnitude to a 2-year event were to occur in one season, impacts described above could occur more than once. Although infrequent, multiple peaks in high flows during the spawning season, for example, could culminate in further mortality of incubating eggs and further decreased spawning production.

Impacts on Pacific Lamprey

Under Scenario 4 with a 2-year flow event, effects to Pacific lamprey would be similar to impacts on steelhead, since they have similar spatial distribution, adult migration timing, and prolonged larval and juvenile rearing. Upstream migrating and holding Pacific lamprey adults are predicted to experience an SEV of 6 January through March of the migratory period (January through June) from Anderson Dam to Ogier Ponds (Table 19). An SEV of 6 is associated with moderate physiological stress, resulting in an increase in respiration rate. This level of effect is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration.

Table 19. Predicted Suspended Sediment Impacts on Pacific lamprey from Anderson Dam to Ogier Ponds under Scenario 4, assuming a 2-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult migration and holding	30	1,060,842	5.7	Moderate physiological stress
Larval rearing	180	5,381,996	5.6	Moderate physiological stress
Spring outmigration	14	599,919	4.9	Minor physiological stress

As described previously, suspended sediment resulting from the Project could impact multiple year-classes of the larva population. Lamprey are reported to have an intermediate level of tolerance to increased sedimentation and turbidity (Zaroban et al. 1999), but it is not known how changes in suspended sediment affect larva survival. Based on impacts to salmonids, an SEV of 6 is predicted for larval rearing, during a constant inflow when the reservoir is a low elevation. An SEV of 6 for juvenile salmonids would cause moderate physiological stress, but because Pacific lamprey larvae can rear in burrows in fine sediment (Stillwater 2014), they may tolerate spikes in suspended sediment resulting from the Project, although excessive sedimentation from the settling out of suspended fines could possibly smother larvae in some areas. Pacific lamprey larvae are filter-feeders (Stillwater 2014), so reduced growth rates might be expected from elevated suspended sediment. However, the broad spatial distribution of Pacific lamprey in the Coyote Creek Watershed, including Upper Penitencia Creek, should mean that a large portion of the rearing larva population would not be impacted by the Project. In addition, larvae that rear downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half) as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress). Juvenile spring downstream migrants are anticipated to only experience minor physiological stress for a short duration during migration.

Impacts on Instream Habitat

The stream reach between Anderson Dam and Ogier Ponds is primarily erosional but there are a few locations of deposition, mainly downstream of bridges (AECOM 2021). Flows under Scenario 4 are predicted to result in a net 1,860 tons of erosion if a 2-year flow event or greater occurs. This magnitude of erosion will be driven by higher than usual flows downstream of Anderson Dam during Scenario 4 and is predicted to increase pool depths, reduce spawning gravel quantity, and potentially reduce access to low-terrace floodplain habitat for steelhead, Chinook salmon, and Pacific lamprey. Deposition is predicted to occur in limited areas, including around 4.9 inches of deposition near the Serpentine Trail Crossing, around 3.8 inches downstream of the Sycamore Avenue crossing, and around 3.6 inches near the U.S. Highway 101 Bridge (AECOM 2021). For the limited areas predicted to experience deposition, this magnitude of deposition could reduce the quality of steelhead, Chinook salmon, and Pacific lamprey spawning habitat and reduce BMI production as food supply for rearing steelhead and Chinook salmon but is not likely to be substantial enough to reduce pool habitat for rearing anadromous species. This deposition is predicted to reduce the survival of incubating eggs, and the growth of fry and juveniles rearing within these limited areas. However, Pacific lamprey larvae may benefit from new areas of deposition.

Scenario 4–Wet Season with 5-Year Flow Event Overview

Under Scenario 4 with a 5-year inflow event SSC reaches a value of about 25,000 mg/L ahead of the water level reaching a maximum elevation of 510 feet (Figure 6). The suspended sediment concentration in the outflow closely follows the inflow, but because the inflow for the 5-year event is much larger than the 2-year inflow, the outflow SSC would be much smaller due to the higher water levels in the reservoir resulting in reduced erosion of reservoir deposits.

Figure 6. Predicted suspended sediment concentration at a cross section ("XS") upstream of Ogier Ponds for Scenario 4 with a 5-year flow event (URS 2020b). Total suspended solids or TSS is a measure of suspended sediment concentration (SSC).

Impacts on Steelhead

Under Scenario 4 with a 5-year flow event, upstream migrating steelhead adults are predicted to experience an SEV of 6 during December through March of the migratory period (December through April) from Anderson Dam to Ogier Ponds (Table 20). An SEV of 6 is associated with moderate physiological stress, resulting in an increased rate of coughing and respiration. This level of effect over a short duration (hours) is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. For most constructed redds that occur between December through March, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of embryos, delayed hatching, smaller fry, and up to 20% mortality. Timing of an increase in suspended sediment has a large influence on the potential impacts. For example, an event in December would likely expose very few redds because most steelhead spawning has not yet occurred. The same event in March could expose the majority of that year's incubating steelhead eggs/embryos. Multiple storm events could also expose larger percentages of the population. This level of effect would result in a decrease in spawning production about once or twice during ADSRP. Adults or redds exposed further downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half), and experience less of an impact (i.e., less reduced growth of embryos, delayed hatching, smaller fry, less than 20% mortality, and less physiological stress for juveniles and adults).

Table 20. Predicted Suspended Sediment Impacts on Steelhead from Anderson Dam to Ogier Ponds under Scenario 4, assuming a 5-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult	14	589,084	5.6	Moderate physiological stress
Eggs and alevins	91	2,756,376	10.0	0–20% mortality
Fry and juveniles	182	5,317,721	5.6	Moderate physiological stress

The effect of Scenario 4 with a 5-year flow event on steelhead rearing fry and juveniles is predicted to be an SEV of 6, translating to moderate physiological stress, short-term reduction in feeding rates, and feeding success. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing, because of low SSC and short exposure duration. Steelhead fry and juveniles rearing downstream of Ogier Ponds is less common than upstream of Ogier Ponds. However, those individuals that do occur would be exposed to lower levels of suspended sediment (down to about half) as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact.

A 5-year event has a probability of occurring on average once every 5 years (probably only once or twice during ADSRP). Since the outlet would still be discharging at the same rate, during a larger storm event the reservoir would fill up, and SSC in the dam releases would not increase nor have greater impacts. However, if multiple events of similar magnitude to a 5-year event were to occur in one season, impacts described above could occur more than once. Although infrequent, multiple peaks in high flows during the spawning season, for example, could culminate in further mortality of incubating embryos.

Impacts on Chinook Salmon

Under Scenario 4 with a 5-year flow event, upstream migrating Chinook salmon adults are predicted to experience an SEV of 6 in the FCWMZ (Table 21). An SEV of 6 is associated with moderate physiological stress, resulting in an increased rate of coughing and respiration. This level of effect over a short duration (hours) is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration. Also, only one to two 5-year events would be expected during the duration of ADSRP construction and most 5-year events do not occur before mid-December, while Chinook salmon adults can start migrating starting in October in this system so many Chinook salmon adults would migrate before a 5-year storm event has the potential to occur. For most constructed redds, incubating eggs would experience an SEV of 10, translating to potentially reduced growth of embryos, delayed hatching, smaller fry, and up to 20% mortality. Timing of an increase in suspended sediment has a large influence on the potential impacts. For example, an event in December would likely expose a smaller number of Chinook salmon eggs/embryos because Chinook salmon spawning often occurs in October and November. The same event in February would likely expose very few redds, because most incubation would be completed by then. Multiple storm events could also expose larger percentages of the population. This would result in decreased spawning production during ADSRP. Adults or redds exposed further downstream of Ogier Ponds, where most Chinook salmon spawning occurs, would be exposed to lower levels of suspended sediment (down to about half) and experience less of an impact (i.e., less reduced growth of embryos, delayed hatching, smaller fry, less than 20% mortality, and less physiological stress for juveniles and adults).

Table 21. Predicted Suspended Sediment Impacts on Chinook salmon from Anderson Dam to Ogier Ponds under Scenario 4, assuming a 5-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult	14	589,084	5.6	Moderate physiological stress
Eggs and alevins	91	2,756,375	10.0	0–20% mortality
Fry and juveniles			5.4	Minor physiological stress

The effect of Scenario 4 with a 5-year flow event on rearing Chinook salmon fry and juveniles is predicted to be an SEV of 5, translating to minor physiological stress. This level of impact is anticipated to result in sublethal effects to fry and juveniles and would not substantially affect rearing mostly because of the low concentration of SSC and short duration of exposure. Fry and juveniles rearing downstream of Ogier Ponds would be exposed to lower levels of suspended sediment and thus would experience less of an impact (i.e., less than moderate physiological stress).

A 5-year event has a probability of occurring on average once every 5 years, or about once or twice during ADSRP. Because the outlet would still be discharging at the same rate, during a larger storm event the reservoir would fill up and SSC would not have greater impacts. However, if multiple events of similar magnitude to a 5-year event were to occur in one season, impacts described above could occur more than once. Although infrequent, multiple peaks in high flows during the spawning season, for example, could culminate in further mortality of incubating eggs.

Impacts on Pacific Lamprey

Under Scenario 4 with a 5-year flow event, effects to Pacific lamprey would be similar to impacts to steelhead, since they have similar spatial distribution, adult migration timing, and prolonged larval and juvenile rearing. Upstream migrating and holding Pacific lamprey adults are predicted to experience an SEV of 6 during January through March of the migratory period (January through June) from Anderson Dam to Ogier Ponds (Table 22). An SEV of 6 is associated with moderate physiological stress. This level of effect is anticipated to result in sublethal effects to adults and is not predicted to substantially affect migration.

Table 22. Predicted Suspended Sediment Impacts on Pacific lamprey from Anderson Dam to Ogier Ponds under Scenario 4, assuming a 5-year flow event (based on Newcombe and Jensen 1996)

Life stage	Total exposure (days)	Total CD (mg-hr/L)	SEV	Effects
Adult migration and holding	30	1,039,430	5.7	Moderate physiological stress
Larval rearing	180	5,261,427	5.6	Moderate physiological stress
Spring outmigration	14	589,083	4.9	Minor physiological stress

As described previously, suspended sediment resulting from the Project could impact multiple year-classes of the larva population. Lamprey are reported to have an intermediate level of tolerance to increased sedimentation and turbidity (Zaroban et al. 1999), but it is not known how changes in suspended sediment affect larva survival. Based on impacts to salmonids, an SEV of 6 is predicted for larval rearing under Scenario 4 with a 5-year flow event. An SEV of 6 for juvenile salmonids would cause moderate physiological stress, but because Pacific lamprey larvae can rear in burrows in fine sediment (Stillwater 2014), they may tolerate spikes in suspended sediment resulting from the Project, although excessive sedimentation from the settling out of suspended fines could possibly smother larvae in some areas. Pacific lamprey larvae are filter-feeders (Stillwater 2014), so reduced growth rates might be expected from elevated suspended sediment. However, the broad spatial distribution of Pacific lamprey in the Coyote Creek Watershed, including Upper Penitencia Creek, should mean that a large portion of the rearing larva population would not be impacted by the Project. In addition, larvae that rear downstream of Ogier Ponds would be exposed to lower levels of suspended sediment (down to about half) as a result of dilution from additional sources of flow and deposition within Ogier and Coyote Percolation Pond (URS 2020c), and thus would experience less of an impact (i.e., less than moderate physiological stress). Juvenile spring downstream migrants are anticipated to experience only minor physiological stress for a short duration during migration.

Impacts on Instream Habitat

The stream reach between Anderson Dam and Ogier Ponds is primarily erosional but there are a few locations of deposition, mainly downstream of bridges (AECOM 2021). Under Scenario 4 the reach is predicted to experience a net 2,789 tons of erosion if a 5-year flow event or greater occurs. This magnitude of erosion will be driven by higher than usual flows downstream of Anderson Dam during construction flows, and is predicted to increase pool depths, reduce spawning gravel quantity, and potentially reduce access to low-terrace floodplain habitat. Deposition is predicted to occur in limited areas including around 6.0 inches of deposition near the Serpentine Trail Crossing, around 4.8 inches downstream of the Sycamore Avenue crossing, around 3.5 inches downstream of the Coyote Creek Trail Crossing, and around 2.8 inches near the U.S. Highway 101 Bridge (AECOM 2021). For the limited areas predicted to experience deposition, this magnitude of deposition could reduce the quality of steelhead, Chinook salmon, and Pacific lamprey spawning habitat and reduce BMI production as food supply for rearing steelhead and Chinook salmon but is not likely to be substantial enough to reduce pool habitat for rearing anadromous species. This deposition is predicted to reduce the survival of incubating embryos, and the growth of fry and juveniles rearing within these limited areas. However, Pacific lamprey larvae may benefit from new areas of deposition.

Modeling and Analysis Caveats

The indices used by Newcombe and Jensen (1996) have become a standard for selecting management-related turbidity and suspended sediment criteria (e.g., Walters et al. 2001), and their report remains the best available source for determining effects of SSC on salmonids (Berry et al. 2003). However, there are inherent sources of uncertainty in this application of the model. Newcombe and Jensen (1996) base much of their analysis on laboratory studies that were conducted in controlled environments over short durations, mostly examining acute lethal impacts of non-fluctuating concentrations of suspended sediment where the fish have no behavioral regulation over their exposure. In addition, Newcombe and Jensen (1996) do not explicitly address the translation of sublethal severity levels into population-level effects.

As Gregory et al. (1993) noted in their criticism of the SEV stress model (first presented by Newcombe and MacDonald 1991), the approach simplifies the effects of suspended sediment and in doing so assumes all effects of suspended sediment are negative, despite literature to the contrary. This exaggerates the effects of suspended sediment, particularly for lower concentrations and durations of exposure. Although the predictions of mortality at high concentrations and durations of exposure are considered more certain than the predictions of sublethal effects, in this application sublethal effects resulting from exposure to lower concentrations are included because of the concern that sublethal impacts of suspended sediment could be adverse in conjunction with high water temperature (Bozek and Young 1994) for some life stages.

In addition, to date, there is no better accepted approach for assessing the impacts of suspended sediment on salmonids. Therefore, in this analysis, Newcombe and MacDonald (1991) is used to calculate SEV and the Newcombe and Jensen (1996) quantitative analysis on suspended sediment impacts is used to evaluate the SEV effects of sediment transport on steelhead, Chinook salmon, and Pacific lamprey, while acknowledging that the analysis is likely to exaggerate the impacts of low concentrations.

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Post-Construction Instream Flow Operations–WEAP Model Outputs

Introduction

This section provides the detailed methods and analysis for the impacts of post-construction instream flow operations (Fish and Aquatic Habitat Collaborative Effort [FAHCE] rule curves) on fisheries resources that supports the impact assessment summaries in the impact analysis of the EIR for special status fish with habitat suitability characteristics that can be quantitatively assessed with the FAHCE Water Evaluation and Planning (WEAP) model. The FAHCE WEAP model does not model habitat for all the fisheries resources in the EIR. Fish species that do not have modeled habitat or do not have habitat that can be inferred from the FAHCE WEAP model, are analyzed qualitatively in the impact assessment.

Geographic Setting - Reaches of Interest (ROI) and Points of Interest (POI)

The FAHCE developed WEAP model was used in the EIR analysis to provide a quantitative basis from which to assess the FAHCE reservoir re-operation rule curves on special status fish habitats. To support WEAP, the FAHCE Technical Working Group identified Reaches of Interest (ROIs), which establish a life stage-specific framework to guide the location of Points of Interest (POIs) that are used in the FAHCE WEAP Model. The details of the ROIs and POIs can be found in the *Methods for Establishing Reaches of Interest and Points of Interest* (FAHCE Technical Working Group 2016). To improve the modeling, WEAP nodes or POIs were selected to yield the most ecologically relevant results for salmonids, considering existing and potential future operations. The fourteen POIs for Coyote Creek and Upper Penitencia Creek are summarized in Table 1 and shown on Figure 1.

Figure 1. Points of interest (POI) in Coyote Creek and Upper Penitencia Creek (sources: ESRI 2016 and Valley Water 2020).

Table 1. Location of Points of Interest (POI) in Coyote Creek. Distances shown in feet (ft) upstream from San Francisco Bay (SFB).

POI ID	POI	Distance to SFB (ft)
COYO1	Highway 237	59,000
COYO2	Downstream of Penitencia Creek confluence	87,800
COYO3	Downstream of Silver Creek confluence	92,800
COYO4	Singleton Road	127,500
COYO5	Upstream of Hellyer Avenue	141,500
COYO6	Downstream of Coyote Percolation Pond	167,500
COYO7	Upstream of Golf Drive	192,000
COYO8	Upstream of Ogier Ponds	204,000
COYO9	Downstream of San Felipe Pipeline	214,400
COYO10	Downstream of Anderson Reservoir	222,600
UPEN1	Penitencia Creek downstream of Mabury Diversion	94,000
UPEN2	Penitencia Creek at Piedmont Road	105,000
UPEN3	Penitencia Creek at Dorel Drive	110,000
UPEN4	Penitencia Creek at Alum Rock YSI	121,500

Methods

Valley Water's FAHCE WEAP model uses known hydrology from past years (January 1, 1991 to December 31, 2010) and applies different scenarios to see how downstream flows would change. The WEAP model was used to provide a quantitative basis from which to assess impacts of post-construction implementation of the FAHCE reservoir re-operation rule curves (i.e., instream flow operations) on fisheries resources compared with the Pre-FOCP Baseline conditions and Future Baseline conditions.

The WEAP modeling scenarios are briefly characterized as follows:

- ***Project post-construction FAHCE Operations***. The Project implements the FAHCE reservoir reoperation rule curves and anticipated projected 2035 water demands and associated supplies as defined in Valley Water's 2015 Urban Water Management Plan (UWMP; Valley Water 2016). This scenario includes no seismic restrictions on Anderson Reservoir because the seismic retrofit will have been completed. The lack of seismic restrictions means that the FAHCE rule curves are no longer required to behave on restricted reservoir volumes. This scenario includes water temperature predictions incorporating the influence of imported water releases at the Coyote Discharge Line, but flow releases at the CVPE will be infrequent and are not included in the quantitative modeling.
- ***Pre-FOCP Baseline***. The Pre-FOCP Baseline scenario uses the 2015 operational rules and demands which are the latest published water demands and usage in Valley Water's UWMP (Valley Water 2016). This scenario includes seismic restrictions on Anderson Reservoir and uses the Pre-FOCP reservoir operation rules.
- ***Future Baseline***. The Future Baseline is defined to characterize anticipated conditions for 2035 in the Coyote Creek Watershed if FAHCE is not implemented, Valley Water continues the same

operational rules used prior to FOCP but seismic restrictions are lifted following completion of the seismic retrofit, and Anderson Reservoir is returned to its maximum storage capacity. The Future Baseline incorporates the projected 2035 water demand and associated supplies as defined in Valley Water's 2015 UWMP (Valley Water 2016).

Daily hydrology (i.e., flow) and hydraulics (e.g., water depth) in Coyote Creek for each modeling scenario were simulated from 1990 to 2010 by the WEAP model at specific POIs (SEI and Valley Water 2020). The FAHCE technical working group (TWG, composed of staff from Valley Water, NMFS, CDFW, and other FAHCE initialing parties) identified ROIs in Coyote Creek, which establish a life stage-specific framework to guide the selection of POI used in the WEAP model (Figure 1).

The WEAP model was originally applied by Valley Water as a monthly model and only recently applied on a daily timescale to Coyote Creek Watershed for the ADSRP, Pre-FOCP, and Future Baseline conditions (SEI and Valley Water 2020). The primary objective of disaggregating the existing monthly Valley Water WEAP model was to simulate flow conditions at specific POIs with sufficient temporal variability in order to reasonably assess habitat variables as they would be experienced by steelhead and Chinook salmon during three life stages (spawning, rearing, and migration) in a stream network with a flashy hydrological regime. The FAHCE TWG decided to shift to a daily model due to the inability of monthly average data to represent actual river conditions. In addition to temporal disaggregation, a spatial disaggregation was deemed both feasible and necessary, based on data available from storm drain outfalls and to assess flow conditions at specific POIs.

The WEAP modeling approach, methods, input data, and assumptions are described in various documents. *Valley Water Daily WEAP Model Technical Memorandum* includes details of the WEAP model (SEI and Valley Water 2020), *White Paper on Work Flow of the HEC-RAS Cross Section Analysis* includes details of the hydraulics model component (Valley Water 2020), and *Methods for Establishing Reaches of Interest and Points of Interest Technical Memorandum* (FAHCE Technical Working Group 2016) includes details on how POIs were determined. Daily water temperature at the POIs was simulated during this period using a calibrated water temperature regression model. *Temperature Modeling Technical Memorandum* (Valley Water 2021) includes details on the water temperature model. Daily habitat availability for incubation-adjusted spawning[5], fry rearing, and juvenile rearing steelhead and Chinook salmon life stages was estimated over the 20-year modeling period based on simulated flows, hydraulics, water temperatures, and measured structural habitat data. For the models, the characteristics that define the habitat preferences for each life stage are provided in *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* (Valley Water 2019).

Multiple statistics were calculated for the simulated daily hydrology, hydraulics, water temperature, and habitat availability over the 20-year modeling period for the two respective baselines and Post-

[5] Incubation-adjusted spawning habitat is defined as spawning habitat that results in successful incubation. Estimates of incubation-adjusted spawning habitat take into consideration the stream conditions, including water temperature, that are required for both spawning and incubation as defined in the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* (Valley Water 2019).

construction Operations (FAHCE). At each POI within Coyote Creek, the maximum, average, and minimum for each day of the year were calculated from the daily results over the 20-year modeling period. For example, the average simulated flow on January 1 was estimated by calculating the average of all simulated flows on January 1 from 1991 to 2010, the average simulated flow on January 2 was estimated by calculating the average of all simulated flows on January 2 from 1991 to 2010, and so on until the average simulated flow was estimated for each day of the year. The maximum and minimum values of parameters on each day of the year were the absolute daily maximum and absolute daily minimum on that individual day across the entire 20-year modeling period (1991 to 2010), such that the entire simulated range of variation for the parameter is quantified by the maximum and minimum daily values. Annual averages of the average daily habitat also were calculated during each life stage (i.e., effective spawning, fry rearing, and juvenile rearing).

Additionally, the annual averages of the average daily habitat were calculated for habitat during the specific portion of the life stage within the relevant Summer Cold Water Program (i.e., May 1 to October 31) and Winter Base Flow (i.e., November 1 to April 30) operational periods defined in the FAHCE Settlement Agreement (FAHCE 2003) when the life stage spanned the two different operational periods. For example, the steelhead fry rearing life stage extends from March 1 to May 31, with March 1 to April 30 occurring during the Winter Base Flow operations period and May 1 to May 31 occurring during the Summer Cold Water Program operations period. As such, the annual average of the average daily steelhead fry rearing habitat during the Winter Base Flow operations period was estimated by calculating the average of the daily average steelhead fry rearing habitat from only March 1 to April 30, while the annual average of the average daily steelhead fry rearing habitat during Summer Cold Water Program operations period was estimated by calculating the average of the daily average steelhead fry rearing habitat from only May 1 to May 31.

Multiple statistics were also calculated for the differences in the simulated daily hydrology, hydraulics, water temperature, and habitat availability between the WEAP modeling scenarios over the 20-year modeling period. Habitat differences between scenarios were calculated as the Post-construction Operations (FAHCE) minus the evaluated baseline, such that a positive difference indicates an increase in modeled habitat under post-construction operations and a negative difference indicates a decrease in modeled habitat under post-construction operations. Differences were calculated for each day in the 20-year modeling period during the applicable life stage or during the applicable life stage within an operational period, then the maximum, average, and minimum daily difference over the entire 20-year modeling period were calculated. The daily habitat differences were calculated for each life stage at each individual POI, then these were summed across all POIs to determine the total daily habitat differences throughout Coyote Creek within the study area. In figures, the daily habitat difference is presented as the absolute daily maximum, daily average, and absolute daily minimum across the entire 20-year modeling period (1991 to 2010) to characterize the potential range of variation between the ADSRP and the two respective baselines.

The *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* provides a detailed description of how the WEAP model simulates daily upstream adult passage suitability (Valley Water 2019; SEI and Valley Water 2020). The average number of days stream conditions were suitable at individual POIs for adult steelhead and Chinook salmon passage during the modeling period was estimated from the WEAP model under the Post-construction Operations (FAHCE) and the two baselines (Pre-FOCP and Future) (SEI and Valley Water 2020). Passage suitability for adult upstream migration on individual days was estimated based on a combination of the simulated water depth and water temperature and binary water depth criterions for steelhead and Chinook salmon to evaluate passage past critical riffles (i.e., 0.7

feet and 0.9 feet, respectively) and a binary water temperature criterion of 65°F (18.3°C). An upstream passage water depth criterion for each species was developed in coordination with the FAHCE Technical Working Group based on a review of published literature on suitable water depths for the individual species, and its previous application as a depth criterion on the California coast (e.g., CDFW 2013; SWRCB 2014). While some scientific literature does report steelhead and Chinook salmon migrating upstream at water temperatures greater than 65°F (18.3°C) (McCullough et al. 2001, Goniea et al. 2006, Bratovich et al. 2012), the upstream passage water temperature criterion of 65°F (18.3°C) was selected for both steelhead and Chinook salmon during upstream migration and holding based on the water temperatures reported in literature that did not appreciably affect physiological processes or behaviors for migrating steelhead or Chinook salmon (see Section 3.4.2.1 for further details). In order for a day to be considered having suitable passage at a POI, the simulated water depth and water temperature would both have to be equal to or greater than their respective thresholds for the species being considered at that POI and all downstream POIs. When no simulated water temperature results were available for a POI, passage was considered suitable when the simulated water depth was equal to or greater than the respective threshold for the species being considered. Differences in the average and total number of days stream conditions were suitable for adult steelhead and Chinook salmon passage were also calculated between the baseline scenarios and the FAHCE reoperation rule curves (i.e., post-construction flow operations).

Pre-FOCP Baseline conditions include the modeled habitat prior to the FOCP but do not include the predicted additional habitat from the Live Oak Restoration Project that will be constructed during FOCP; therefore, the Live Oak Restoration Project (i.e., Existing Conditions Baseline) habitat was incorporated into the impact analysis in the EIR. Incorporation of the Live Oak Restoration Project restored and enhanced habitat is important for understanding the context of the changes in instream flows but it is not repeated in this Appendix. Therefore, it is important to understand that changes in habitat in the following comparisons is not the only context to consider habitat for the Project.

Steelhead spawning and incubation habitat availability (i.e., incubation-adjusted spawning) were estimated by assessing the combined suitability of stream conditions for steelhead spawning on the individual days and throughout the expected duration[6] of incubation for eggs laid on those individual days. Spawning habitat suitability was calculated for individual days using modeled depths and velocities, surveyed substrate conditions in the stream, and literature-based steelhead habitat suitability curves or criteria that assign a suitability of these parameters from 0 (unsuitable) to 1 (optimally suitable). Water temperature was not evaluated as part of the spawning habitat suitability because it was included in the incubation habitat suitability and water temperature for incubation was more restrictive. Incubation habitat suitability was calculated for each daily spawning cohort from the day of spawning to fry emergence (i.e., the incubation duration) using modeled depth, water temperature, and literature-based steelhead binary criteria, indicating whether depth or water temperature would be suitable or unsuitable for incubation (i.e., 0 being unsuitable and 1 being suitable). To ensure eggs were wet throughout incubation and there was sufficient depth for alevins to emerge and move into the channel successfully, water depth was considered suitable if it was 0.1 foot or greater and unsuitable if it was less than 0.1 foot

[6] The duration of incubation is based on the accumulated temperature units (ATUs) from the day of spawning to fry emergence, so the incubation period is estimated for each daily spawning cohort (that is, for each day of the specified spawning period) from the modeled daily water temperature.

(SWRCB 2007). A steelhead upper optimal water temperature binary criterion of 54^{o}F (12.2°C) was selected such that water temperatures equal to or less than 54^{o}F were suitable and water temperatures greater than 54^{o}F were unsuitable. The upper optimal water temperature characterized the highest water temperature that could support high steelhead embryo survival based on a review of available literature and data on the range of steelhead embryo incubation water temperature tolerances, including Redding and Schreck (1979), Kamler and Kato (1983), Velsen (1987), Rombough (1988), CDFG (1991), McCullough et al. (2001), USEPA (2003), Myrick and Cech (2004), and multiple studies reviewed in Bratovich et al. (2012).

The overall steelhead incubation-adjusted spawning habitat availability for each day was estimated by calculating the geometric mean of the suitability of individual parameters (e.g., depth) based on the applicable suitability curves/binary criteria and multiplying that value by the creek area being assessed (i.e., the area between POIs). In the geometric mean calculation, if one of the steelhead spawning habitat suitability criteria is unsuitable on the day of evaluation or if one of the steelhead incubation habitat suitability binary criteria (i.e., water depth greater than or equal to 0.1 foot or water temperature less than or equal to 54^{o}F) are not met one or more days during the incubation period, then the steelhead incubation-adjusted spawning habitat for that day's evaluation is zero. In this manner, incubation-adjusted spawning habitat availability area greater than zero on a day quantifies the stream area that would provide suitable conditions for an entire steelhead spawning and incubation life-stage that began on that day from spawning to fry emergence. Please refer to the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* for further details on the development of criteria, the specific habitat suitability curves or criteria, the geometric mean calculation, and the way this was combined to estimate steelhead spawning and incubation habitat availability in the WEAP model (Valley Water 2019; SEI and Valley Water 2020).

Habitat availability for fry and juvenile steelhead were estimated by the WEAP model was based on life stage-specific preferences for depth, velocity, water temperature, and cover/shelter (SEI and Valley Water 2020). As described in the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum,* habitat suitability curves for individual parameters (e.g., water depth) were developed for fry and juvenile steelhead life stages based on a literature review of habitat preferences (Valley Water 2019). As an individual habitat parameter value increased and passed through the range of values fry or juvenile steelhead have been observed to use, habitat suitability curves generally ranged from unsuitable (i.e., 0) to optimally suitable (i.e., 1) to unsuitable (i.e., 0), with the specific shape of the curve synthesized from the shape of the curves found in the literature review.

Steelhead fry rearing habitat suitability curves for depths and velocities had a generally right-skewed asymmetrical bell-shaped curve with values ranging from 0 feet (unsuitable) to 0.63 feet (optimally suitable) to 4.25 feet (unsuitable) and 0 feet per second (ft/s) (unsuitable) to 0.41 ft/s (optimally suitable) to 2.81 ft/s (unsuitable), respectively. Steelhead juvenile rearing habitat suitability curves for depths and velocities had a generally right-skewed asymmetrical curve with values ranging from 0.22 feet (unsuitable) to 1.49 to 3.00 feet (optimally suitable) to 5.70 feet (unsuitable) and 0.05 ft/s (unsuitable) to 1.14 ft/s (optimally suitable) to 4.45 ft/s (unsuitable), respectively.

A steelhead fry and juvenile habitat suitability curve for water temperature was developed based on a literature review of the water temperature range pertaining to optimal growth (i.e., optimally suitable) and survival (i.e., suitable), with water temperatures outside of the survivable range considered unsuitable. While there is a range of water temperatures for optimal growth in the literature depending on food availability and specific studies may report optimal growth or survival water temperatures several degrees higher or lower than selected here, an optimal growth range for fry and juvenile steelhead was chosen to be 50°F–65°F (10°C –18.3°C) and a survivable water temperature range was chosen to be 36°F–75°F (2.2°C –23.9°C) based on a synthesis of all the literature reviewed, including Wurtsbaugh and Davis (1977), Sullivan et al. (2000), McCullough et al. (2001), Myrick and Cech (2001), USEPA (2002), USEPA (2003), Myrick and Cech (2004), Myrick and Cech (2005), Bratovich et al. (2012), and NMFS (2016). As such, the steelhead fry and juvenile habitat suitability curve for water temperature ranged from 36°F (2.2°C) (unsuitable) to 50°F–65°F (10°C –18.3°C) (optimally suitable) to 75°F (23.9°C) (unsuitable).

Two different sets of cover/shelter steelhead fry and juvenile rearing habitat suitability criteria were also developed based on a literature review of steelhead fry and juvenile preferences during different seasons and data on cover/shelter within Coyote Creek reaches, with one set applying during spring/summer/fall and the other set applying during winter. During spring/summer/fall, the cover suitability linearly increased from unsuitable (i.e., 0) when habitat area with cover was 0% to suitable (i.e., 1) when the habitat area with cover was 15% and the cover suitability remained suitable when cover was greater 15%. During winter, the cover suitability was considered unsuitable (i.e., 0) when less than 10% the habitat area didn't contain the preferred cover elements and suitable (i.e., 1) when 10% or more of the habitat area contained the preferred cover elements. Please refer to the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* for further details on the cover/shelter steelhead fry and juvenile rearing habitat suitability criteria, including the specific types of cover/shelter considered for the different seasons (Valley Water 2019).

The overall steelhead fry or juvenile habitat availability was estimated by calculating the geometric mean of the water depth, velocity, water temperature, and cover suitability based on the applicable habitat suitability curves/binary criteria for the life stage and multiplying that value by the area of the creek being assessed. Please refer to the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* for further details on the development of criteria, the specific habitat suitability curves or criteria, the geometric mean calculation, and the way this was combined to estimate steelhead fry or juvenile habitat availability in the WEAP model (Valley Water 2019; SEI and Valley Water 2020).

The maximum, average, and minimum number of days stream conditions were suitable for juvenile steelhead (i.e., smolts) passage across all years in the modeling period was estimated from the WEAP model simulated thalweg (the lowest point of successive cross-sections along the creek) water depth and water temperature and literature-based binary criteria assessing the suitability of water depth and water temperature for downstream juvenile passage (SEI and Valley Water 2020). To ensure there was sufficient water depth for steelhead to migrate downstream past critical riffles, thalweg water depth was considered suitable if it was 0.4 feet or greater and unsuitable if it was less than 0.4 feet (CDFW 2013). An upper tolerable water temperature binary criterion of 59°F (15°C) was selected to determine whether the modeled daily water temperatures at POIs would be suitable during the steelhead juvenile emigration period. Water temperatures equal to or less than 59°F (15°C) were classified as suitable, while water temperatures greater than 59°F (15°C) was classified as unsuitable (Valley Water 2019). This criterion was selected since NMFS (2016) stated that suitable water temperatures for steelhead range from 50°F to 63°F (10°C to 11.7°C) during the parr to smolt transformation and outmigration periods, with water temperatures less than 59°F (15°C) considered to be most optimal (Zedonis and Newcomb 1997). Some steelhead juveniles may still smolt and emigrate at water temperatures above 59°F (15°C), but higher water temperatures during the smolt outmigration period would result in decreased smolting tendencies (Zedonis and Newcomb 1997). Both the water depth and water temperature criteria had to be met at all POI within Coyote Creek for a day to be counted as passable for juvenile steelhead. Differences in the average and total number of days stream conditions were suitable for juvenile steelhead passage were also calculated between the Pre-FOCP Baseline of the Future Baseline and the Post-construction Operations (FAHCE).

Chinook salmon spawning and incubation habitat availability (i.e., incubation-adjusted spawning) were estimated by assessing the combined suitability of stream conditions for Chinook salmon spawning on the individual days and throughout the expected duration of incubation for eggs laid on those individual days. Spawning habitat suitability was calculated for individual days using modeled depths and velocities, surveyed substrate conditions in the stream, and literature-based Chinook salmon habitat suitability curves or criteria that assign a suitability of these parameters from 0 (unsuitable) to 1 (optimally suitable). Water temperature was not evaluated as part of the spawning habitat suitability because it was included in the incubation habitat suitability and water temperatures for incubation were more restrictive. Incubation habitat suitability was calculated for each daily spawning cohort from the day of spawning to fry emergence (i.e., the incubation duration) using modeled depth and water temperature and literature-based Chinook salmon binary criteria indicating whether depth or water temperature would be suitable or unsuitable for incubation (i.e., 0 being unsuitable and 1 being suitable). To ensure eggs were wet throughout incubation and there was sufficient depth for alevins to emerge and move into the channel successfully, water depth was considered suitable if it was 0.1 foot or greater and unsuitable if it was less than 0.1 foot (SWRCB 2007). A Chinook salmon upper optimal water temperature binary criterion of 56°F (13.3°C) was selected such that water temperatures equal to or less than 56°F (13.3°C) were suitable and water temperatures greater than 56°F (13.3°C) were unsuitable. The upper optimal water temperature characterized the highest water temperature that could support high embryo survival based on a review of available literature and data on the range of Chinook embryo incubation water temperature tolerances, including Seymour (1956), Combs and Burrows (1957), Boles et al. (1988), USFWS (1999), McCullough et al. (2001), USEPA (2003), Myrick and Cech (2004), and multiple studies reviewed in Bratovich et al. (2012).

The overall Chinook salmon incubation-adjusted spawning habitat availability for each day was estimated by calculating the geometric mean of the suitability of individual parameters (e.g., depth) based on the applicable suitability curves/binary criteria and multiplying that value by the creek area being assessed (i.e., the area between POIs). In the geometric mean calculation, if one the spawning habitat suitability criteria on the day being evaluated was unsuitable or if one of the incubation habitat suitability binary criteria (i.e., water depth greater than or equal to 0.1 foot or water temperature less than or equal to 56°F [13.3°C]) are not met one or more days during the incubation period, then the incubation-adjusted spawning habitat for the day being evaluated is 0. In this manner, incubation-adjusted spawning habitat availability area greater than zero on a day quantifies the stream area that would provide suitable conditions for an entire Chinook salmon spawning and incubation life-stage that began on that day from spawning to fry emergence. Please refer to the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* for further details on the development of criteria, the specific habitat suitability curves or criteria, the geometric mean calculation, and the way this was combined to estimate Chinook salmon spawning and incubation habitat availability in the WEAP model (Valley Water 2019; SEI and Valley Water 2020).

Habitat availability for fry and juvenile Chinook salmon were estimated by the WEAP model based on life stage-specific preferences for depth, velocity, water temperature, and cover/shelter (SEI and Valley Water 2020). As described in the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum,* habitat suitability curves for each habitat element (e.g., water depth) were developed for fry and juvenile Chinook salmon life stages based on a literature review of habitat preferences (Valley Water 2019). Chinook salmon fry rearing habitat suitability curves for depths and velocities had a generally right-skewed asymmetrical bell-shaped curve with values ranging from 0 feet (unsuitable) to 1.30 feet (optimally suitable) to 5.72 feet (unsuitable), and 0 ft/s (suitable) to 0.28 ft/s (optimally suitable) to 2.55 ft/s (unsuitable), respectively. Chinook salmon juvenile rearing habitat suitability curves for depths and velocities had a generally right-skewed asymmetrical bell-shaped curve with values ranging from 0.08 feet (unsuitable) to 1.27 feet (optimally suitable) to 3.90 feet (unsuitable), and 0 ft/s (unsuitable) to 0.67 ft/s (optimally suitable) to 3.27 ft/s (unsuitable), respectively. A Chinook salmon fry and juvenile habitat suitability curve for water temperature was developed based on a literature review of the water temperature range pertaining to optimal growth (i.e., optimally suitable) and survival (i.e., suitable), with water temperatures outside of the survivable range considered unsuitable. While there was a range of water temperatures for optimal growth in the literature depending on food availability, and specific studies may have reported optimal growth or survival water temperatures several degrees higher or lower than selected here, an optimal growth range for Chinook salmon fry and juvenile was chosen to be 50°F–61°F (10°C–16.1°C) and a survivable water temperature range was chosen to be 33°F–75°F (0.6°C–23.9°C) based on a synthesis of all the literature reviewed, including Brett et al. (1982), Rich (1987), Boles et al. (1988), Marine (1992), Cech and Myrick (1999), Myrick and Cech (2001), USEPA (2003), Marine and Cech (2004), Bratovich et al. (2012), and NMFS (2016). As such, the Chinook salmon fry and juvenile habitat suitability curve for water temperature ranged from 33°F (0.6°C) (unsuitable) to 50°F–61°F (10–16°C) (optimally suitable) to 75°F (24°C) (unsuitable). Two different sets of cover/shelter Chinook salmon fry and juvenile rearing habitat suitability criteria were also developed based on a literature review of Chinook salmon fry and juvenile preferences during different seasons and data on cover/shelter within Coyote Creek reaches, with one set applying during winter and the other set applying during spring/early summer. During winter, the cover suitability was considered unsuitable (i.e., 0) when less than 10% of the habitat area contained the preferred cover elements and suitable (i.e., 1) when 10% or more of the habitat area contained the preferred cover elements. During spring/early summer, the cover suitability linearly increased from unsuitable (i.e., 0) when habitat area with cover was 0% to suitable (i.e., 1) when the habitat area with cover was 20% and the cover suitability remained suitable when cover was greater 20%. Please refer to the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* for further details (Valley Water 2019).

The overall Chinook salmon fry or juvenile habitat availability was estimated by calculating the geometric mean of the water depth, velocity, water temperature, and cover suitability based on the applicable habitat suitability curves/binary criteria for the life stage and multiplying that value by the area of the creek being assessed. As explained above, if one the Chinook salmon fry or juvenile habitat suitability criteria on the day being evaluated was unsuitable (i.e., 0) in the geometric mean calculation, then the Chinook salmon fry or juvenile habitat for the day being evaluated was 0. Please refer to the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* for further details on the development of criteria, the specific habitat suitability curves or criteria, the geometric mean calculation, and the way this was combined to estimate Chinook salmon fry or juvenile habitat availability in the WEAP model (Valley Water 2019; SEI and Valley Water 2020).

The maximum, average, and minimum number of days stream conditions were suitable for juvenile Chinook salmon (i.e., smolts) passage across all years in the modeling period was estimated from the WEAP model simulated thalweg water depth and water temperature, as well as literature-based binary criteria assessing the suitability of depth and water temperature for downstream juvenile passage (SEI and Valley Water 2020). To ensure there was sufficient water depth for juvenile Chinook salmon to migrate downstream past critical riffles, thalweg water depth was considered suitable if it was 0.3 feet or greater and unsuitable if it was less than 0.3 feet (CDFW 2013). Based on literature reviewed, an upper tolerable water temperature value of 65°F (18.3°C) was applied as a binary criterion to simulated daily water temperatures by POI during the Chinook salmon juvenile emigration period (Valley Water 2019).

This criterion was selected because it represents an upper tolerable value for Chinook salmon juvenile downstream movement, while also being lower than the upper tolerable water temperature value for smolt emigration indicated by Bratovich et al. (2012) and similarly suggested by Zedonis and Newcomb (1997) (i.e., 68°F [20°C]). Both the water depth and water temperature criteria had to be met at all POI within a stream for a day to be counted as passable for juvenile Chinook salmon. Differences in the average and total number of days stream conditions were suitable for juvenile Chinook salmon passage were also calculated between the baseline scenarios and the ADSRP. Please refer to the *Fisheries Habitat Availability Estimation Methodology Technical Memorandum* for further details on how juvenile Chinook salmon (i.e., smolts) passage was estimated.

Pacific lamprey were assessed for various life stages using other modeled data, including water temperature, wetted area and thalweg depth, and WEAP Model results for steelhead when life stage timing and habitat preference overlap between the species. Pacific lamprey spawning habitat was assessed using WEAP model results for steelhead. Larval rearing habitat was assessed using the wetted area predictions of the WEAP Model, with additional consideration of habitat restored via Conservation Measures and modeled water temperatures during the year-round Pacific lamprey rearing period. Adult and juvenile migration condition impacts were assessed based on modeled changes in thalweg depth (using a minimum suitable passage depth of 1 inch) and resulting changes in the number of suitable passage days under the Project compared with baseline conditions, as well as modeled changes in water temperature under each scenario compared with temperature tolerances from the literature. Pre-spawning holding habitat was assessed using modeled changes in wetted area and water temperature. Water temperatures up to 68°F (20°C) are believed to be suitable for adult migration and pre-spawning holding (Robinson and Bayer 2005, Clemens et al. 2011, McCovey 2011, Starcevich et al. 2013), but water temperature suitability for migrating juveniles has not been described.

Sacramento hitch and **southern coastal roach** were assessed semi quantitatively using wetted area and temperature changes from baseline conditions combined with temperature tolerances from the literature. Wetted area does not always change in a linear fashion with habitat suitability for fish; however, for Sacramento hitch and southern coastal roach, it is logical to assume that a decrease in wetted area from one scenario to another would represent a relative decrease in aquatic habit and an increase in wetted area would represent a relative increase in aquatic habitat. When the change in wetted area is combined with the temperature tolerances of these fish, then a semi-quantitative assessment can be conducted with some qualitative inference as is done in the EIR impact analysis.

The modeled habitat and wetted area reported for each POI represents the habitat or wetted area for the stream reach between that POI and the nearest downstream POI (for example, a habitat estimate at POI 9 would represent all habitat between POI 9 and POI 8). In contrast, modeled water depth and water temperature characterize the conditions at the specific POI and they do not represent conditions along a reach of the stream.

Project Changes in Modeled Habitat Variables

Average Daily Flow

Changes in average daily flow between the Project, Pre-FOCP, and Future Baseline conditions were modeled for the upstream and downstream portions of the FCWMZ in Coyote Creek (Figures 2 and 3, respectively).

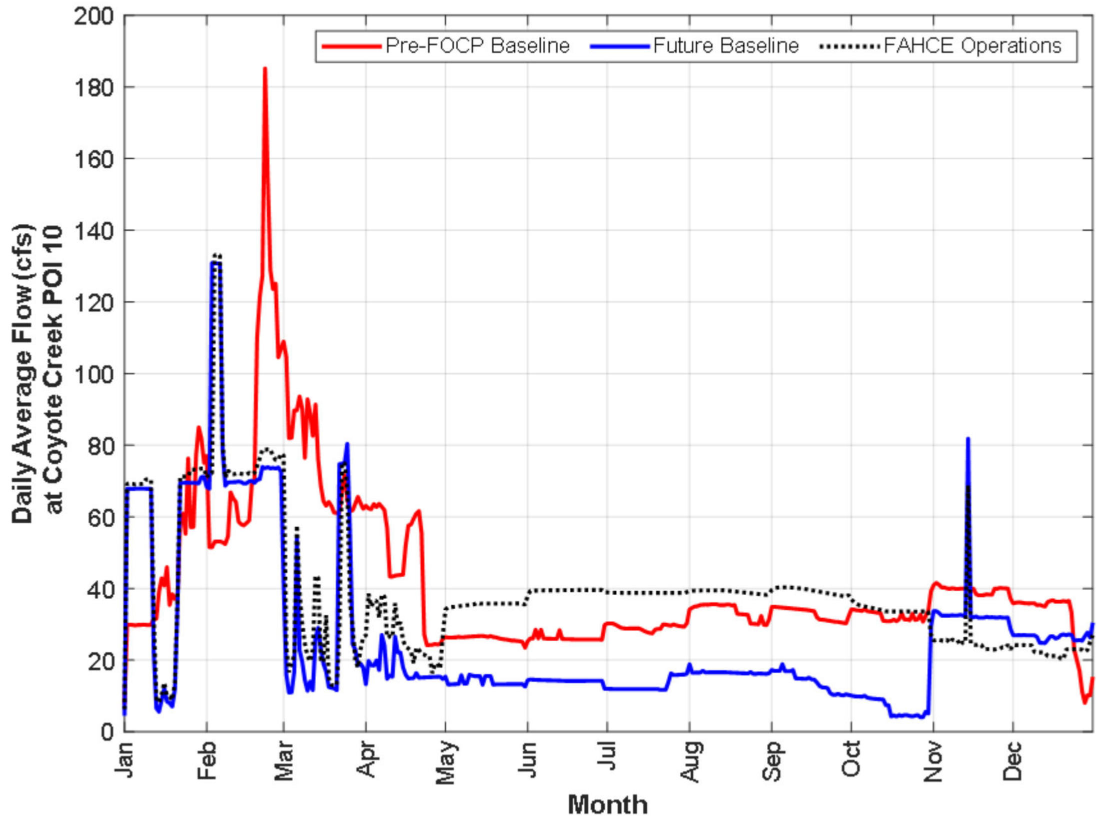


Figure 2. Modeled daily average flow (cfs) in the upstream portion of the FCWMZ in Coyote Creek (POI COYO 10) under the Project (FAHCE Operations; dotted black line), Pre-FOCP Baseline (solid red line), and Future Baseline (solid blue line). Data are from outputs of Valley Water's WEAP model.

Figure 3. Modeled daily average flow (cfs) in the downstream portion of the FCWMZ in Coyote Creek (POI COYO 9) under the Project (FAHCE Operations; dotted black line), Pre-FOCP Baseline (solid red line), and Future Baseline (solid blue line). Data are from outputs of Valley Water's WEAP model.

Daily average water temperature at Coyote Creek POIs were modeled under Project and Pre-FOCP Baseline conditions (Figure 4) and under Project and Future Baseline conditions (Figure 5).

Figure 4. Modeled daily average water temperature at Coyote Creek POIs under the Project (FAHCE Operations scenario; blue dotted line) and Pre-FOCP Baseline (red solid line), calculated from the FAHCE WEAP Model. Colored bands show the range of the daily average water temperature during the 20-year modeling period (1991–2010) under each scenario. No modeled water temperature results are available for the POIs not shown.

Figure 5. Modeled daily average water temperature at Coyote Creek POIs under the Project (FAHCE Operations scenario; blue dotted line) and Future Baseline (red solid line), calculated from the FAHCE WEAP Model. Colored bands show the range of the daily average water temperature during the 20-year modeling period (1991–2010) under each scenario. No modeled water temperature results are available for the POIs not shown.

Thalweg Depth

Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay under the Project and Pre-FOCP Baseline were modeled for the period of January 1 to June 30 (Figure 6) and December 1 to May 31 (Figure 7) and under the Project and Future Baseline for the period of January 1 to June 30 (Figure 8) and December 1 to May 31 (Figure 9).

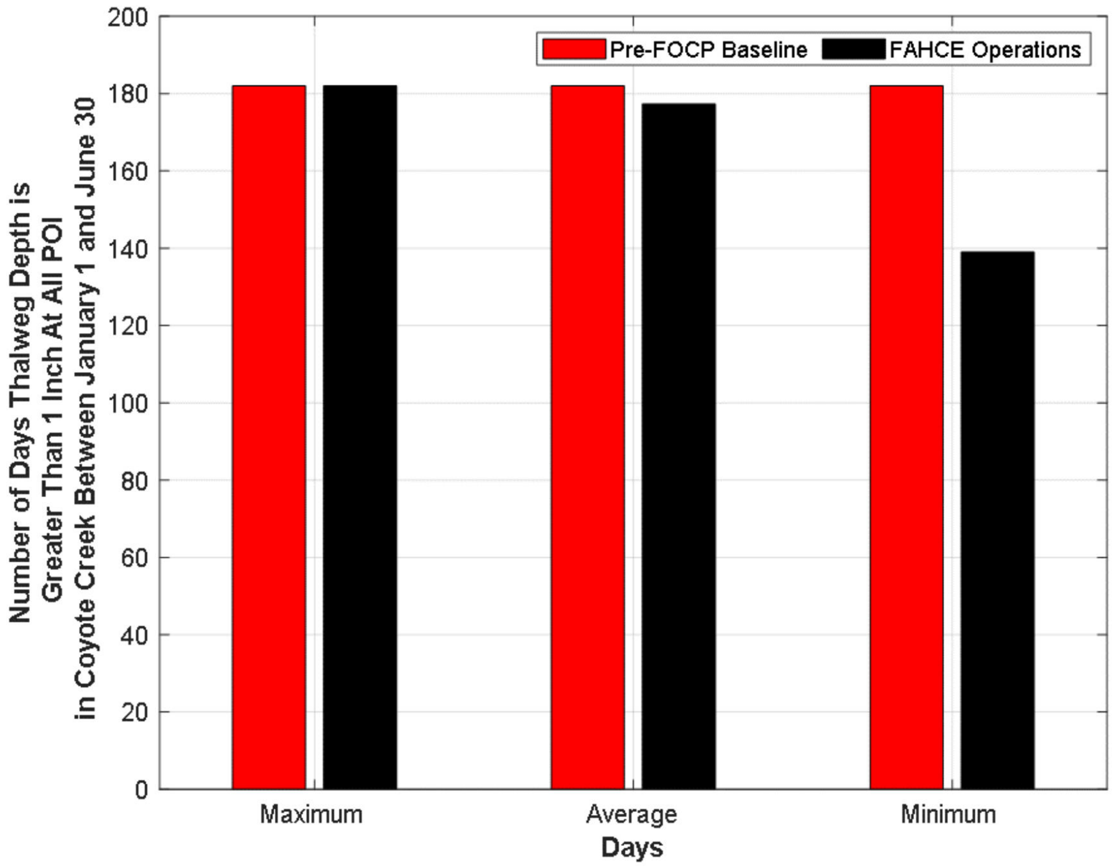


Figure 6. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from January 1 to June 30 under the Project and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 7. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from December 1 to May 31 under the Project and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 8. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from January 1 to June 30 under the Project and Future Baseline. Data are from Valley Water's WEAP model.

Figure 9. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from December 1 to May 31 under the Project and Future Baseline. Data are from Valley Water's WEAP model.

Daily average wetted area at Coyote Creek POIs were modeled under Project and Pre-FOCP Baseline conditions (Figures 10–11) and under Project and Future Baseline conditions (Figures 12–13).

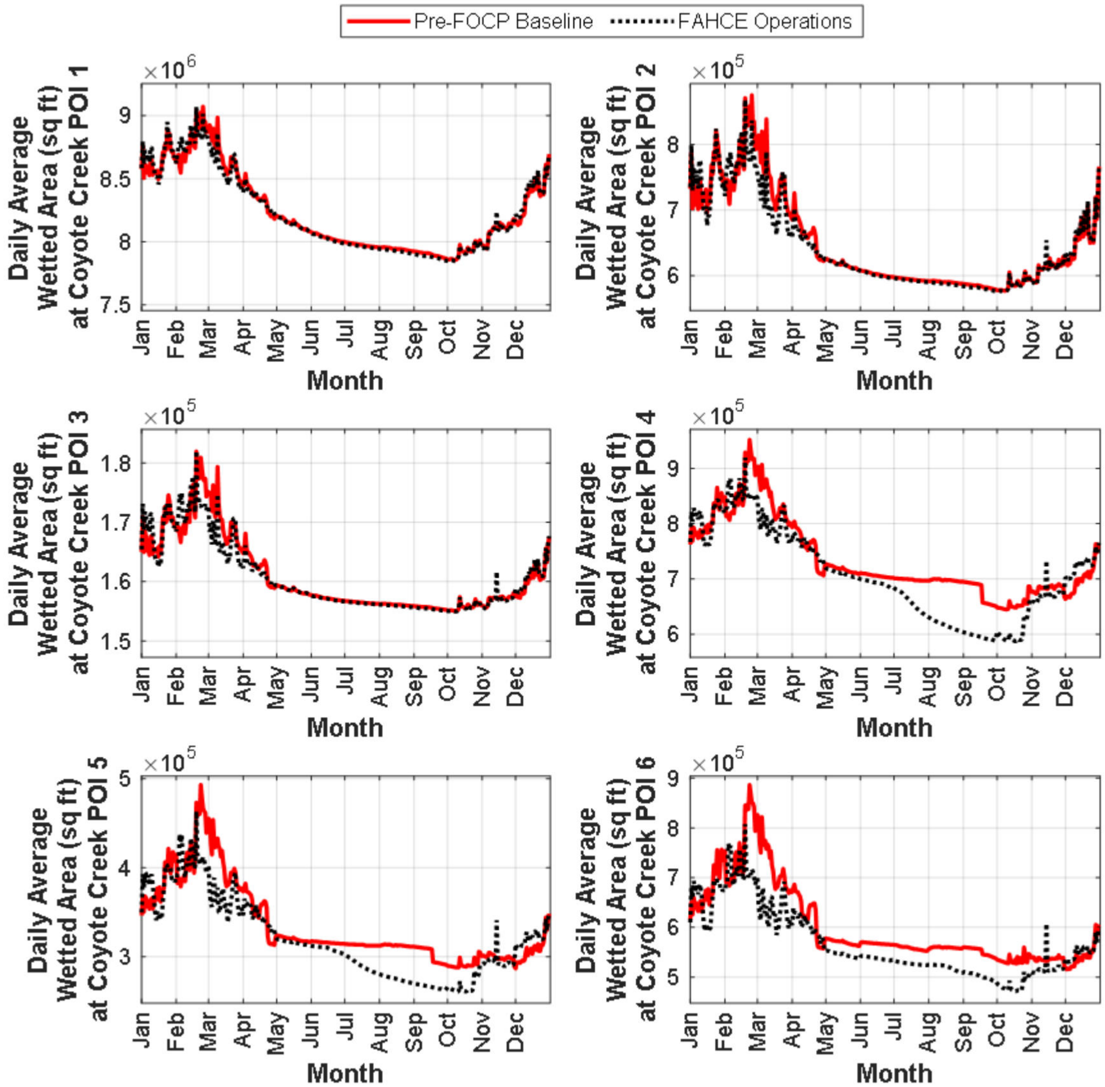


Figure 10. Modeled daily average wetted area at Coyote Creek POIs 1–6 under the Project (FAHCE Operations scenario; black dotted line) and Pre-FOCP Baseline (red solid line), calculated from the FAHCE WEAP Model.

Figure 11. Modeled daily average wetted area at Coyote Creek POIs 7–10 under the Project (FAHCE Operations scenario; black dotted line) and Pre-FOCP Baseline (red solid line), calculated from the FAHCE WEAP Model.

Figure 12. Modeled daily average wetted area at Coyote Creek POIs 1–6 under the Project (FAHCE Operations scenario; black dotted line) and Future Baseline (red solid line), calculated from the FAHCE WEAP Model.

Figure 13. Modeled daily average wetted area at Coyote Creek POIs 7–10 under the Project (FAHCE Operations scenario; black dotted line) and Future Baseline (red solid line), calculated from the FAHCE WEAP Model.

Central California Coast Steelhead Change in Habitat under the Project Compared with Pre-FOCP and Future Baselines

The amount of steelhead habitat for all life stages under the Project and Pre-FOCP Baseline conditions is summarized in Table 2. Steelhead habitat under Project and Future Baseline conditions is summarized in Table 3. Results are shown for the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8) and for the total amount of habitat from Coyote Creek downstream of Anderson Dam.

Table 2. Central California Coast Steelhead Habitat in Coyote Creek under FAHCE Operations (Project) Compared with the Pre-FOCP Baseline.

Steelhead life stage period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Steelhead Habitat Pre-FOCP Baseline (sq ft)			
Incubation-adjusted Spawning	12,225	11,182	23,407
Fry Rearing Total (March 1–May 31)	2,024,369	207,594	2,231,962
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,062,248	203,076	2,265,324
Fry Rearing Summer Release Program (May 1–May 31)	1,949,832	216,483	2,166,316
Juvenile Rearing Total (year-round)	2,497,231	289,739	2,786,971
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,688,873	287,700	2,976,572
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,308,454	291,748	2,600,202
Steelhead Habitat FAHCE Operations (sq ft)			
Incubation-adjusted Spawning	13,837	8,039	21,876
Fry Rearing Total (March 1–May 31)	1,990,108	216,112	2,206,220
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,032,118	213,312	2,245,430
Fry Rearing Summer Release Program (May 1–May 31)	1,907,443	221,622	2,129,065
Juvenile Rearing Total (year-round)	2,298,113	276,854	2,574,967
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,447,632	257,684	2,705,316
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,150,828	295,737	2,446,565

Steelhead life stage period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Change in Habitat (sq. ft)[b]			
Incubation-adjusted Spawning	1,600 (13.1%)	-3,100 (-27.7%)	-1,500 (-6.4%)
Fry Rearing Total (March 1–May 31)	-34,300 (-1.7%)	8,500 (4.1%)	-25,700 (-1.2%)
Fry Rearing Winter Base Flow Operations (March 1–April 30)	-30,100 (-1.5%)	10,200 (5%)	-19,900 (-0.9%)
Fry Rearing Summer Release Program (May 1–May 31)	-42,400 (-2.2%)	5,100 (2.4%)	-37,300 (-1.7%)
Juvenile Rearing Total (year-round)	-199,100 (-8%)	-12,900 (-4.5%)	-212,000 (-7.6%)
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	-241,200 (-9%)	-30,000 (-10.4%)	-271,300 (-9.1%)
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	-157,600 (-6.8%)	4,000 (1.4%)	-153,600 (-5.9%)

[a] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[b] The change in habitat in square feet (sq ft) is the difference between the modeled habitat under the FAHCE Operations and the Pre-FOCP Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Pre-FOCP Baseline.

Table 3. Central California Coast Steelhead Habitat in Coyote Creek under FAHCE Operations (Project) Compared with the Future Baseline.

Steelhead life stage period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Steelhead Habitat Future Baseline (sq ft)			
Incubation-adjusted Spawning	10,740	7,212	17,952
Fry Rearing Total (March 1–May 31)	2,001,494	208,137	2,209,631
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,029,850	208,825	2,238,675
Fry Rearing Summer Release Program (May 1–May 31)	1,945,697	206,783	2,152,480
Juvenile Rearing Total (year-round)	2,293,920	248,794	2,542,715
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,392,731	249,194	2,641,925
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,196,586	248,401	2,444,987

Steelhead life stage period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Steelhead Habitat FAHCE Operations (sq ft)			
Incubation-adjusted Spawning	13,837	8,039	21,876
Fry Rearing Total (March 1–May 31)	1,990,108	216,112	2,206,220
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,032,118	213,312	2,245,430
Fry Rearing Summer Release Program (May 1–May 31)	1,907,443	221,622	2,129,065
Juvenile Rearing Total (year-round)	2,298,113	276,854	2,574,967
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,447,632	257,684	2,705,316
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,150,828	295,737	2,446,565
Change in Habitat (sq. ft)[b]			
Incubation-adjusted Spawning	3,100 (28.9%)	800 (11.1%)	3,900 (21.7%)
Fry Rearing Total (March 1–May 31)	-11,400 (-0.6%)	8,000 (3.8%)	-3,400 (-0.2%)
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,300 (0.1%)	4,500 (2.2%)	6,800 (0.3%)
Fry Rearing Summer Release Program (May 1–May 31)	-38,300 (-2%)	14,800 (7.2%)	-23,400 (-1.1%)
Juvenile Rearing Total (year-round)	4,200 (0.2%)	28,100 (11.3%)	32,300 (1.3%)
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	54,900 (2.3%)	8,500 (3.4%)	63,400 (2.4%)
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	-45,758 (-2.1%)	47,336 (19.1%)	1,578 (0.1%)

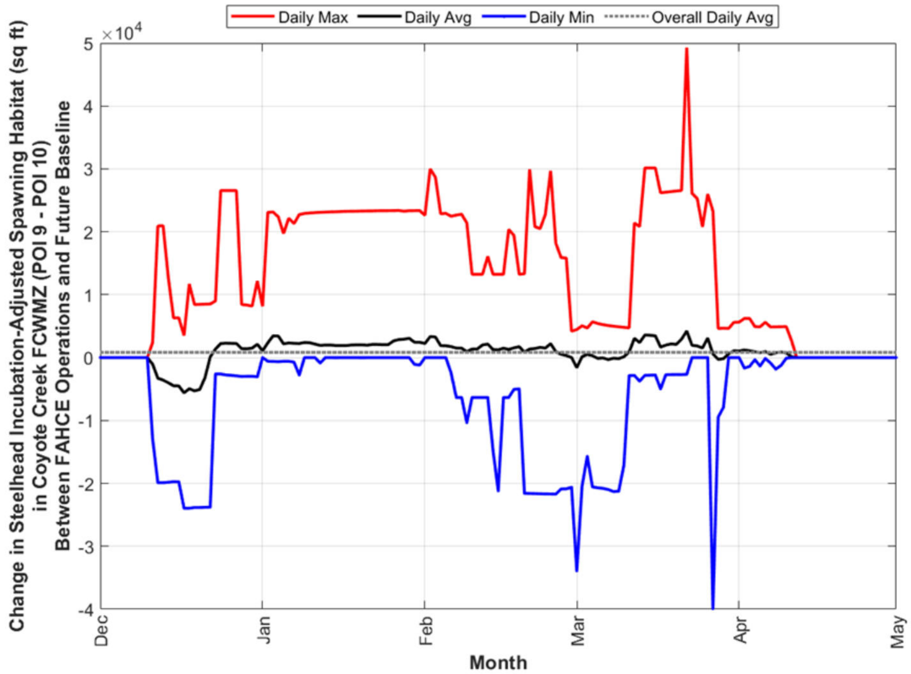
[a] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[b] The change in habitat in square feet (sq ft) is the difference between the modeled habitat under the FAHCE Operations and the Pre-FOCP Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Pre-FOCP Baseline.

Spawning and Incubation

Changes in modeled steelhead incubation-adjusted spawning habitat area between the Project and Pre-FOCP Baseline and the Project and Future Baseline are shown in Figures 14 and 15, respectively, and summarized in Tables 2–3.

Figure 14. Change in modeled incubation-adjusted spawning habitat area for steelhead in Coyote Creek under the Project in the FCWMZ (top; $ft^2 \times 10^4$) and downstream reaches (bottom; $ft^2 \times 10^5$), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.



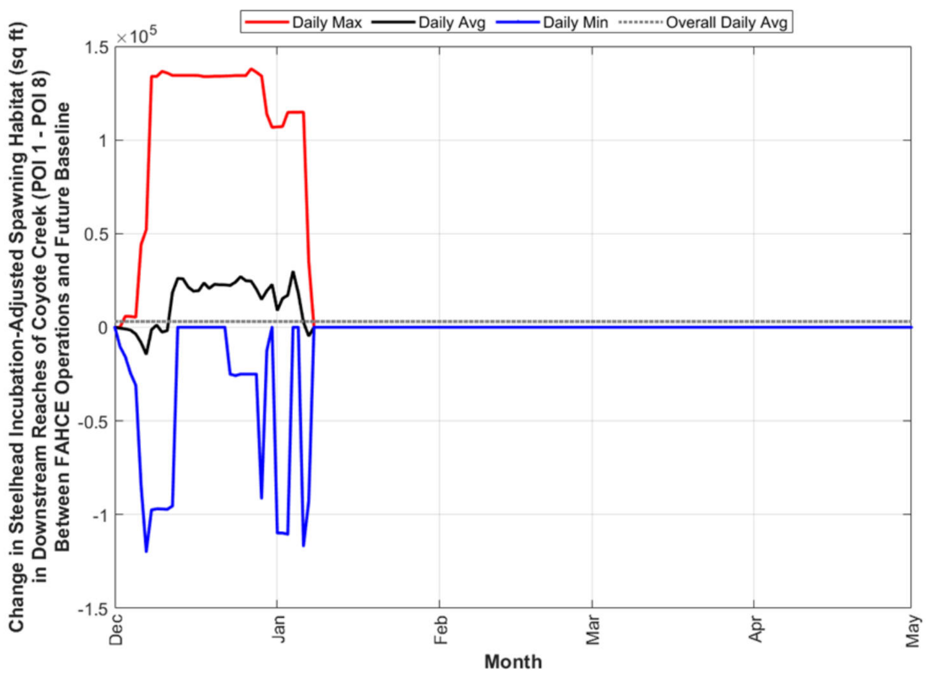


Figure 15. Change in modeled incubation-adjusted spawning habitat area for steelhead in Coyote Creek under the Project in the FCWMZ (top; $ft^2 \times 10^4$) and downstream reaches (bottom; $ft^2 \times 10^5$), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Fry Rearing

Changes in modeled steelhead fry rearing habitat in Coyote Creek between the Project and Pre-FOCP Baseline and the Project and Future Baseline are shown in Figures 16 and 17, respectively, and summarized in Tables 2–3.

Figure 16. Change in modeled fry rearing habitat area ($ft^2 \times 10^5$) for steelhead in Coyote Creek under the Project in the FCWMZ (top) and downstream reaches (bottom), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 17. Change in modeled fry rearing habitat area (ft^2 x 10^5) for steelhead in Coyote Creek under the Project in the FCWMZ (top) and downstream reaches (bottom), compared with the Future Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Juvenile Rearing

Changes in modeled steelhead juvenile rearing habitat in Coyote Creek between the Project and Pre-FOCP Baseline and the Project and Future Baseline are shown in Figures 18 and 19, respectively, and summarized in Tables 2–3.

Figure 18. Change in modeled juvenile rearing habitat area for steelhead in Coyote Creek under the Project in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 19. Change in modeled juvenile rearing habitat area for steelhead in Coyote Creek under the Project in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Future Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Conditions for Migration

Adult Upstream Passage

Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead upstream passage at Coyote Creek POIs during the December–April upstream migration period under the Project and Pre-FOCP Baseline (Figure 20) and under the Project and Future Baseline (Figure 21).

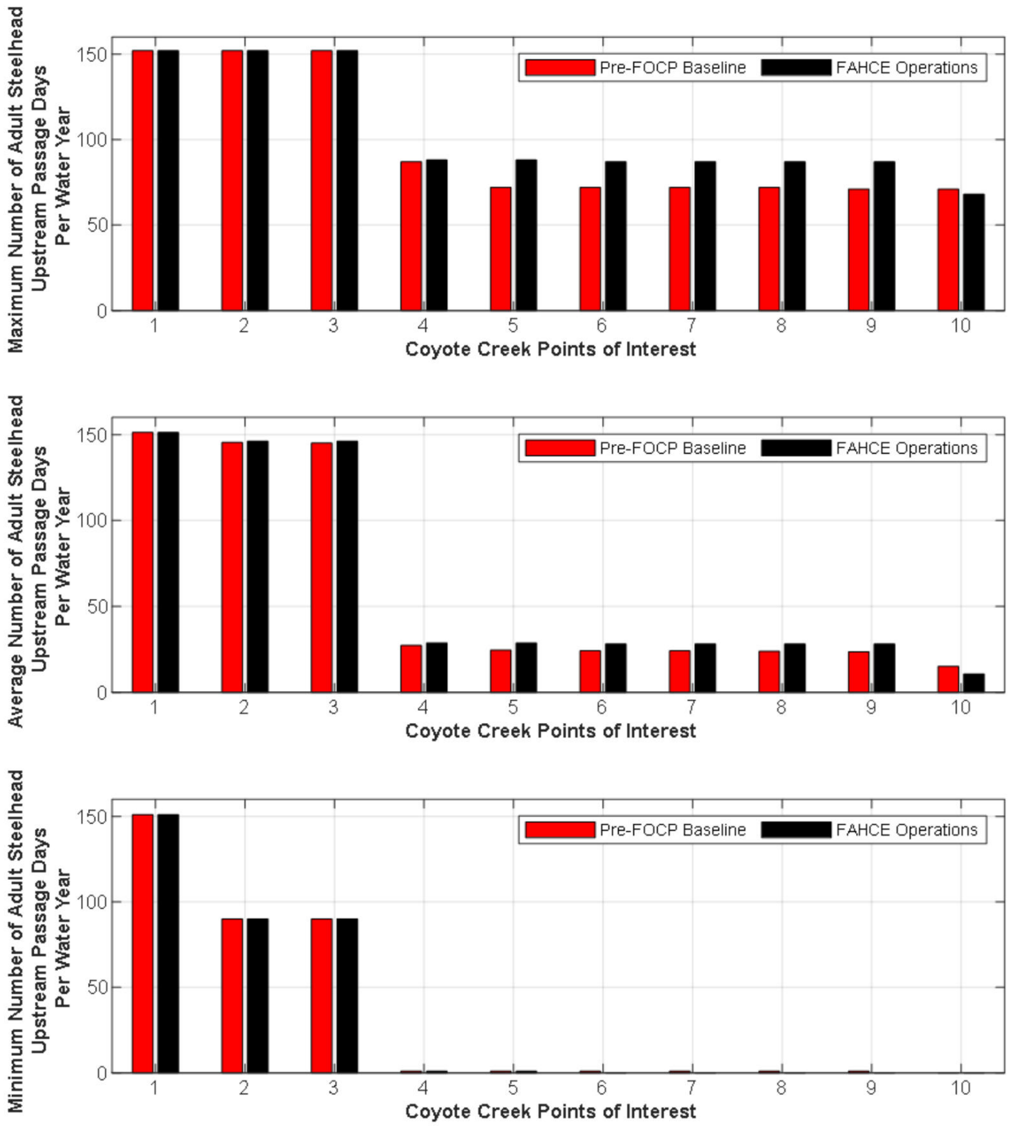


Figure 20. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the December–April upstream migration period under the Project and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 21. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the December–April upstream migration period under the Project and Future Baseline. Data are from Valley Water's WEAP model.

Juvenile Downstream Passage

Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile steelhead passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Project and Pre-FOCP Baseline (Figure 22) and under the Project and Future Baseline (Figure 23).

Figure 22. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile steelhead passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Project and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 23. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile steelhead passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Project and Future Baseline. Data are from Valley Water's WEAP model.

Central Valley Fall-Run Chinook Salmon

The amount of Chinook salmon habitat in Coyote Creek for all life stages under the Project and Pre-FOCP Baseline conditions is summarized in Table 4. Chinook salmon habitat under Project and Future Baseline conditions is summarized in Table 5. Results are shown for the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8) and for the total amount of habitat from Coyote Creek downstream of Anderson Dam.

Table 4. Chinook Salmon Habitat in Coyote Creek under FAHCE Operations (Project) Compared with the Pre-FOCP Baseline.

Chinook life stage period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Chinook Salmon Habitat Pre-FOCP Baseline (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	27,111	13,550	40,661
Fry Rearing Total (Jan 1–Apr 30)	2,873,644	229,306	3,102,950
Juvenile Rearing Total (Jan 1–Jun 30)	2,377,274	242,686	2,619,960
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,496,020	236,401	2,732,421
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,141,730	255,152	2,396,882
Chinook Salmon Habitat Project (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	33,005	11,510	44,515
Fry Rearing Total (Jan 1–Apr 30)	2,890,944	227,519	3,118,463
Juvenile Rearing Total (Jan 1–Jun 30)	2,285,468	248,089	2,533,557
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,389,074	238,400	2,627,474
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,079,955	267,307	2,347,263

Chinook life stage period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Change in Habitat (sq. ft) [c]			
Incubation-adjusted Spawning (Oct 15–Jan 31)	5,900 (21.8%)	-2,000 (-14.8%)	3,900 (9.6%)
Fry Rearing Total (Jan 1–Apr 30)	17,300 (0.6%)	-1,800 (-0.8%)	15,500 (0.5%)
Juvenile Rearing Total (Jan 1–Jun 30)	-91,800 (-3.9%)	5,400 (2.2%)	-86,400 (-3.3%)
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	-106,900 (-4.3%)	2,000 (0.8%)	-104,900 (-3.8%)
Juvenile Rearing Summer Release Program (May 1–Jun 30)	-61,800 (-2.9%)	12,200 (4.8%)	-49,600 (-2.1%)

[a] Habitat is the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[b] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

[c] The change in habitat in sq ft is the difference between the modeled habitat under the FAHCE Operations and the Pre-FOCP Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Pre-FOCP Baseline.

Table 5. Chinook Habitat in Coyote Creek under FAHCE Operations (Project) Compared with the Future Baseline.

Chinook Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Chinook Salmon Habitat Future Baseline (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	25,030	11,044	36,075
Fry Rearing Total (Jan 1–April 30)	2,877,097	221,654	3,098,751
Juvenile Rearing Total (Jan 1–Jun 30)	2,263,293	231,833	2,495,125
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,353,560	229,576	2,583,136
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,084,238	236,309	2,320,547

Chinook Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Chinook Salmon Habitat Project (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	33,005	11,510	44,515
Fry Rearing Total (Jan 1–April 30)	2,890,944	227,519	3,118,463
Juvenile Rearing Total (Jan 1–Jun 30)	2,285,468	248,089	2,533,557
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,389,074	238,400	2,627,474
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,079,955	267,307	2,347,263
Change in Habitat (sq. ft)[c]			
Incubation-adjusted Spawning (Oct 15–Jan 31)	8,000 (32%)	500 (4.5%)	8,400 (23.3%)
Fry Rearing Total (Jan 1–April 30)	13,800 (0.5%)	5,900 (2.7%)	19,700 (0.6%)
Juvenile Rearing Total (Jan 1–Jun 30)	22,200 (1%)	16,300 (7%)	38,400 (1.5%)
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	35,500 (1.5%)	8,800 (3.8%)	44,300 (1.7%)
Juvenile Rearing Summer Release Program (May 1–Jun 30)	-4,283 (-0.2%)	30,999 (13.1%)	26,716 (1.2%)

[a] Habitat is the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

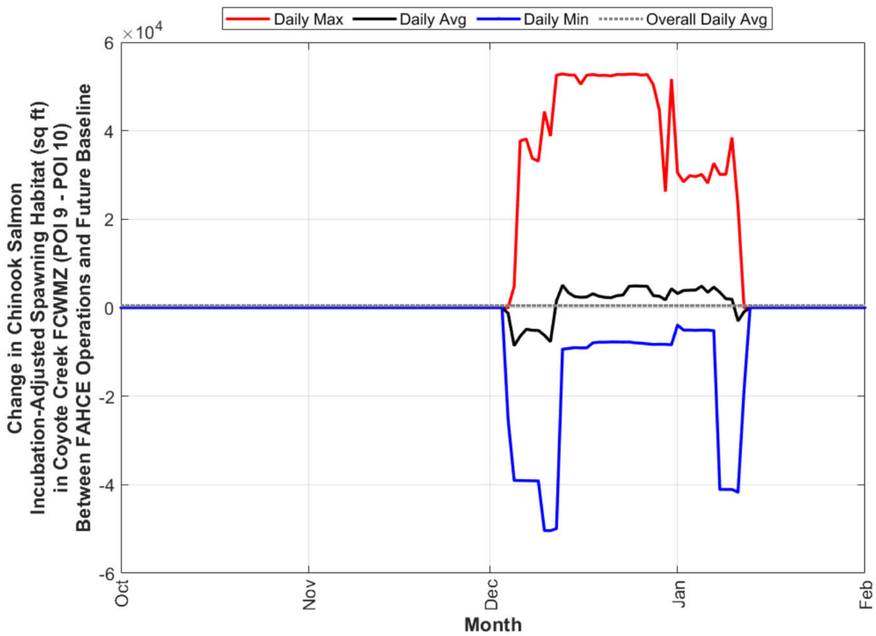
[b] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

[c] The change in habitat in sq ft is the difference between the modeled habitat under the FAHCE Operations and the Future Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Future Baseline.

Spawning and Incubation

Changes in modeled Chinook salmon incubation-adjusted spawning habitat area in Coyote Creek between the Project and Pre-FOCP Baseline and the Project and Future Baseline are shown in Figures 24 and 25, respectively, and summarized in Tables 4–5.

Figure 24. Change in modeled incubation-adjusted spawning habitat area for Chinook salmon in Coyote Creek under the Project in the FCWMZ (top; ft^2 x 10^4) and downstream reaches (bottom; ft^2 x 10^5), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the baseline and negative values represent a decrease. Data are from outputs of Valley Water's WEAP model.



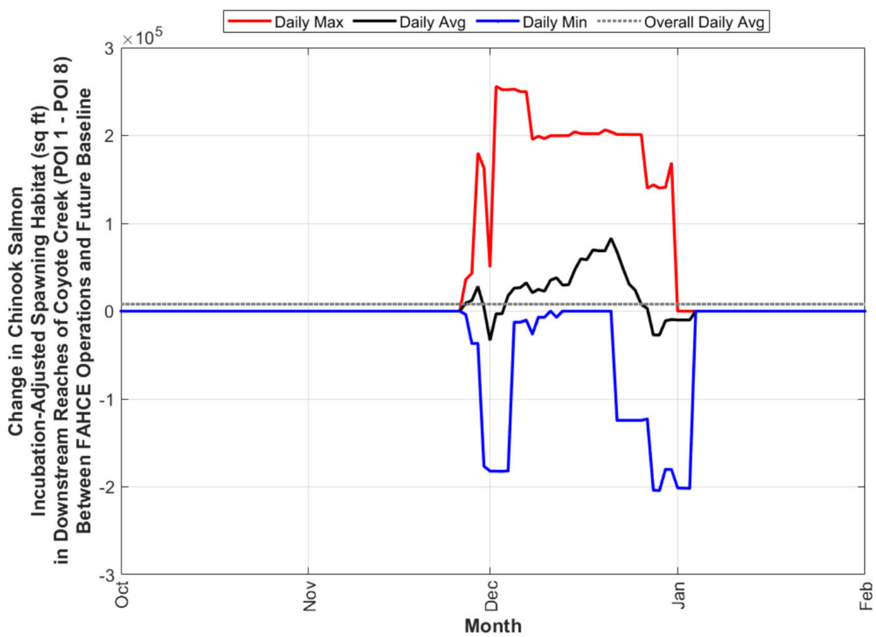


Figure 25. Change in modeled incubation-adjusted spawning habitat area for Chinook in Coyote Creek under the Project in the FCWMZ (top; ft^2 x 10^4) and downstream reaches (bottom; ft^2 x 10^5), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Fry Rearing

Changes in modeled Chinook salmon fry rearing habitat in Coyote Creek between the Project and Pre-FOCP Baseline and the Project and Future Baseline are shown in Figures 26 and 27, respectively, and summarized in Tables 4–5.

Figure 26. Change in modeled fry rearing habitat area (ft^2 x 10^5) for Chinook in Coyote Creek under the Project in the FCWMZ (top) and downstream reaches (bottom), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 27. Change in modeled fry rearing habitat area (ft^2 x 10^5) for Chinook in Coyote Creek under the Project in the FCWMZ (top) and downstream reaches (bottom), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data outputs are from Valley Water's WEAP model.

Juvenile Rearing

Changes in modeled Chinook Salmon juvenile rearing habitat in Coyote Creek between the Project and Pre-FOCP Baseline and the Project and Future Baseline are shown in Figures 28 and 29, respectively, and summarized in Tables 4–5.

Figure 28. Change in modeled juvenile rearing habitat area for Chinook in Coyote Creek under the Project in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 29. Change in modeled juvenile rearing habitat area for Chinook salmon in Coyote Creek under the Project in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Conditions for Migration

Adult Upstream Passage

Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult Chinook salmon upstream passage at Coyote Creek POIs during the October 15–January 31 upstream migration period under the Project and Pre-FOCP Baseline (Figure 30) and under the Project and Future Baseline (Figure 31).

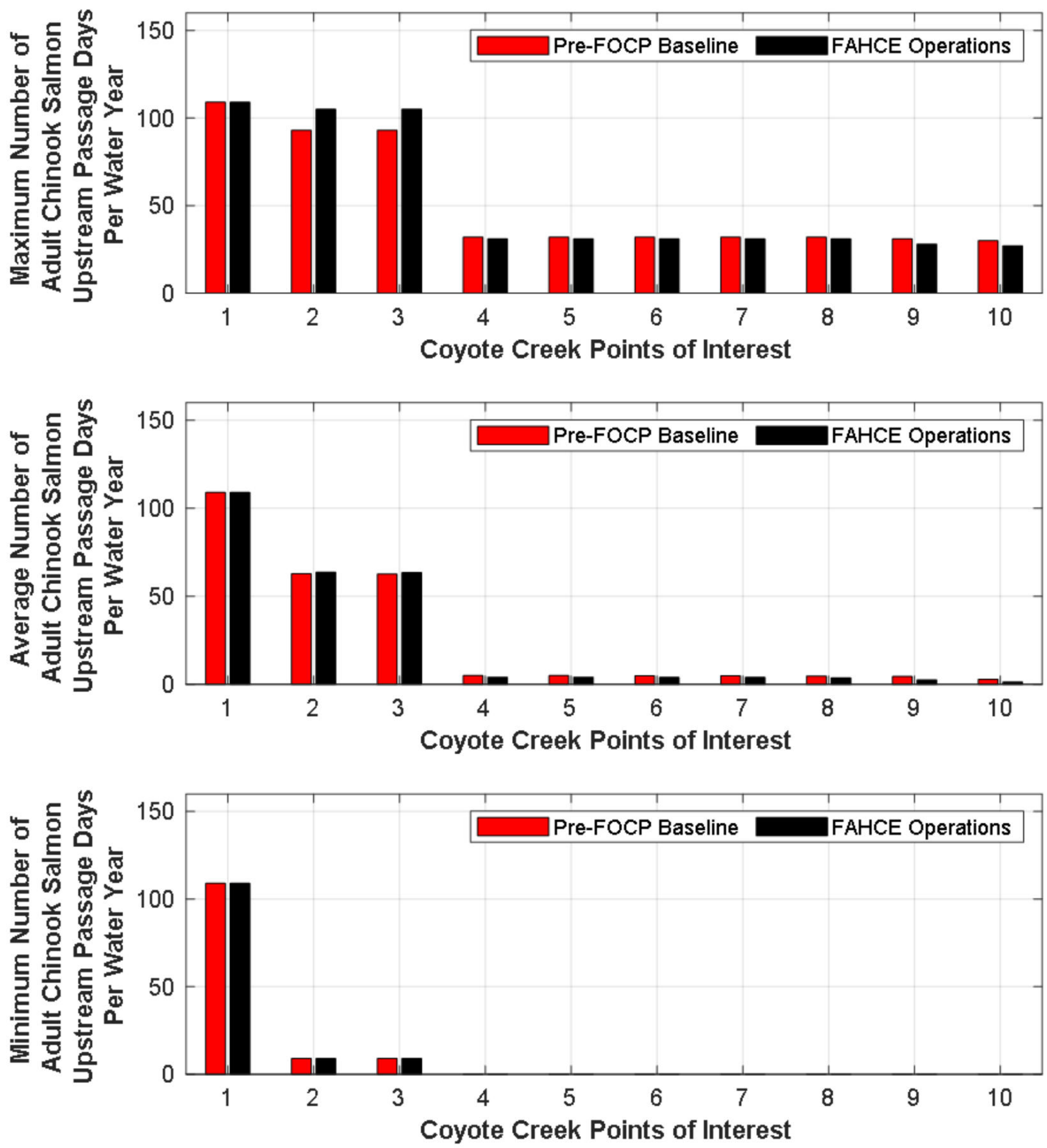


Figure 30. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the October 15 through January 31 upstream migration period under the Project and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 31. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the October 15 through January 31 upstream migration period under the Project and Future Baseline. Data are from Valley Water's WEAP model.

Juvenile Downstream Passage

Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile Chinook salmon passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February 1 –June 30 evaluation period for outmigration under the Project and Pre-FOCP Baseline (Figure 32) and under the Project and Future Baseline (Figure 33).

Figure 32. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile Chinook passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February 1 through June 30 evaluation period for outmigration under the Project and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 33. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile Chinook passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February 1 through June 30 evaluation period for outmigration under the Project and Future Baseline. Data are from Valley Water's WEAP model.

FAHCE-Plus Alternative Changes in Modeled Habitat Variables

Average Daily Flow

Changes in average daily flow between the FAHCE-plus Alternative, Pre-FOCP, and Future Baseline conditions were modeled for the upstream and downstream portions of the FCWMZ in Coyote Creek (Figures 34 and 35, respectively).

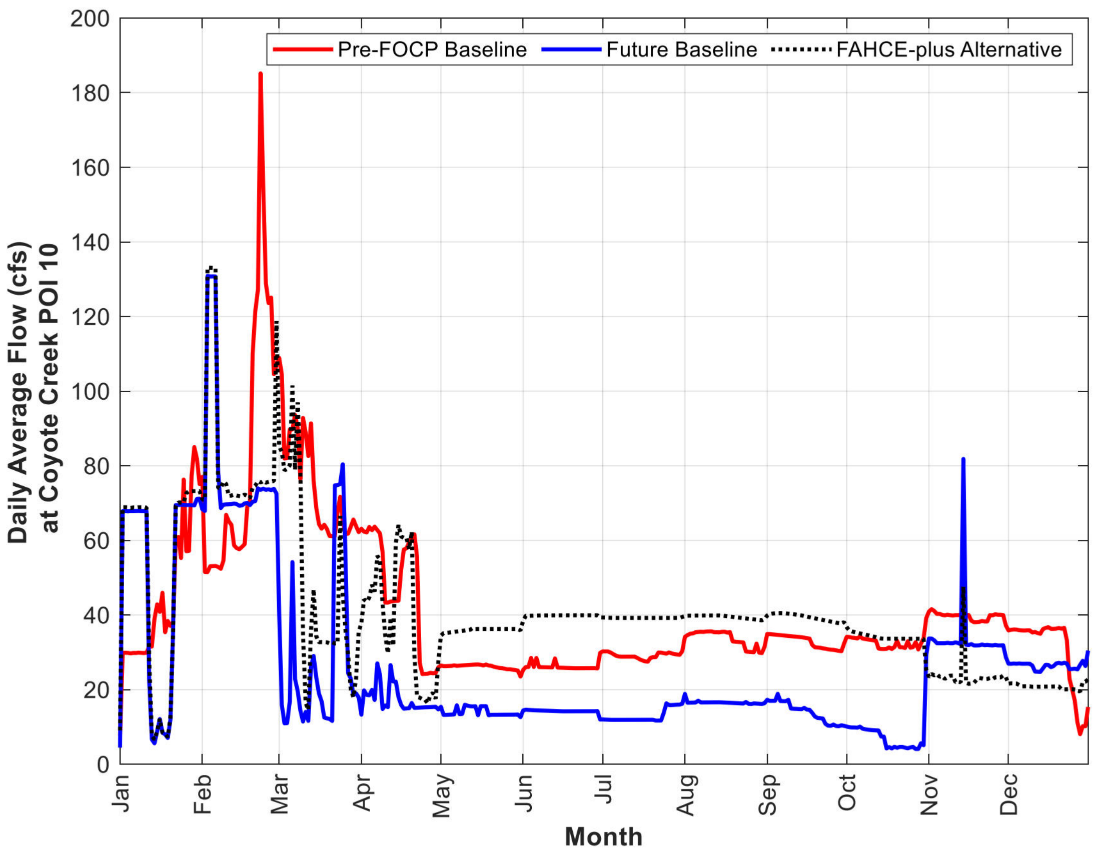


Figure 34. Modeled daily average flow (cfs) in the upstream portion of the FCWMZ in Coyote Creek (POI COYO 10) under the FAHCE-plus Alternative (dotted black line), Pre-FOCP Baseline (solid red line), and Future Baseline (solid blue line). Data are from outputs of Valley Water's WEAP model.

Figure 35. Modeled daily average flow (cfs) in the downstream portion of the FCWMZ in Coyote Creek (POI COYO 9) under the FAHCE-plus Alternative (dotted black line), Pre-FOCP Baseline (solid red line), and Future Baseline (solid blue line). Data are from outputs of Valley Water's WEAP model.

Daily average water temperature at Coyote Creek POIs were modeled under the FAHCE-plus Alternative and Pre-FOCP Baseline conditions (Figure 36) and under the FAHCE-plus Alternative and Future Baseline conditions (Figure 37).

Figure 361. Modeled daily average water temperature at Coyote Creek POIs under the FAHCE-plus Alternative (blue dotted line) and Pre-FOCP Baseline (red solid line), calculated from the FAHCE WEAP Model. Colored bands show the range of the

daily average water temperature during the 20-year modeling period (1991–2010) under each scenario. No modeled water temperature results are available for the POIs not shown.

Figure 372. Modeled daily average water temperature at Coyote Creek POIs under the FAHCE-plus Alternative (blue dotted line) and Future Baseline (red solid line), calculated from the FAHCE WEAP Model. Colored bands show the range of the daily average water temperature during the 20-year modeling period (1991–2010) under each scenario. No modeled water temperature results are available for the POIs not shown.

Thalweg Depth

Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay under the FAHCE-plus Alternative and Pre-FOCP Baseline were modeled for the period of January 1 to June 30 (Figure 38) and December 1 to May 31 (Figure 39) and under the FAHCE-plus Alternative and Future Baseline for the period of January 1 to June 30 (Figure 40) and December 1 to May 31 (Figure 41).

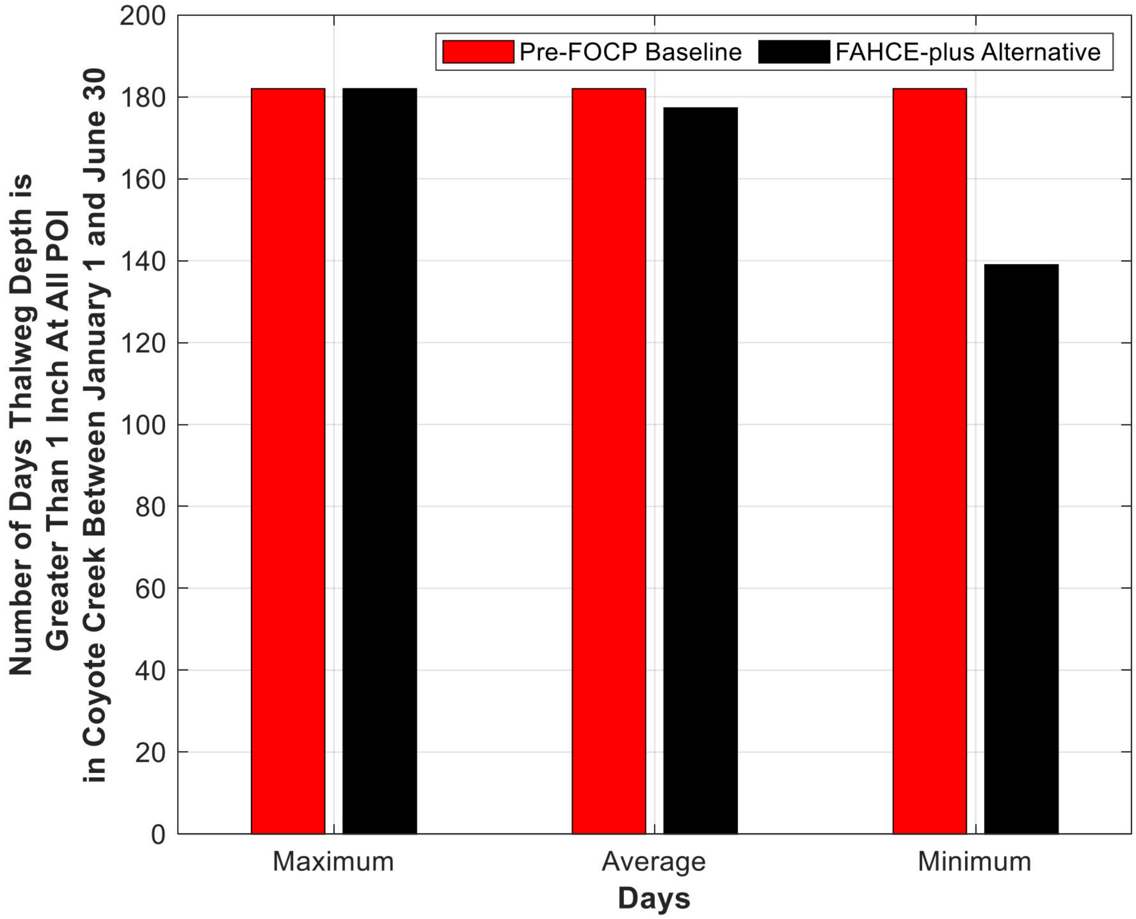


Figure 38. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from January 1 to June 30 under the FAHCE-plus Alternative and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 39. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from December 1 to May 31 under the FAHCE-plus Alternative and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 40. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from January 1 to June 30 under the FAHCE-plus Alternative and Future Baseline. Data are from Valley Water's WEAP model.

Figure 41. Maximum, average, and minimum number of days per water year predicted to have thalweg depths greater than 1 inch in Coyote Creek from the FCWMZ to San Francisco Bay from December 1 to May 31 under the FAHCE-plus Alternative and Future Baseline. Data are from Valley Water's WEAP model.

Daily average wetted area at Coyote Creek POIs were modeled under the FAHCE-plus Alternative and Pre-FOCP Baseline conditions (Figures 42–43) and under the FAHCE-plus Alternative and Future Baseline conditions (Figures 44–45).

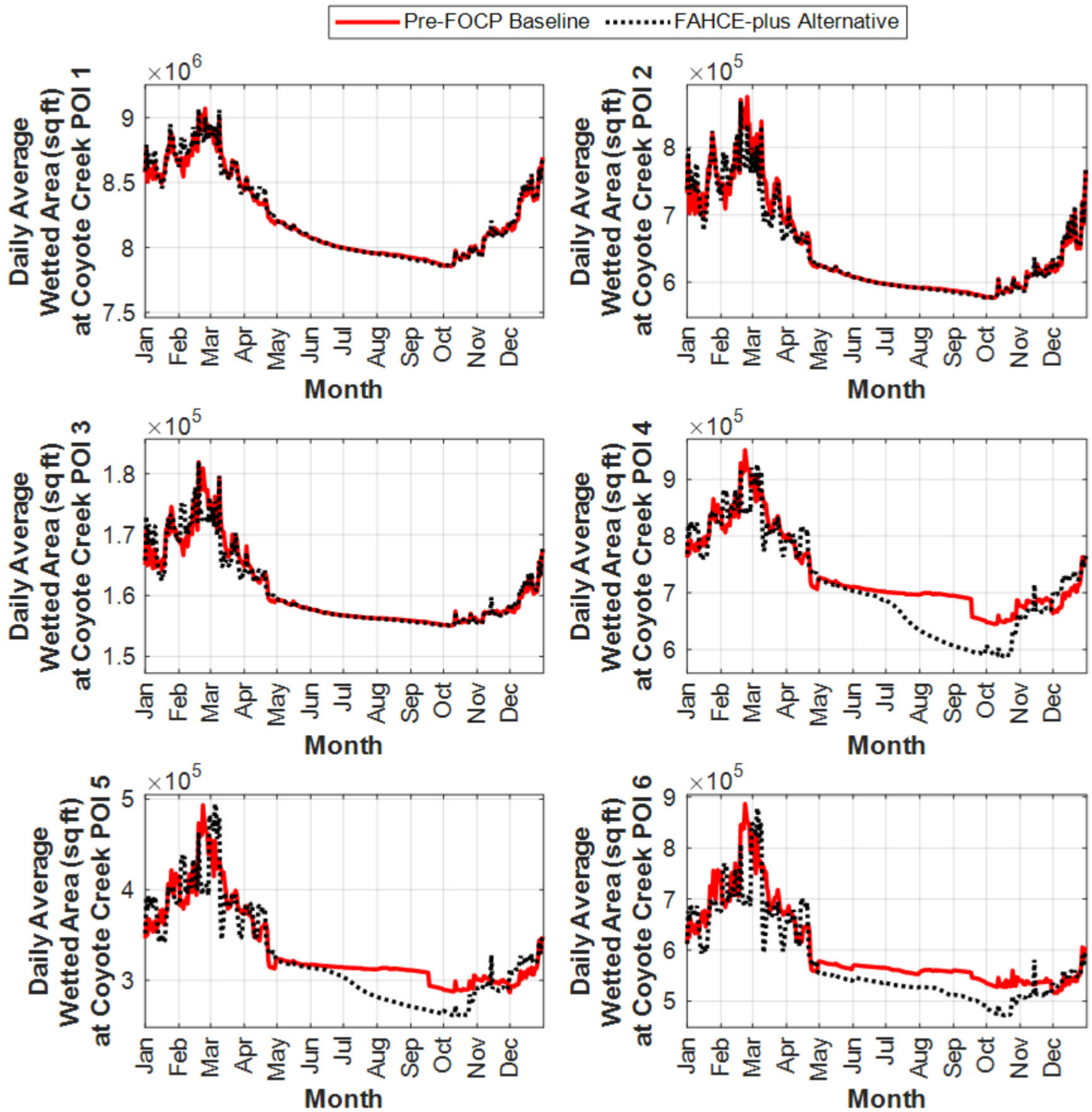


Figure 42 3. Modeled daily average wetted area at Coyote Creek POIs 1–6 under the FAHCE-plus Alternative (black dotted line) and Pre-FOCP Baseline (red solid line), calculated from the FAHCE WEAP Model.

Figure 434. Modeled daily average wetted area at Coyote Creek POIs 7–10 under the FAHCE-plus Alternative (black dotted line) and Pre-FOCP Baseline (red solid line), calculated from the FAHCE WEAP Model.

Figure 445. Modeled daily average wetted area at Coyote Creek POIs 1–6 under the FAHCE-plus Alternative (black dotted line) and Future Baseline (red solid line), calculated from the FAHCE WEAP Model.

Figure 456. Modeled daily average wetted area at Coyote Creek POIs 7–10 under the FAHCE-plus Alternative (black dotted line) and Future Baseline (red solid line), calculated from the FAHCE WEAP Model.

Central California Coast Steelhead Change in Habitat under the FAHCE-plus Alternative Compared with Pre-FOCP and Future Baselines

The amount of steelhead habitat for all life stages under the FAHCE-plus Alternative and Pre-FOCP Baseline conditions is summarized in Table 6. Steelhead habitat under the FAHCE-plus Alternative and Future Baseline conditions is summarized in Table 7. Results are shown for the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8) and for the total amount of habitat from Coyote Creek downstream of Anderson Dam.

Table 6. Central California Coast Steelhead Habitat in Coyote Creek under the FAHCE-plus Alternative Compared with the Pre-FOCP Baseline.

Steelhead Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Steelhead Habitat Pre-FOCP Baseline (sq ft)			
Incubation-adjusted Spawning	12,225	11,182	23,407
Fry Rearing Total (March 1–May 31)	2,024,369	207,594	2,231,962
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,062,248	203,076	2,265,324
Fry Rearing Summer Release Program (May 1–May 31)	1,949,832	216,483	2,166,316
Juvenile Rearing Total (year-round)	2,497,231	289,739	2,786,971
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,688,873	287,700	2,976,572
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,308,454	291,748	2,600,202
Steelhead Habitat FAHCE-plus Alternative (sq ft)			
Incubation-adjusted Spawning	13,229	8,775	22,004
Fry Rearing Total (March 1–May 31)	2,017,151	223,657	2,240,808
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,067,849	224,569	2,292,418
Fry Rearing Summer Release Program (May 1–May 31)	1,917,389	221,863	2,139,252
Juvenile Rearing Total (year-round)	2,353,034	282,662	2,635,695
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,541,973	268,673	2,810,646
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,166,919	296,441	2,463,360
Change in Habitat (sq ft)[b]			
Incubation-adjusted Spawning	1,000 (8.2%)	-2,400 (-21.5%)	-1,400 (-6.0%)
Fry Rearing Total (March 1–May 31)	-7,200 (-0.4%)	16,100 (7.7%)	8,800 (0.4%)
Fry Rearing Winter Base Flow Operations (March 1–April 30)	5,600 (0.3%)	21,500 (10.6%)	27,100 (1.2%)
Fry Rearing Summer Release Program (May 1–May 31)	-32,400 (-1.7%)	5,400 (2.5%)	-27,100 (-1.3%)

Steelhead Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Juvenile Rearing Total (year-round)	-144,200 (-5.8%)	-7,100 (-2.4%)	-151,300 (-5.4%)
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	-146,900 (-5.5%)	-19,000 (-6.6%)	-165,900 (-5.6%)
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	-141,500 (-6.1%)	4,700 (1.6%)	-136,800 (-5.3%)

[a] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[b] The change in habitat in square feet (sq ft) is the difference between the modeled habitat under the FAHCE-plus Alternative and the Pre-FOCP Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Pre-FOCP Baseline.

Table 7. Central California Coast Steelhead Habitat in Coyote Creek under the FAHCE-plus Alternative Compared with the Future Baseline.

Steelhead Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Steelhead Habitat Future Baseline (sq ft)			
Incubation-adjusted Spawning	10,740	7,212	17,952
Fry Rearing Total (March 1–May 31)	2,001,494	208,137	2,209,631
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,029,850	208,825	2,238,675
Fry Rearing Summer Release Program (May 1–May 31)	1,945,697	206,783	2,152,480
Juvenile Rearing Total (year-round)	2,293,920	248,794	2,542,715
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,392,731	249,194	2,641,925
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,196,586	248,401	2,444,987
Steelhead Habitat FAHCE-plus Alternative (sq ft)			
Incubation-adjusted Spawning	13,229	8,775	22,004
Fry Rearing Total (March 1–May 31)	2,017,151	223,657	2,240,808
Fry Rearing Winter Base Flow Operations (March 1–April 30)	2,067,849	224,569	2,292,418
Fry Rearing Summer Release Program (May 1–May 31)	1,917,389	221,863	2,139,252
Juvenile Rearing Total (year-round)	2,353,034	282,662	2,635,695
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	2,541,973	268,673	2,810,646
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	2,166,919	296,441	2,463,360

Steelhead Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total
Change in Habitat (sq ft)[b]			
Incubation-adjusted Spawning	2,500 (23.2%)	1,600 (21.7%)	4,100 (22.8%)
Fry Rearing Total (March 1–May 31)	15,700 (0.8%)	15,500 (7.5%)	31,200 (1.4%)
Fry Rearing Winter Base Flow Operations (March 1–April 30)	38,000 (1.9%)	15,700 (7.5%)	53,700 (2.4%)
Fry Rearing Summer Release Program (May 1–May 31)	-28,300 (-1.5%)	15,100 (7.3%)	-13,200 (-0.6%)
Juvenile Rearing Total (year-round)	59,100 (2.6%)	33,900 (13.6%)	93,000 (3.7%)
Juvenile Rearing Winter Base Flow (Nov 1–Apr 30)	149,200 (6.2%)	19,500 (7.8%)	168,700 (6.4%)
Juvenile Rearing Summer Cold Water Program (May 1–Oct 31)	-29,700 (-1.4%)	48,000 (19.3%)	18,400 (0.8%)

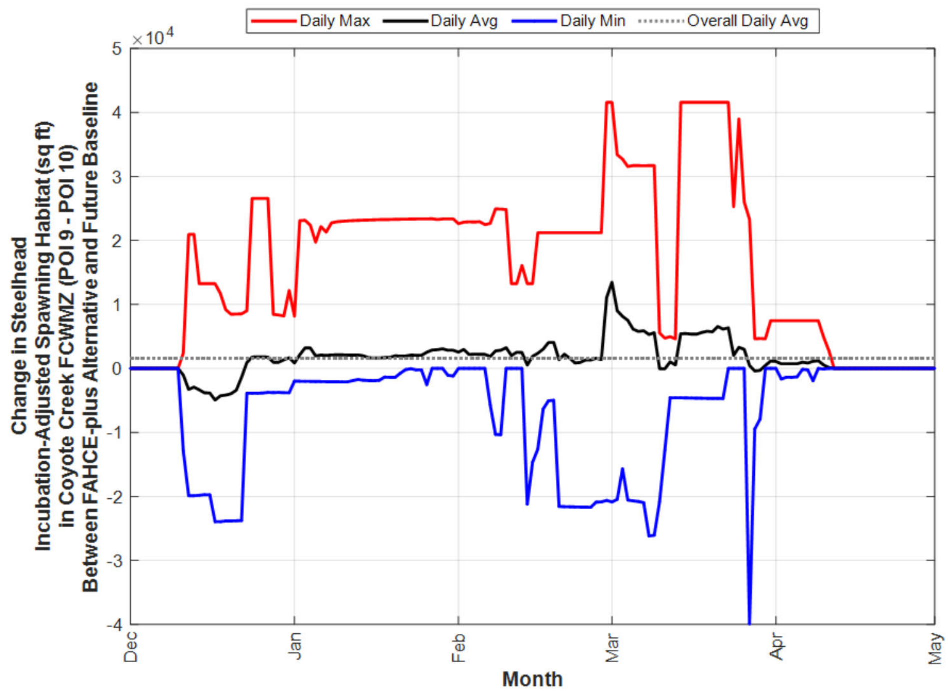
[a] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[b] The change in habitat in square feet (sq ft) is the difference between the modeled habitat under the FAHCE-plus Alternative and the Future Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Future Baseline.

Spawning and Incubation

Changes in modeled steelhead incubation-adjusted spawning habitat area between the FAHCE-plus Alternative and Pre-FOCP Baseline and the FAHCE-plus Alternative and Future Baseline are shown in Figures 46 and 47, respectively, and summarized in Tables 6–7.

Figure 46. Change in modeled incubation-adjusted spawning habitat area for steelhead in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; $ft^2 \times 10^4$) and downstream reaches (bottom; $ft^2 \times 10^5$), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.



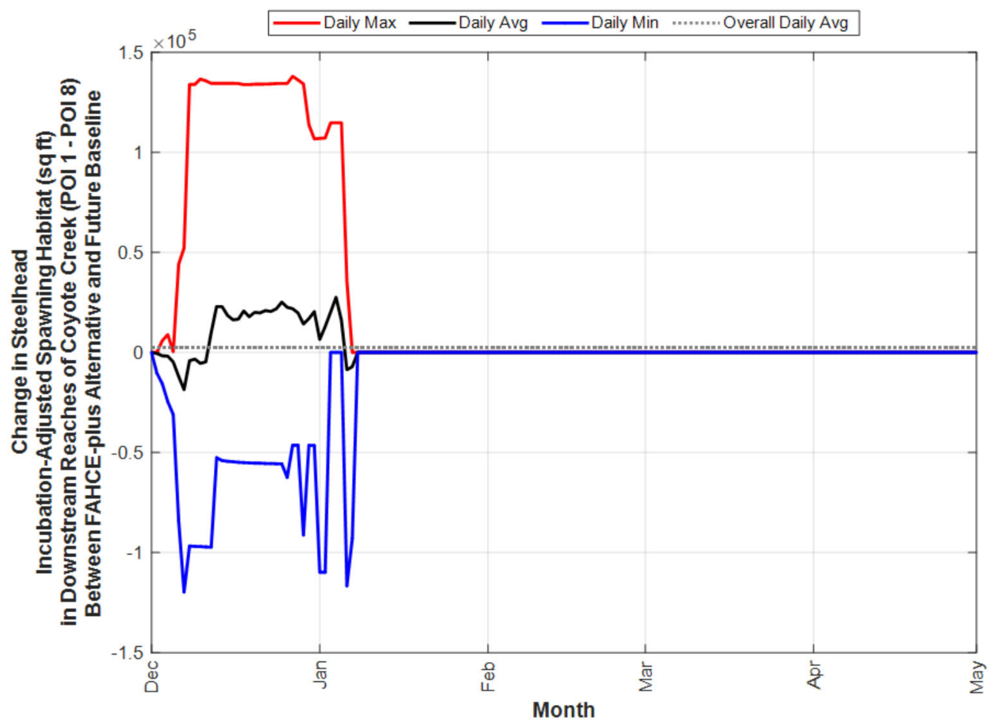


Figure 47. Change in modeled incubation-adjusted spawning habitat area for steelhead in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; $ft^2 \times 10^4$) and downstream reaches (bottom; $ft^2 \times 10^5$), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Fry Rearing

Changes in modeled steelhead fry rearing habitat in Coyote Creek between the FAHCE-plus Alternative and Pre-FOCP Baseline and the FAHCE-plus Alternative and Future Baseline are shown in Figures 48 and 49, respectively, and summarized in Tables 6–7.

Figure 48. Change in modeled fry rearing habitat area (ft^2 x 10^5) for steelhead in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top) and downstream reaches (bottom), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 49. Change in modeled fry rearing habitat area ($ft^2 \times 10^5$) for steelhead in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top) and downstream reaches (bottom), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Juvenile Rearing

Changes in modeled steelhead juvenile rearing habitat in Coyote Creek between the FAHCE-plus Alternative and Pre-FOCP Baseline and the FAHCE-plus Alternative and Future Baseline are shown in Figures 50 and 51, respectively, and summarized in Tables 6–7.

Figure 50. Change in modeled juvenile rearing habitat area for steelhead in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 51. Change in modeled juvenile rearing habitat area for steelhead in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Conditions for Migration

Adult Upstream Passage

Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead upstream passage at Coyote Creek POIs during the December–April upstream migration period under the FAHCE-plus Alternative and Pre-FOCP Baseline (Figure 52) and under the FAHCE-plus Alternative and Future Baseline (Figure 53).

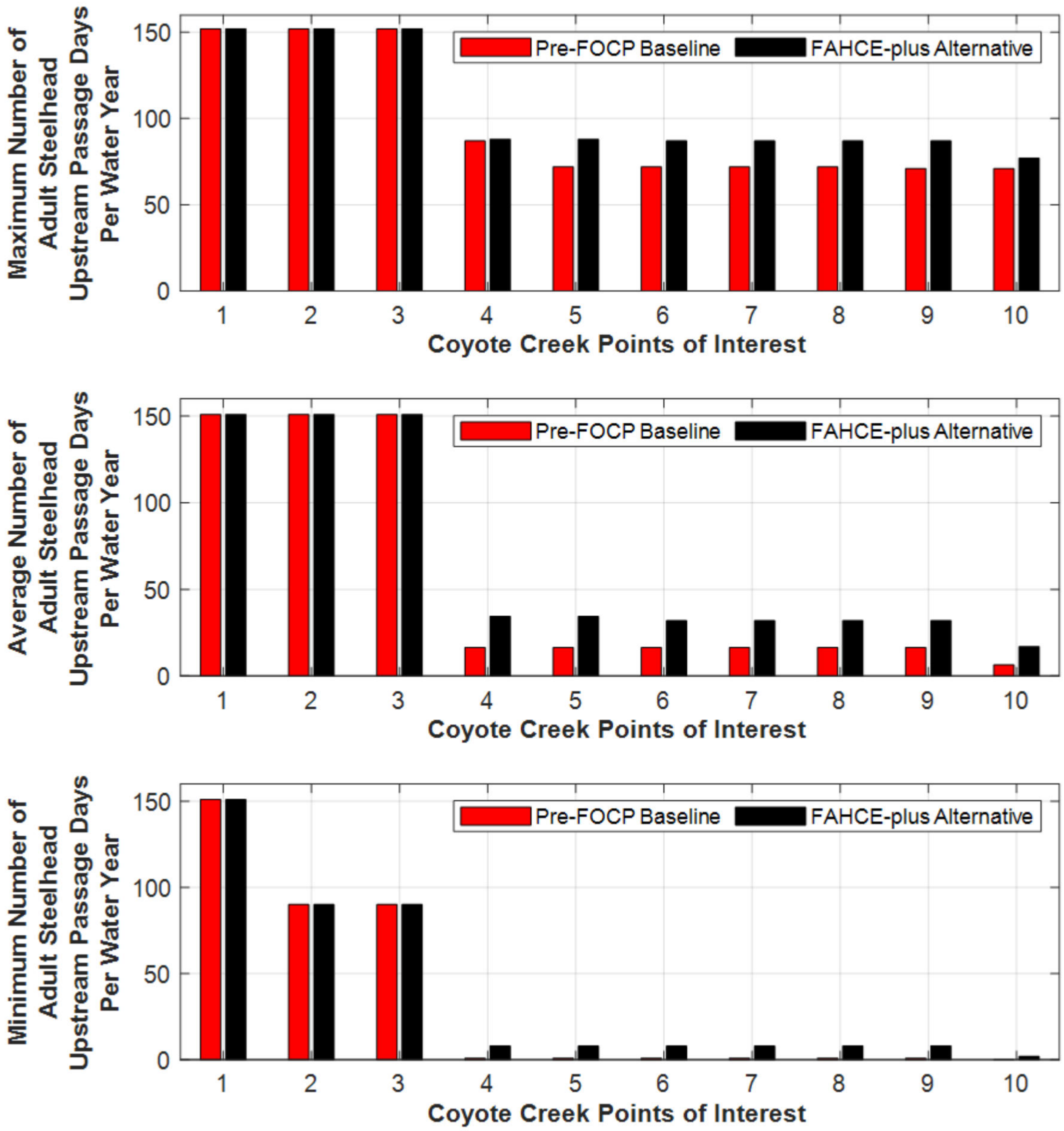


Figure 52. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the December–April upstream migration period under the FAHCE-plus Alternative and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 53. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the December–April upstream migration period under the FAHCE-plus Alternative and Future Baseline. Data are from Valley Water's WEAP model.

Juvenile Downstream Passage

Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile steelhead passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the FAHCE-plus Alternative and Pre-FOCP Baseline (Figure 54) and under the FAHCE-plus Alternative and Future Baseline (Figure 55).

Figure 54. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile steelhead passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the FAHCE-plus Alternative and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 55. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile steelhead passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the FAHCE-plus Alternative and Future Baseline. Data are from Valley Water's WEAP model.

Central Valley Fall-Run Chinook Salmon

The amount of Chinook salmon habitat in Coyote Creek for all life stages under the FAHCE-plus Alternative and Pre-FOCP Baseline conditions is summarized in Table 8. Chinook salmon habitat under the FAHCE-plus Alternative and Future Baseline conditions is summarized in Table 9. Results are shown for the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8) and for the total amount of habitat from Coyote Creek downstream of Anderson Dam.

Table 8. Chinook Salmon Habitat in Coyote Creek under the FAHCE-plus Alternative Compared with the Pre-FOCP Baseline.

Chinook Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Chinook Salmon Habitat Pre-FOCP Baseline (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	27,111	13,550	40,661
Fry Rearing Total (Jan 1–Apr 30)	2,873,644	229,306	3,102,950
Juvenile Rearing Total (Jan 1–Jun 30)	2,377,274	242,686	2,619,960
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,496,020	236,401	2,732,421
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,141,730	255,152	2,396,882
Chinook Salmon Habitat FAHCE-plus Alternative (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	29,516	11,050	40,567
Fry Rearing Total (Jan 1–Apr 30)	2,936,610	235,033	3,171,642
Juvenile Rearing Total (Jan 1–Jun 30)	2,332,503	254,400	2,586,903
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,459,349	247,657	2,707,006
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,080,892	267,775	2,348,667
Change in Habitat (sq. ft) [c]			
Incubation-adjusted Spawning (Oct 15–Jan 31)	2,400 (8.9%)	-2,500 (-18.4%)	-100 (-0.2%)
Fry Rearing Total (Jan 1–Apr 30)	63,000 (2.2%)	5,700 (2.5%)	68,700 (2.2%)
Juvenile Rearing Total (Jan 1–Jun 30)	-44,800 (-1.9%)	11,700 (4.8%)	-33,100 (-1.3%)
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	-36,700 (-1.5%)	11,300 (4.8%)	-25,400 (-0.9%)

Chinook Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Juvenile Rearing Summer Release Program (May 1–Jun 30)	-60,800 (-2.8%)	12,600 (4.9%)	-48,200 (-2%)

[a] Habitat is the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[b] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.
[c] The change in habitat in sq ft is the difference between the modeled habitat under the FAHCE-plus Alternative and the Pre-FOCP Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Pre-FOCP Baseline.

Table 9. Chinook Habitat in Coyote Creek under the FAHCE-plus Alternative Compared with the Future Baseline.

Chinook Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Chinook Salmon Habitat Future Baseline (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	25,030	11,044	36,075
Fry Rearing Total (Jan 1–April 30)	2,877,097	221,654	3,098,751
Juvenile Rearing Total (Jan 1–Jun 30)	2,263,293	231,833	2,495,125
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,353,560	229,576	2,583,136
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,084,238	236,309	2,320,547
Chinook Salmon Habitat FAHCE-plus Alternative (sq ft)			
Incubation-adjusted Spawning (Oct 15–Jan 31)	29,516	11,050	40,567
Fry Rearing Total (Jan 1–April 30)	2,936,610	235,033	3,171,642
Juvenile Rearing Total (Jan 1–Jun 30)	2,332,503	254,400	2,586,903
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	2,459,349	247,657	2,707,006
Juvenile Rearing Summer Release Program (May 1–Jun 30)	2,080,892	267,775	2,348,667

Chinook Life Stage Period[a]	POI COYO 1–COYO 8	POI COYO 9–COYO 10 (FCWMZ)	Total[b]
Change in Habitat (sq ft) [c]			
Incubation-adjusted Spawning (Oct 15–Jan 31)	4,500 (17.9%)	6 (0.1%)	4,500 (12.5%)
Fry Rearing Total (Jan 1–April 30)	59,500 (2.1%)	13,400 (6%)	72,900 (2.4%)
Juvenile Rearing Total (Jan 1–Jun 30)	69,200 (3.1%)	22,600 (9.7%)	91,800 (3.7%)
Juvenile Rearing Winter Base Flow Operations (Jan 1–April 30)	105,800 (4.5%)	18,100 (7.9%)	123,900 (4.8%)
Juvenile Rearing Summer Release Program (May 1–Jun 30)	-3,300 (-0.2%)	31,500 (13.3%)	28,100 (1.2%)

[a] Habitat is the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

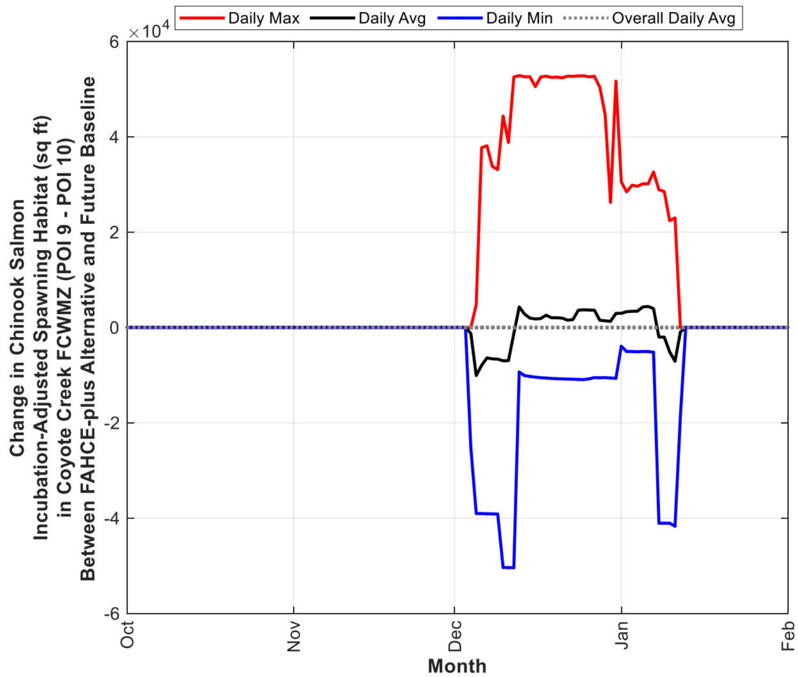
[b] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

[c] The change in habitat in sq ft is the difference between the modeled habitat under the FAHCE-plus Alternative and the Future Baseline scenarios rounded to the nearest hundred. The change in the habitat in percent is the rounded change in habitat in sq ft divided by the unrounded modeled habitat in sq ft under the Future Baseline.

Spawning and Incubation

Changes in modeled Chinook salmon incubation-adjusted spawning habitat area in Coyote Creek between the FAHCE-plus Alternative and Pre-FOCP Baseline and the FAHCE-plus Alternative and Future Baseline are shown in Figures 56 and 57, respectively, and summarized in Tables 8–9.

Figure 56. Change in modeled incubation-adjusted spawning habitat area for Chinook salmon in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; ft^2 x 10^4) and downstream reaches (bottom; ft^2 x 10^5), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the baseline and negative values represent a decrease. Data are from outputs of Valley Water's WEAP model.



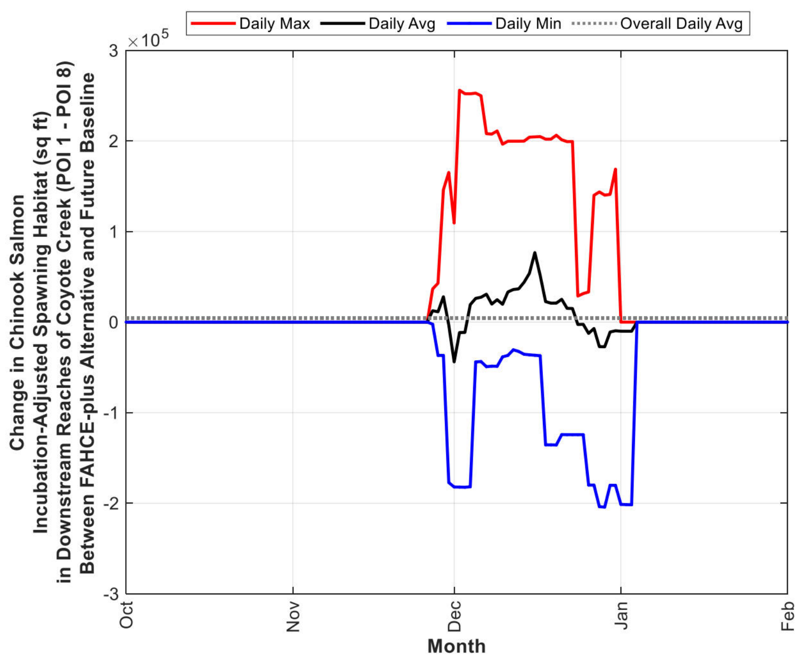


Figure 57. Change in modeled incubation-adjusted spawning habitat area for Chinook in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; ft^2 x 10^4) and downstream reaches (bottom; ft^2 x 10^5), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Fry Rearing

Changes in modeled Chinook salmon fry rearing habitat in Coyote Creek between the FAHCE-plus Alternative and Pre-FOCP Baseline and the FAHCE-plus Alternative and Future Baseline are shown in Figures 58 and 59, respectively, and summarized in Tables 8–9.

Figure 58. Change in modeled fry rearing habitat area ($ft^2 \times 10^5$) for Chinook in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top) and downstream reaches (bottom), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 59. Change in modeled fry rearing habitat area ($ft^2 \times 10^5$) for Chinook in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top) and downstream reaches (bottom), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data outputs are from Valley Water's WEAP model.

Juvenile Rearing

Changes in modeled Chinook Salmon juvenile rearing habitat in Coyote Creek between the FAHCE-plus Alternative and Pre-FOCP Baseline and the FAHCE-plus Alternative and Future Baseline are shown in Figures 60 and 61, respectively, and summarized in Tables 8–9.

Figure 60. Change in modeled juvenile rearing habitat area for Chinook in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Pre-FOCP Baseline. Positive values represent an increase relative to the Pre-FOCP Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Figure 61. Change in modeled juvenile rearing habitat area for Chinook salmon in Coyote Creek under the FAHCE-plus Alternative in the FCWMZ (top; $ft^2 \times 10^5$) and downstream reaches (bottom; $ft^2 \times 10^6$), compared with the Future Baseline. Positive values represent an increase relative to the Future Baseline and negative values represent a decrease. Data are from Valley Water's WEAP model.

Conditions for Migration

Adult Upstream Passage

Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult Chinook salmon upstream passage at Coyote Creek POIs during the October 15–January 31 upstream migration period under the FAHCE-plus Alternative and Pre-FOCP Baseline (Figure 62) and under the FAHCE-plus Alternative and Future Baseline (Figure 63).

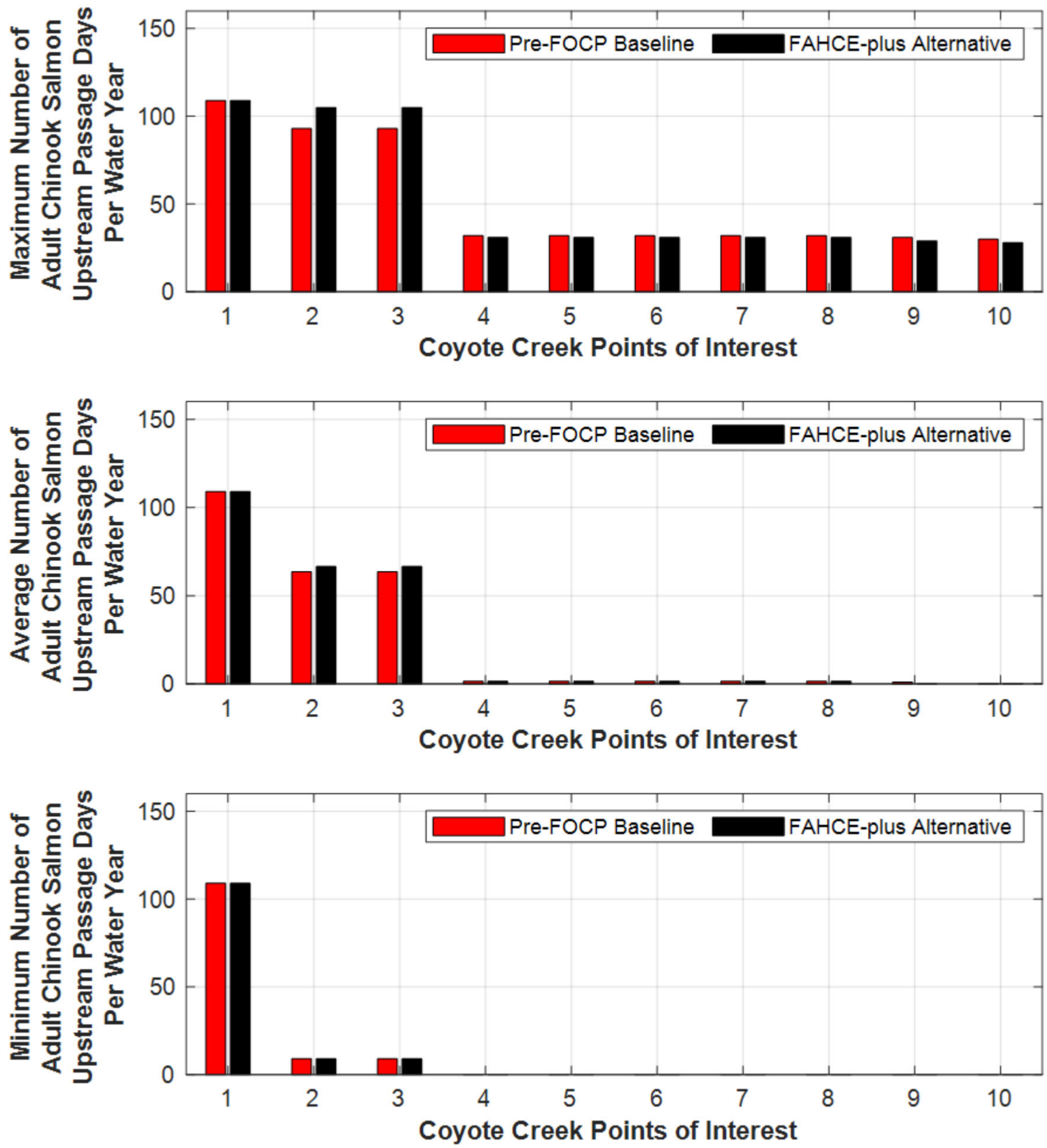


Figure 62. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the October 15 through January 31 upstream migration period under the FAHCE-plus Alternative and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 63. Minimum, average, and maximum number of days per water year predicted to have suitable conditions for adult steelhead passage at Coyote Creek POIs during the October 15 through January 31 upstream migration period under the FAHCE-plus Alternative and Future Baseline. Data are from Valley Water's WEAP model.

Juvenile Downstream Passage

Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile Chinook salmon passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February 1 –June 30 evaluation period for outmigration under the FAHCE-plus Alternative and Pre-FOCP Baseline (Figure 64) and under the FAHCE-plus Alternative and Future Baseline (Figure 65).

Figure 64. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile Chinook passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February 1 through June 30 evaluation period for outmigration under the FAHCE-plus Alternative and Pre-FOCP Baseline. Data are from Valley Water's WEAP model.

Figure 65. Maximum, median, and minimum number of days per water year predicted to have suitable conditions for juvenile Chinook passage in Coyote Creek from the FCWMZ to San Francisco Bay during the February 1 through June 30 evaluation period for outmigration under the FAHCE-plus Alternative and Future Baseline. Data are from Valley Water's WEAP model.

FAHCE-plus Alternative Compared to the Project WEAP Model Outputs

Central California Coast Steelhead

Spawning and Incubation

The total amount of steelhead incubation-adjusted habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 10. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within in the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 10. Central California Coast Steelhead Incubation-Adjusted Spawning Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Steelhead Incubation-Adjusted Spawning Habitat [b]				
COYO 3	0	0	0	0
COYO 4	0	0	0	0
COYO 5	14	26	41	40
COYO 6	22	34	60	58
COYO 7	2,200	2,100	2,400	2,300
COYO 8	10,000	8,600	11,300	10,800
COYO 9	10,100	6,600	7,200	7,800
COYO 10	1,000	600	800	1,000
Total COYO 1–8 [c]	12,200	10,800	13,800	13,200
Total COYO 9–10 [c] (FCWMZ)	11,100	7,200	8,000	8,800
Total COYO 1–10 [c]	23,300	18,000	21,800	22,000

[a] No FAHCE WEAP model results were available for the POIs not shown.
[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

Fry Rearing

The total amount of steelhead fry rearing habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 11. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 11. Central California Coast Steelhead Fry Rearing (March 1–May 31) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Steelhead Fry Rearing Total (March 1–May 31) Habitat [b]				
COYO 3	14,100	14,600	14,700	14,300
COYO 4	193,500	200,700	189,200	166,100
COYO 5	212,600	211,200	209,100	217,200
COYO 6	376,900	362,900	364,200	389,000
COYO 7	613,000	530,800	534,300	584,700
COYO 8	614,300	681,300	678,600	645,800
COYO 9	155,400	161,300	160,400	163,200
COYO 10	52,200	46,800	55,700	60,400
Total COYO 1–8 [c]	2,024,400	2,001,500	1,990,100	2,017,100
Total COYO 9–10 [c] (FCWMZ)	207,600	208,100	216,100	223,600
Total COYO 1–10 [c]	2,232,000	2,209,600	2,206,200	2,240,700

[a] No FAHCE WEAP model results were available for the POIs not shown.
[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

The total amount of steelhead fry rearing Winter Base Flow Operations habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 12. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 12. Central California Coast Steelhead Fry Rearing Winter Base Flow Operations (March 1–April 30) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Steelhead Fry Rearing Winter Base Flow Operations (March 1–April 30) Habitat [b]				
COYO 3	13,400	14,300	14,100	13,700
COYO 4	184,700	192,900	179,800	143,700
COYO 5	222,300	217,500	219,800	230,600
COYO 6	395,100	375,400	383,800	419,500
COYO 7	639,400	534,900	554,900	629,200
COYO 8	607,400	694,800	679,600	631,100
COYO 9	152,200	161,700	162,100	166,400
COYO 10	50,800	47,100	51,200	58,200
Total COYO 1–8 [c]	2,062,300	2,029,800	2,032,000	2,067,800
Total COYO 9–10 [c] (FCWMZ)	203,000	208,800	213,300	224,600
Total COYO 1–10 [c]	2,265,300	2,238,600	2,245,300	2,292,400

[a] No FAHCE WEAP model results were available for the POIs not shown.

[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

The total amount of steelhead fry rearing Summer Release Program habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 13. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 13. Central California Coast Steelhead Fry Rearing Summer Release Program (May 1–May 31) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Steelhead Fry Rearing Summer Release Program (May 1–May 31) Habitat [b]				
COYO 3	15,500	15,300	15,800	15,700
COYO 4	211,000	216,000	207,800	210,200
COYO 5	193,500	198,800	188,000	190,800
COYO 6	341,100	338,400	325,600	328,900
COYO 7	560,900	522,600	493,700	496,900
COYO 8	627,800	654,600	676,600	674,900
COYO 9	161,700	160,500	156,900	157,000
COYO 10	54,700	46,200	64,700	64,800
Total COYO 1–8 [c]	1,949,800	1,945,700	1,907,500	1,917,400
Total COYO 9–10 [c] (FCWMZ)	216,400	206,700	221,600	221,800
Total COYO 1–10 [c]	2,166,200	2,152,400	2,129,100	2,139,200

[a] No FAHCE WEAP model results were available for the POIs not shown.
[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

Juvenile Rearing

The total amount of steelhead juvenile rearing habitat year-round under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 14. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 14. Central California Coast Steelhead Juvenile Rearing Total (year-round) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Steelhead Juvenile Rearing Total (year-round) Habitat [b]				
COYO 3	68,300	68,700	68,600	67,600
COYO 4	212,200	234,300	231,700	239,700
COYO 5	216,300	214,800	208,600	218,100
COYO 6	456,200	422,200	418,400	428,700
COYO 7	715,100	550,500	555,700	582,300
COYO 8	829,100	803,400	815,100	816,700
COYO 9	218,600	200,800	201,800	205,200
COYO 10	71,100	47,900	75,000	77,500
Total COYO 1–8 [c]	2,497,200	2,293,900	2,298,100	2,353,100
Total COYO 9–10 [c] (FCWMZ)	289,700	248,700	276,800	282,700
Total COYO 1–10 [c]	2,786,900	2,542,600	2,574,900	2,635,800

[a] No FAHCE WEAP model results were available for the POIs not shown.

[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

The total amount of steelhead juvenile rearing Winter Base Flow Operations habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 15. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 15. Central California Coast Steelhead Juvenile Rearing Winter Base Flow Operations (Nov 1–Apr 30) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Steelhead Juvenile Rearing Winter Base Flow Operations (Nov 1–Apr 30) Habitat [b]				
COYO 3	65,600	67,000	65,800	63,600
COYO 4	251,100	288,100	291,200	298,900
COYO 5	252,500	246,300	244,900	256,900
COYO 6	512,600	467,800	481,100	499,400
COYO 7	776,500	513,400	532,500	586,700
COYO 8	830,600	810,100	832,200	836,400
COYO 9	220,100	196,000	202,400	208,800
COYO 10	67,600	53,200	55,300	59,900
Total COYO 1–8 [c]	2,688,900	2,392,700	2,447,700	2,541,900

Total COYO 9–10 [c] (FCWMZ)	287,700	249,200	257,700	268,700
Total COYO 1–10 [c]	2,976,600	2,641,900	2,705,400	2,810,600

[a] No FAHCE WEAP model results were available for the POIs not shown.
[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

The total amount of steelhead juvenile rearing Summer Cold Water Program habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 16. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 16. Central California Coast Steelhead Juvenile Rearing Summer Cold Water Program (May 1–Oct 31) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Steelhead Juvenile Rearing Summer Cold Water Program (May 1–Oct 31) Habitat [b]				
COYO 3	71,000	70,300	71,200	71,500
COYO 4	173,900	181,200	173,100	181,300
COYO 5	180,700	183,900	172,900	179,800
COYO 6	400,600	377,300	356,700	359,000
COYO 7	654,600	587,100	578,600	578,000
COYO 8	827,600	796,800	798,200	797,300
COYO 9	217,200	205,700	201,200	201,600
COYO 10	74,600	42,700	94,500	94,800
Total COYO 1–8 [c]	2,308,400	2,196,600	2,150,700	2,166,900
Total COYO 9–10 [c] (FCWMZ)	291,800	248,400	295,700	296,400
Total COYO 1–10 [c]	2,600,200	2,445,000	2,446,400	2,463,300

[a] No FAHCE WEAP model results were available for the POIs not shown.
[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

Conditions for Migration

Adult Upstream Passage

The range of adult steelhead upstream passage opportunities at Coyote Creek POIs under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative during all modeled water years (Figure 66).

Figure 66. Adult steelhead upstream passage opportunities in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative during all modeled water years (1990–2010). Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. The FAHCE WEAP model began on January 1, 1990, so 1990 was a partial water year that only quantified adult steelhead upstream passage from January to April rather than the entire adult steelhead migration period from December to April.

The range of adult steelhead upstream passage opportunities at Coyote Creek POIs under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative for dry and below normal water years (Figure 67).

Figure 67. Adult steelhead upstream passage opportunities in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, for Dry (upper graph) and Below Normal (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. The FAHCE WEAP model began on January 1, 1990, so the dry water year (i.e., 1990) was a partial water year that only quantified adult steelhead upstream passage from January to April rather than the entire adult steelhead migration period from December to April.

The range of adult steelhead upstream passage opportunities at Coyote Creek POIs under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative for above normal and wet water years (Figure 68).

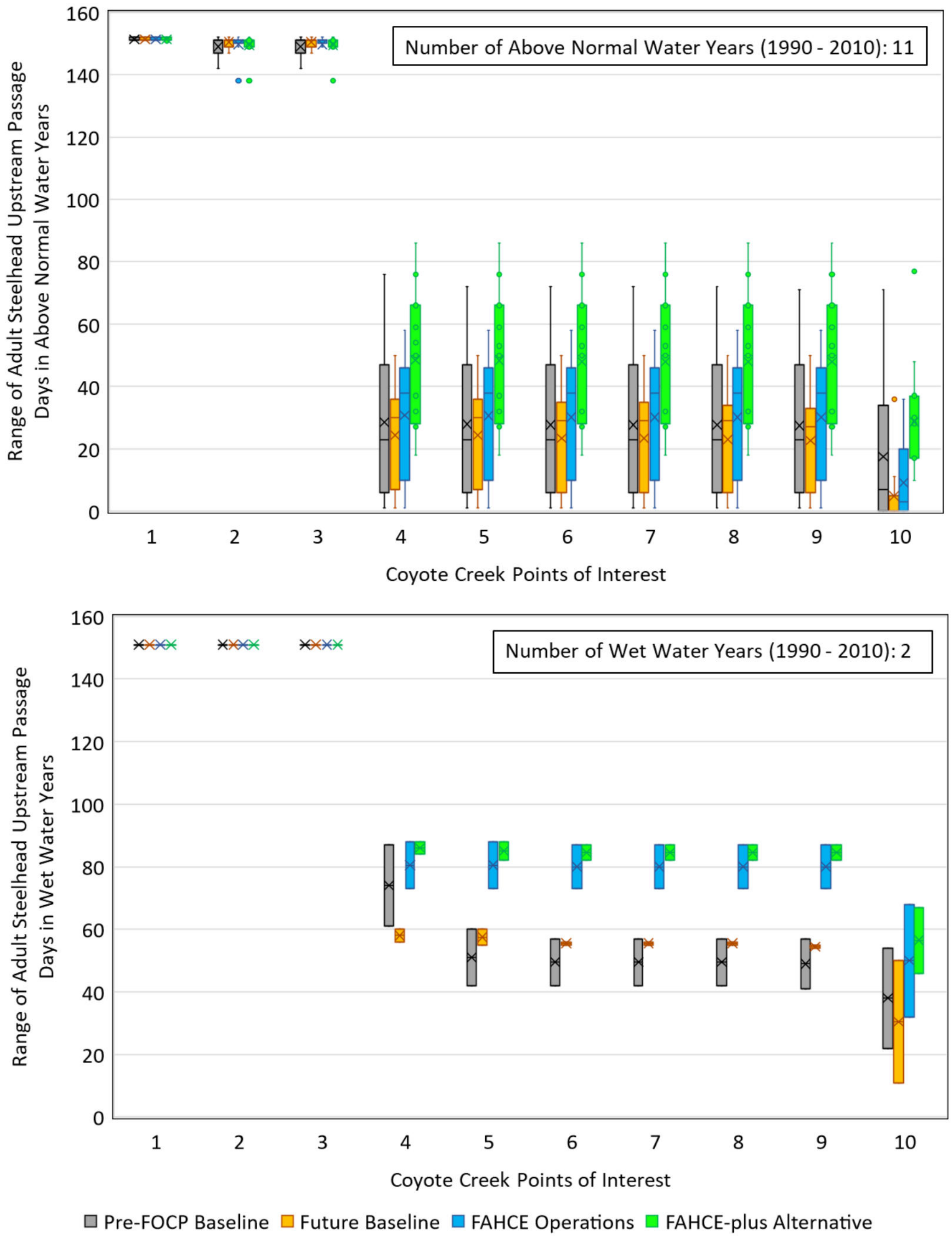


Figure 68. Adult steelhead upstream passage opportunities in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, for Above Normal (upper graph) and Wet (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers,

whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean.

Juvenile Downstream Passage

The range of juvenile steelhead downstream passage opportunities by water year type (i.e., dry, below normal, above normal, and wet water years) under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative (Figure 69).

Figure 69. Number of days per water year predicted to have suitable conditions for juvenile steelhead downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, by Coyote Creek watershed water year type. The ‘n’ indicates the number of water years of that type during the modeled time period (i.e., 1990 through 2010). Data are from Valley Water’s FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. Please note that the number of days with suitable conditions for juvenile steelhead downstream passage during the dry water (i.e., 1990) is fully characterized even though 1990 is a partial water year starting in January since the juvenile steelhead outmigration period (February - May) falls completely within the partial water year.

The range of juvenile steelhead downstream days per month by month under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative in dry and below normal water years (Figure 70).

Figure 70. Number of days per month predicted to have suitable conditions for juvenile steelhead downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative in Dry (upper graph) and Below Normal (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. The number of days with suitable conditions for juvenile steelhead downstream passage during the dry water (i.e., 1990) is fully characterized even though 1990 is a partial water year starting in January since the

juvenile steelhead outmigration period (February - May) falls completely within the partial water year.

The range of juvenile steelhead downstream days per month by month under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative in above normal and wet water years (Figure 71).

Figure 71. Number of days per month predicted to have suitable conditions for juvenile steelhead downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative in Above Normal (upper graph) and Wet (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the

first and third quartiles, the line through the box represents the median, and the X represents the mean. The FAHCE-plus Modified Alternative is expected to change the distribution of these days but totals should be similar to the modeled FAHCE-plus rule curves.

The range of days with suitable water depths for juvenile steelhead downstream passage per water year type (i.e., dry, below normal, above normal, and wet) under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative (Figure 72).

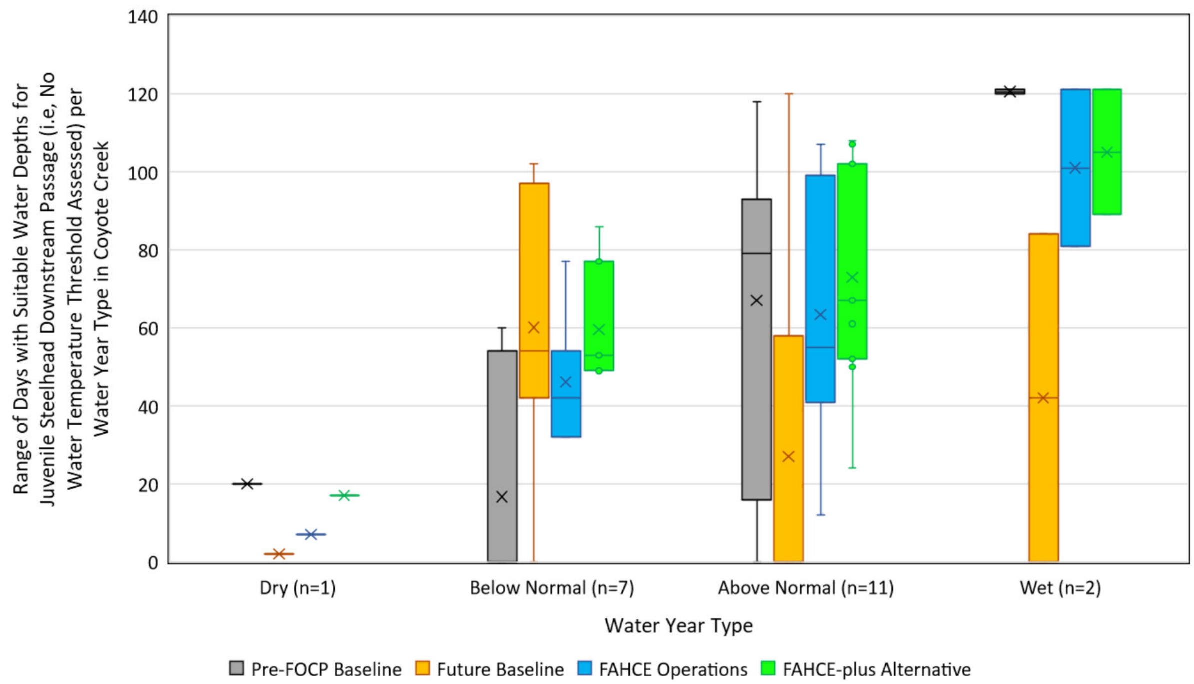


Figure 72. Number of days per water year predicted to have suitable water depths (i.e., no water temperature threshold assessed) for juvenile steelhead downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, by Coyote Creek watershed water year type. The 'n' indicates the number of water years of that type during the modeled time period (i.e., 1990 through 2010). Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. The number of days with suitable water depths for juvenile steelhead downstream passage during the dry water (i.e., 1990) is fully characterized even though 1990 is a partial water year starting in January since the juvenile steelhead outmigration period (February - May) falls completely within the partial water year.

The range of days with suitable water depths for juvenile steelhead downstream passage per month under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative in dry and below normal water years (Figure 73).

Figure 73. Number of days per month predicted to have suitable water depths (i.e., no water temperature threshold assessed) for juvenile steelhead downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative in Dry (upper graph) and Below Normal (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box

represents the median, and the X represents the mean. The number of days with suitable conditions for juvenile steelhead downstream passage during the dry water (i.e., 1990) is fully characterized even though 1990 is a partial water year starting in January since the juvenile steelhead outmigration period (February - May) falls completely within the partial water year.

The range of days with suitable water depths for juvenile steelhead downstream passage per month under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative in above normal and wet water years (Figure 74).

Figure 74. Number of days per month predicted to have suitable water depths (i.e., no water temperature threshold assessed) for juvenile steelhead downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–May evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative

in Above Normal (upper graph) and Wet (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean.

Spawning and Incubation

The amount of Chinook salmon incubation-adjusted habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 17. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within in the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 17. Central Valley Fall-Run Chinook Salmon Incubation-Adjusted Spawning Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Chinook Salmon Incubation-Adjusted Spawning Habitat [b]				
COYO 3	0	0	0	0
COYO 4	0	0	0	0
COYO 5	32	200	200	200
COYO 6	400	500	600	600
COYO 7	1,600	2,200	2,700	2,700
COYO 8	25,100	22,200	29,500	26,000
COYO 9	11,800	9,400	10,100	9,800
COYO 10	1,700	1,600	1,400	1,300
Total COYO 1–8 [c]	27,100	25,100	33,000	29,500
Total COYO 9–10 [c] (FCWMZ)	13,500	11,000	11,500	11,100
Total COYO 1–10 [c]	40,600	36,100	44,500	40,600

[a] No FAHCE WEAP model results were available for the POIs not shown.
[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

Fry Rearing

The total amount of Chinook salmon fry rearing habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 18. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 18. Central Valley Fall-Run Chinook Salmon Fry Rearing (January 1–April 30) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Chinook Salmon Fry Rearing Total (Jan 1–Apr 30) Habitat [b]				
COYO 3	57,300	59,900	58,700	54,800
COYO 4	398,100	432,200	432,300	435,200
COYO 5	293,500	285,800	288,600	296,200
COYO 6	477,800	440,200	448,300	465,800
COYO 7	959,200	866,100	884,800	924,000
COYO 8	687,800	792,900	778,200	760,600
COYO 9	164,800	164,300	165,800	169,400
COYO 10	64,500	57,300	61,700	65,600
Total COYO 1–8 [c]	2,873,700	2,877,100	2,890,900	2,936,600
Total COYO 9–10 [c] (FCWMZ)	229,300	221,600	227,500	235,000
Total COYO 1–10 [c]	3,103,000	3,098,700	3,118,400	3,171,600

[a] No FAHCE WEAP model results were available for the POIs not shown.

[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

Juvenile Rearing

The total amount of Chinook salmon juvenile rearing habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 19. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 19. Central Valley Fall-Run Chinook Salmon Juvenile Rearing Total (January 1–June 30) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Chinook Salmon Juvenile Rearing Total (Jan 1–Jun 30) Habitat [b]				
COYO 3	20,100	20,900	21,100	20,800
COYO 4	80,700	78,200	81,100	79,600
COYO 5	262,400	253,600	254,300	263,500
COYO 6	446,400	423,800	430,200	448,000
COYO 7	820,100	703,200	715,000	747,100
COYO 8	747,500	783,600	783,700	773,500
COYO 9	184,000	180,100	181,600	184,200
COYO 10	58,700	51,700	66,400	70,200
Total COYO 1–8 [c]	2,377,200	2,263,300	2,285,400	2,332,500
Total COYO 9–10 [c] (FCWMZ)	242,700	231,800	248,000	254,400
Total COYO 1–10 [c]	2,619,900	2,495,100	2,533,400	2,586,900

[a] No FAHCE WEAP model results were available for the POIs not shown.

[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

The total amount of Chinook salmon juvenile rearing Winter Base Flow Operations habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 20. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 20. Central Valley Fall-Run Chinook Salmon Juvenile Rearing Winter Base Flow Operations (January 1–April 30) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Chinook Salmon Juvenile Rearing Winter Base Flow Operations (Jan 1–Apr 30) Habitat [b]				
COYO 3	19,200	20,500	20,300	19,800
COYO 4	72,200	72,200	71,600	71,200
COYO 5	285,200	271,000	275,400	287,500
COYO 6	483,300	455,700	465,600	491,400
COYO 7	885,500	726,700	754,400	802,500
COYO 8	750,600	807,400	801,800	787,000
COYO 9	182,600	179,600	182,200	186,000
COYO 10	53,800	50,000	56,200	61,700
Total COYO 1–8 [c]	2,496,000	2,353,500	2,389,100	2,459,400
Total COYO 9–10 [c] (FCWMZ)	236,400	229,600	238,400	247,700
Total COYO 1–10 [c]	2,732,400	2,583,100	2,627,500	2,707,100

[a] No FAHCE WEAP model results were available for the POIs not shown.

[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.

[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

The total amount of Chinook salmon juvenile rearing Summer Cold Water Program habitat under the Pre-FOCP Baseline, Future Baseline, the FAHCE Operations, and FAHCE-plus Alternative is summarized in Table 21. Individual results are shown for POI COYO 3 through COYO 10, as well as the totals from within the FCWMZ (POI COYO 9 to POI COYO 10), downstream of the FCWMZ (POI COYO 1 to COYO 8), and from POI COYO 1 to COYO 10.

Table 21. Central Valley Fall-Run Chinook Salmon Juvenile Rearing Summer Cold Water Program (May 1–June 30) Habitat in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project), and the FAHCE-plus Alternative.

POI [a]	Pre-FOCP Baseline (sq ft)	Future Baseline (sq ft)	FAHCE Operations (sq ft)	FAHCE-plus Alternative (sq ft)
Chinook Salmon Juvenile Rearing Summer Cold Water Program (May 1–Jun 30) Habitat [b]				
COYO 3	21,900	21,600	22,800	22,800
COYO 4	97,600	90,000	99,900	96,300
COYO 5	217,100	219,300	212,500	215,900
COYO 6	373,300	360,500	360,000	362,000
COYO 7	690,300	656,500	636,900	637,300

COYO 8	741,500	736,300	747,900	746,800
COYO 9	186,600	181,100	180,400	180,600
COYO 10	68,500	55,200	86,900	87,100
Total COYO 1–8 [c]	2,141,700	2,084,200	2,080,000	2,081,100
Total COYO 9–10 [c] (FCWMZ)	255,100	236,300	267,300	267,700
Total COYO 1–10 [c]	2,396,800	2,320,500	2,347,300	2,348,800

[a] No FAHCE WEAP model results were available for the POIs not shown.
[b] Habitat is calculated as the FAHCE WEAP modeled average daily habitat availability averaged across the applicable life stage period. Where specified, this definition of habitat applies to the life stage period within a reservoir operation period.
[c] The total average daily habitat availability for the specified points of interest is the sum of the average daily habitat availability model results across all the specified points of interest.

Conditions for Migration

Adult Upstream Passage

The range of adult Chinook salmon upstream passage opportunities at Coyote Creek POIs under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative during all modeled water years (Figure 75).

Figure 75. Adult Chinook salmon upstream passage opportunities in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative during all modeled water years (1990–2010). Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. The FAHCE WEAP model began on January 1, 1990, so 1990 was a partial water year that only quantified

adult Chinook salmon upstream passage in January rather than the entire adult Chinook salmon migration period from October 15–January 31.

The range of adult Chinook salmon upstream passage opportunities at Coyote Creek POIs under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative for dry and below normal water years (Figure 76).

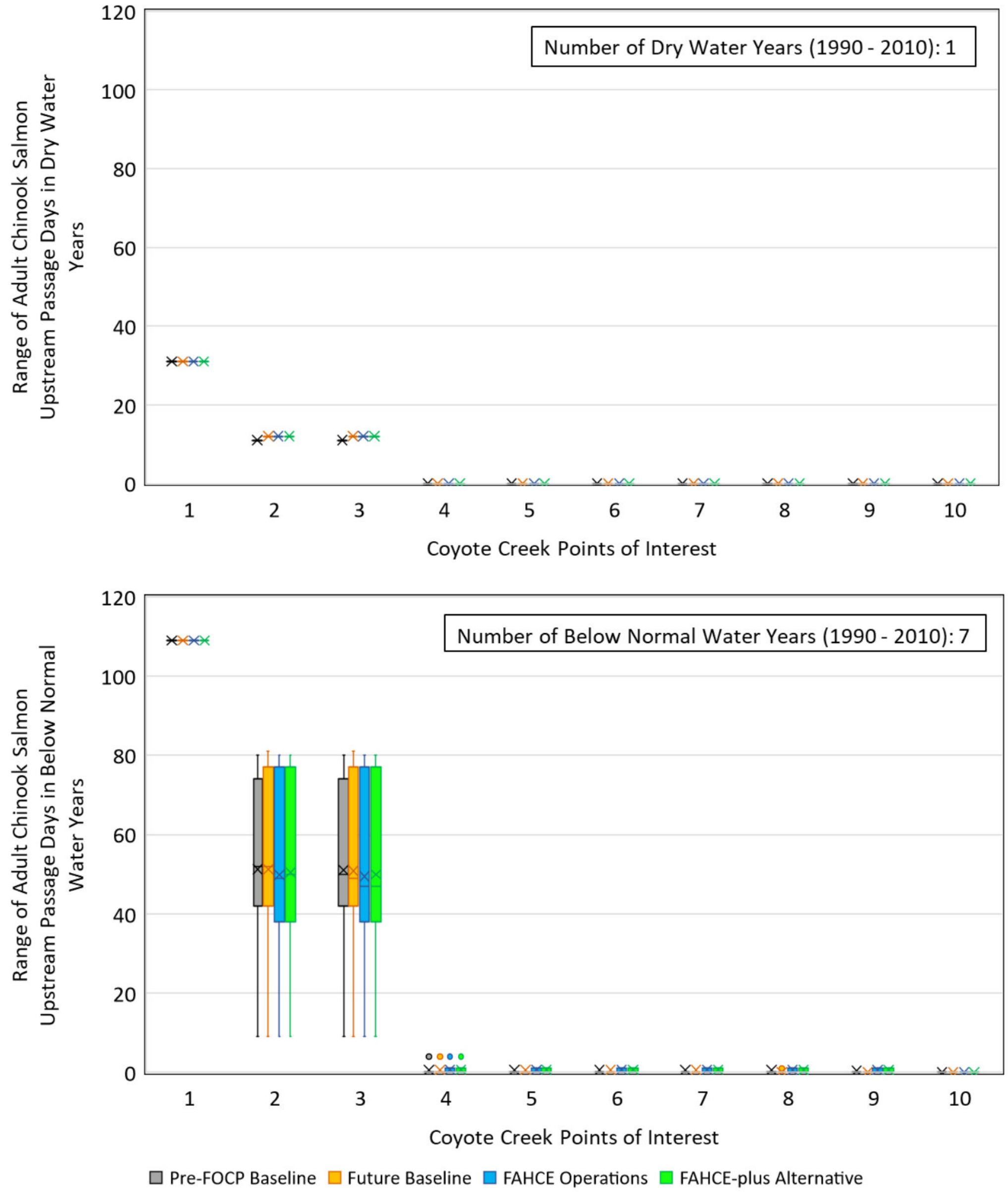


Figure 76. Adult Chinook salmon upstream passage opportunities in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, for Dry (upper graph) and Below Normal (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles,

the line through the box represents the median, and the X represents the mean. The FAHCE WEAP model began on January 1, 1990, so the dry water year (i.e., 1990) was a partial water year that only quantified adult Chinook salmon upstream passage in January rather than the entire Chinook salmon migration period from October 15 to January 31.

The range of adult Chinook salmon upstream passage opportunities at Coyote Creek POIs under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative for above normal and wet water years (Figure 77).

Figure 77. Adult Chinook salmon upstream passage opportunities in Coyote Creek under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, for Above Normal (upper graph) and Wet (lower graph) water years. Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean.

Juvenile Downstream Passage

The range of juvenile Chinook salmon downstream passage days per water year by water year type (i.e., dry, below normal, above normal, and wet water years) under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative (Figure 78).

Figure 78. Number of days per water year predicted to have suitable conditions for juvenile Chinook salmon downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–June evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, by Coyote Creek watershed water year type. The 'n' indicates the number of water years of that type during the modeled time period (i.e., 1990 through 2010). Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. The number of days with suitable conditions for juvenile Chinook salmon downstream passage during the dry water (i.e., 1990) is fully characterized even though 1990 is a partial water year starting in January since the juvenile Chinook salmon outmigration period (February - June)

falls completely within the partial water year.

The range of days with suitable water depths for juvenile Chinook salmon downstream passage by water year type (i.e., dry, below normal, above normal, and wet water years) under the Pre-FOCP Baseline, the Future Baseline, the FAHCE Operations, and the FAHCE-plus Alternative; Figure 79.

Figure 79. Number of days per water year predicted to have suitable water depths (i.e., no water temperature threshold assessed) for juvenile Chinook salmon downstream passage in Coyote Creek at all points of interest from the FCWMZ to San Francisco Bay during the February–June evaluation period for outmigration under the Pre-FOCP baseline, the Future Baseline, the FAHCE Operations (Project) and the FAHCE-plus Alternative, by Coyote Creek watershed water year type. The 'n' indicates the number of water years of that type during the modeled time period (i.e., 1990 through 2010). Data are from Valley Water's FAHCE WEAP model. Circles represent outliers, whiskers represent the range, boxes represent the first and third quartiles, the line through the box represents the median, and the X represents the mean. The number of days with suitable water depths for juvenile Chinook salmon downstream passage during the dry water (i.e., 1990) is fully characterized even though 1990 is a partial water year starting in January since the juvenile Chinook salmon outmigration period (February - June) falls completely within the partial water year.

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Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix G

Biological Resources – Rejected Special Status Plants

Appendix G

Special-status Plant Species Considered but Rejected for Occurrence in the Seismic Retrofit and Conservation Measures Project Areas

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Acanthomintha lanceolata	Santa Clara thorn-mint	Lamiaceae	March - June	CRPR 4.2	Chaparral (often serpentinite), Cismontane woodland, Coastal scrub	No	**Unlikely to Occur** – only records within surrounding quads are to the northeast at higher elevations
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	March - June	CRPR 1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland	No	**Unlikely to Occur** – only one record within surrounding quads at higher elevation near Mt. Hamilton
Androsace elongata ssp. *acuta*	California androsace	Primulaceae	March - June	CRPR 4.2	Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland	No	**Unlikely to Occur** – records in Santa Clara County are limited to the Valley floor and west of Mt. Hamilton
Arctostaphylos andersonii	Anderson's manzanita	Ericaceae	November - May	CRPR 1B.2	Broadleaved upland forest, Chaparral, North Coast coniferous forest/openings, edges	No	**Unlikely to Occur** – restricted to Santa Cruz Mountains
Azolla microphylla	Mexican mosquito fern	Azollaceae	August	CRPR 4.2	Marshes and swamps (ponds, slow water)	No	**Absent** – outside elevational range
Calandrinia breweri	Brewer's calandrinia	Montiaceae	March - June	CRPR 4.2	Chaparral, Coastal scrub/sandy or loamy, disturbed sites and burns	No	**Unlikely to Occur** – records in Santa Clara County are limited to the western side of the county
California macrophylla	round-leaved filaree	Geraniaceae	March - May	CRPR 1B.1	Cismontane woodland, Valley and foothill grassland/clay	No	**Absent** – no suitable habitat with clay soils

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Calochortus umbellatus	Oakland star-tulip	Liliaceae	March - May	CRPR 4.2	Broadleaved upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland/often serpentinite	No	**Unlikely to Occur** – records in Santa Clara County are limited to northern and western portions of the county
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypaws	Montiaceae	May - August	CRPR 1B.1	Chaparral, Cismontane woodland/sandy or gravelly, openings	No	**Absent** – outside of elevational range
Calystegia collina ssp. *venusta*	South Coast Range morning-glory	Convolvulaceae	April – June	CRPR 4.3	Chaparral, Cismontane woodland, Valley and foothill grassland/serpentinite or sedimentary	No	**Unlikely to Occur** – records in Santa Clara County are limited to the western side of the county
Ravenella exigua	chaparral harebell	Campanulaceae	May - June	CRPR 1B.2	Chaparral (rocky, usually serpentinite)	No	**Absent** – outside of elevational range
Castilleja rubicundula ssp. *rubicundula*	pink creamsacs	Orobanchaceae	April - June	CRPR 1B.2	Chaparral (openings), Cismontane woodland, Meadows and seeps, Valley and foothill grassland/ serpentinite.	No	**Unlikely to Occur** – no suitable open, mesic habitat on serpentine soils
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	Asteraceae	May – October	CRPR 1B.1	Valley and foothill grassland (alkaline)	No	**Absent** – no suitable habitat with alkaline soils
Chorizanthe pungens var. *pungens*	Monterey spineflower	Polygonaceae	April - June	FT; CRPR 1B.2	Chaparral (maritime), Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland/sandy	No	**Absent** – generally restricted to coastal areas on sandy soils
Clarkia breweri	Brewer's clarkia	Onagraceae	April - June	CRPR 4.2	Chaparral, Cismontane woodland, Coastal scrub/often serpentinite	No	**Absent** – outside of elevational range

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Clarkia concinna ssp. *automixa*	Santa Clara red ribbons	Onagraceae	May – June	CRPR 4.3	Chaparral, Cismontane woodland	No	**Absent** – only occus to the north and east at higher elevations
Cypripedium fasciculatum	clustered lady's-slipper	Orchidaceae	March - August	CRPR 4.2	Lower montane coniferous forest, North Coast coniferous forest/usually serpentinite seeps and streambanks	No	**Absent** – no suitable habitat
Delphinium californicum ssp. *interius*	Hospital Canyon larkspur	Ranunculaceae	April - June	CRPR 1B.2	Chaparral (openings), Cismontane woodland (mesic), Coastal scrub	No	**Absent** – only occurs to east at higher elevations
Eriastrum tracyi	Tracy's eriastrum	Polemoniaceae	May - July	CRPR 3.2	Chaparral, Cismontane woodland	No	**Absent** – outside elevational range
Eriogonum argillosum	clay buckwheat	Polygonaceae	March - June	CRPR 4.3	Cismontane woodland (serpentinite or clay)	No	**Absent** – outside of elevational range
Eriogonum umbellatum var. *bahiiforme*	bay buckwheat	Polygonaceae	July - September	CRPR 4.2	Cismontane woodland, Lower montane coniferous forest/rocky, often serpentinite	No	**Absent** – outside elevational range
Eriophyllum jepsonii	Jepson's woolly sunflower	Asteraceae	April – June	CRPR 4.3	Chaparral, Cismontane woodland, Coastal scrub	No	**Absent** – only occurs to the east at higher elevations
Eryngium aristulatum var. *hooveri*	Hoovers' button celery	Apiaceae	July	CRPR 1B.1	Vernal pools	No	**Absent** – no suitable habitat
Erysimum franciscanum	San Francisco wallflower	Brassicaceae	March - June	CRPR 4.2	Chaparral, Coastal dunes, Coastal scrub, Valley and foothill grassland/often serpentinite or granitic, sometimes roadsides	No	**Unlikely to Occur** – generally restricted to coastal areas

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Fritillaria agrestis	stinkbells	LIliaceae	March – June	CRPR 4.2	Chaparral, Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland/clay, sometimes serpentinite	No	**Absent** – no records in surrounding quads; only occurs to the north at higher elevations
Galium andrewsii ssp. *gatense*	phlox-leaf serpentine bedstraw	Rubiaceae	April – July	CRPR 4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest/rocky, serpentinite	No	**Absent** – no suitable habitat that has not already been surveyed
Iris longipetala	coast iris	Iridaceae	March - May	CRPR 4.2	Coastal prairie, Lower montane coniferous forest, Meadows and seeps/mesic	No	**Unlikely to Occur** – no suitable mesic habitat
Isocoma menziesii var. *diabolica*	Satan's goldenbush	Asteraceae	August - October	CRPR 4.2	Cismontane woodland	No	**Unlikely to Occur** – records in Santa Clara County are limited to northern portion of county
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	March - June	FE; CRPR 1B.1	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools/mesic	No	**Absent** – no suitable mesic/alkaline habitat
Legenere limosa	legenere	Campanulaceae	April - June	CRPR 1B.1	Vernal pools	No	**Absent** – no suitable habitat
Leptosiphon aureus	bristly leptosiphon	Polemoniaceae	April - July	CRPR 4.2	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland	No	**Unlikely to Occur** – records in Santa Clara County are limited to the western side of the county
Leptosiphon ambiguus	serpentine leptosiphon	Polemoniaceae	March – June	CRPR 4.2	Cismontane woodland, Coastal scrub, Valley and foothill grassland	No	**Absent** – no suitable habitat that has not already been surveyed

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Leptosiphon grandiflorus	large-flowered leptosiphon	Polemoniaceae	April - August	CRPR 4.2	Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland/usually sandy	No	**Absent** – no suitable habitat with sandy soils present
Leptosyne hamiltonii	Mt. Hamilton coreopsis	Asteraceae	March - May	CRPR 1B.2	Cismontane woodland (rocky)	No	**Absent** – outside elevational range
Lessingia hololeuca	wooly-headed lessingia	Asteraceae	June – October	CRPR 3	Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland (clay, serpentinite)	No	**Absent** – only one record within surrounding quads, a 1946 specimen near Gilroy
Lessingia tenuis	spring lessingia	Asteraceae	May - July	CRPR 4.3	Chaparral, Cismontane woodland, Lower montane coniferous forest/openings	No	**Absent** – outside elevational range
Lomatium observatorium	Mt. Hamilton lomatium	Apiaceae	March - May	CRPR 1B.2	Cismontane woodland	No	**Absent** – outside elevational range
Madia radiata	showy golden madia	Asteraceae	March - May	CRPR 1B.1	Cismontane woodland, Valley and foothill grassland	No	**Unlikely to Occur** – only one record within surrounding quads at higher elevation near near Mt. Hamilton
Malacothamnus aboriginum	Indian Valley bush-mallow	Malvaceae	April - October	CRPR 1B.2	Chaparral, Cismontane woodland/Burned areas, granitic, rocky	No	**Absent** – only records in Santa Clara County are 1906 and 1935 specimens from the Valley floor to the northwest

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Malacothamnus arcuatus	arcuate bush-mallow	Malvaceae	April - September	CRPR 1B.2	Chaparral, Cismontane woodland	No	**Unlikely to occur** – only record in surrounding quads is a 1937 specimen from Metcalf Road to the northwest
Malacothrix phaeocarpa	dusky-fruited malacothrix	Asteraceae	April - June	CRPR 4.3	Closed-cone coniferous forest, Chaparral/openings, burned or disturbed areas	No	**Unlikely to Occur** – only marginal habitat present, mostly restricted to the South Coast region
Meconella oregana	Oregon meconella	Papaveraceae	March - April	CRPR 1B.1	Coastal prairie, Coastal scrub	No	**Absent** – known from only five occurrences, mostly in Contra Costa County
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	March - May	CRPR 3.2	Broadleaved upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland/rocky	No	**Absent** – outside of known range
Microseris sylvatica	sylvan microseris	Asteraceae	March - June	CRPR 4.2	Chaparral, Cismontane woodland, Great Basin scrub, Pinyon and juniper woodland, Valley and foothill grassland (serpentinite)	No	**Absent** – thought to be extirpated from Santa Clara County
Navarretia cotulifolia	cotula navarretia	Polemoniaceae	May - June	CRPR 4.2	Chaparral, Cismontane woodland, Valley and foothill grassland/adobe	No	**Absent** – no suitable habitat with adobe soils
Penstemon rattanii var. *kleei*	Santa Cruz Mountains beardtongue	Plantaginaceae	May - June	CRPR 1B.2	Chaparral, Lower montane coniferous forest, North Coast coniferous forest	No	**Unlikely to Occur** – records in Santa Clara County are limited to the western side of the county

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Pentachaeta exilis ssp. *aeolica*	San Benito pentachaeta	Asteraceae	March - May	CRPR 1B.2	Cismontane woodland, Valley and foothill grassland	No	**Absent** – outside elevational range
Perideridia gairdneri ssp. *gairdneri*	Gairdner's yampah	Apiaceae	June - October	CRPR 4.2	Broadleaved upland forest, Chaparral, Coastal prairie, Valley and foothill grassland, Vernal pools/vernally mesic	No	**Absent** – outside of known range, only one record in the county in the Santa Cruz Mountains
Phacelia phacelioides	Mt. Diablo phacelia	Boraginaceae	April - May	CRPR 1B.2	Chaparral, Cismontane woodland/rocky	No	**Absent** – outside elevational range
Piperia leptopetala	narrow-petaled rein orchid	Orchidaceae	May - July	CRPR 4.3	Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest	No	**Absent** – outside of elevational range
Piperia michaelii	Michael's rein orchid	Orchidaceae	April - August	CRPR 4.2	Coastal bluff scrub, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coasta scrub, Lower montane coniferous forest	No	**Absent** – no records in surrounding quads
Plagiobothrys chorisianus var. *hickmanii*	Hickman's popcorn-flower	Boraginaceae	April - June	CRPR 4.2	Closed-cone coniferous forest, Chaparral, Coastal scrub, Marshes and swamps, Vernal pools	No	**Unlikely to Occur** – generally restricted to the western side of the Coast Ranges
Plagiobothrys glaber	hairless popcorn-flower	Boraginaceae	March - May	CRPR 1A	Meadows and seeps (alkaline), Marshes and swamps (coastal salt)	No	**Absent** – thought to be extinct
Plagiobothrys verrucosus	warty popcorn-flower	Boraginaceae	April - May	CRPR 2B.1	Chaparral/Shale	no	**Absent** – outside elevational range
Psilocarphus brevissimus var. *multiflorus*	Delta woolly-marbles	Asteraceae	May - June	CRPR 4.2	Vernal pools	No	**Absent** – no suitable habitat

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]
Sanicula saxatilis	rock sanicle	Apiaceae	April - May	CRPR 1B.2	Broadleaved upland forest, Chaparral, Valley and foothill grassland/rocky	No	**Absent** – outside elevational range
Senecio aphanactis	chaparral ragwort	Asteraceae	January - April	CRPR 2B.2	Chaparral, Cismontane woodland, Coastal scrub (sometimes alkaline)	No	**Absent** – outside of known range
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	April - August	CRPR 4.2	Broadleaved upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland/Often in disturbed areas	No	**Unlikely to Occur** – generally restricted to the western side of the Coast Ranges
Streptanthus callistus	Mt. Hamilton jewel-flower	Brassicaceae	April - May	CRPR 1B.3	Chaparral, Cismontane woodland	No	**Absent** – outside elevational range
Trifolium amoenum	two-fork clover/ showy Indian clover	Fabaceae	April - June	FE; CRPR 1B.1	Coastal bluff scrub, Valley and foothill grassland (sometimes serpentinite)	No	**Absent** – thought to be extirpated from Santa Clara County
Trifolium buckwestiorum	Santa Cruz clover	Fabaceae	April - October	CRPR 1B.1	Broadleaved upland forest, Cismontane woodland, Coastal prairie/gravelly, margins	No	**Absent** – unknown from Santa Clara County

Scientific Name	Common Name	Family	Bloom Period	Regulatory Status	Habitat	VHP Covered Species	Likelihood of Occurrence in Project Site[1]

Key to Abbreviations:
Status: California Native Plant Society California Rare Plant Rank (CRPR)
CRPR 1B = Plants rare, threatened, or endangered in California and elsewhere
CRPR 2 = Plants rare, threatened, or endangered in California but more common elsewhere
CRPR 3 = Plants about which information is needed-a review list
CRPR 4 = Plants of limited distribution-a watch list
.1 = seriously endangered in California
.2 = fairly endangered in California
.3 = not very endangered in California

Footnotes:
[1] Likelihood of Occurrence in the Project Site:
Absent – suitable habitat conditions for the species are not present within the Project site (and the species was unrecorded during protocol-level rare plant surveys)
Unlikely to Occur – habitat conditions are not favorable, resulting in a very low initial probability of occurrence within Project site; all these species were unrecorded during protocol-level rare plant surveys

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix H

Cultural Resources Technical Appendix (Confidential)

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix I

Historic Resources Technical Appendix

HISTORIC RESOURCES INVENTORY AND EVALUATION REPORT

for the

Anderson Dam Seismic Retrofit Project

(Project No. 91864005)

Santa Clara County, California

Prepared For:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Prepared By:

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May 2014

SUMMARY OF FINDINGS

The Santa Clara Valley Water District (District) is proposing a seismic retrofit of the Anderson Dam. The dam is a rockfill embankment structure built in 1950 in Santa Clara County near the eastern boundary of the city of Morgan Hill. The major components of the project are dam embankment remediation, dam crest raise and spillway increase, intake and outlet works construction, borrow areas mining, and spoils disposal. See **Appendix A**, **Figure 1** and **Figure 2** for vicinity and project location maps, and **Figure 3** for the Area of Potential Effects (APE) map.

JRP Historical Consulting, LLC (JRP) prepared this Historic Resources Inventory and Evaluation Report (HRIER) under contract with Far Western Anthropological Research Group, Inc. (Far Western) as part of the environmental compliance for this project. The purpose of this document is to assist with project compliance under National Historic Preservation Act (NHPA) Section 106 and the implementing regulations of the Advisory Council on Historic Preservation (Title 36 Code of Federal Regulations Part 800) as these pertain to federally funded undertakings and their effects on historic properties, i.e., properties listed in or eligible for listing in the National Register of Historic Places (NRHP). This document also is prepared for project compliance with the California Environmental Quality Act (CEQA) as it pertains to historical resources (CEQA Guidelines Section 15064.5). The Federal Energy Regulatory Commission (FERC) is the lead agency for the federal undertaking under the NHPA and for project compliance with the National Environmental Policy Act (NEPA) and District is the lead agency for project compliance under CEQA.

Three historic-era resources are in the APE: the Anderson Dam, the Rhoades Ranch complex at 2290 Cochrane Road (Assessor Parcel Number [APN] 728-34-010), and a single family residence at 2390 Cochrane Road (APN 728-34-011). In 2006, JRP surveyed and evaluated Anderson Dam, concluding it was not eligible for the NRHP and California Register of Historic Resources (CRHR). In 2010, Archives and Architecture, LLC surveyed and evaluated the Rhoades Ranch and found it met Santa Clara County's criteria for historical significance under its Historic Preservation Ordinance (Division C17, Santa Clara County Code) and the property was declared a county Designated Landmark in 2011 (CL11-001). The Rhoades Ranch was also nominated to the NRHP in 2012 and listed on April 7, 2013 as a historic district.[1] The Rhoades Ranch is considered a historic property for purposes of Section 106 and a historical resource for CEQA compliance. Because both the Anderson Dam and Rhoades Ranch were recently surveyed and evaluated, JRP did not re-record these properties for the present study. The third property in the APE is 2390 Cochrane Road. This property is not listed in the NRHP, has not been previously determined eligible for listing in the NRHP or CRHR, has not been previously evaluated for the NRHP or CRHR, and has no local or county historic resource status. This

[1] JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006; Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, listed April 17, 2013, NRIS Reference No. 13000158.

report concludes that the property at 2390 Cochrane Road does not appear to meet the criteria for listing in NRHP or the CRHR. See the Department of Parks and Recreation (DPR) 523 form in **Appendix B** for the recordation and evaluation of this resource.

TABLE OF CONTENTS

APPENDICES

1 PROJECT DESCRIPTION[2]

The Anderson Dam and Reservoir is owned and operated by the Santa Clara Valley Water District (District). In 2011, the District conducted a seismic stability evaluation that identified potential embankment instability as a result of seismic shaking and liquefaction. As a result of this evaluation, the proposed Anderson Dam Seismic Retrofit Project (Project) was initiated. Other deficiencies associated with seismic shaking, fault offset, flood capacity, and emergency drawdown capabilities were identified between 2008 and 2012. These deficiencies include:

- The presence of liquefiable materials in the embankment and foundation of the dam that could result in major slumping and failure of the embankment following a future large earthquake,
- The presence of conditionally active faults in the foundation that could rupture the existing low level outlet,
- A spillway that is inadequate to safely pass large floods, and
- Limitations in being able to quickly draw down the reservoir during floods or other emergency events.

The Project consists of construction activities associated with remedying these seismic, flood capacity, and reservoir drawdown deficiencies at Anderson Dam. The Project is being conducted by the District in coordination with resource agencies, stakeholders, and the public. The District has established a target date of December 31, 2018 for the completion of all necessary remedial work to correct the identified deficiencies.

As the lead agency responsible for compliance with the California Environmental Quality Act (CEQA), the District has determined that the Project is a “project” for the purposes of CEQA (pursuant to CEQA Guidelines §15378), and would have the potential to result in significant environmental effects. Accordingly, the District will be preparing an Environmental Impact Report (EIR) for the Project (CEQA Guidelines §15064).

The proposed Project includes the following elements to retrofit Anderson Dam:

- Dam Embankment Remediation
- Dam Crest Raise and Spillway Capacity Increase
- Intake and Outlet Works Construction
- Borrow Areas Mining
- Spoils Disposal

[2] This project description is derived from the Anderson Dam Seismic Retrofit Project Initial Study dated August 2013, provided by the District.

2 RESEARCH AND FIELD METHODS

JRP conducted research and prepared a historic context statement addressing themes relevant to the historic-era resource within the APE. Research was conducted at the San Jose Public Library, Dr. Martin Luther King, Jr. Branch; Santa Clara County Recorder; and Santa Clara County Building Department. JRP obtained additional materials from its in-office library and online. Far Western conducted a record search for this project at the Northwest Information Center of the California Historical Resources Information System at Sonoma State University and shared the results with JRP as they pertained to historic resources. The records search identified the Phegley House (CA-SCL-323-H; P-43-000171) and the Rhoades House (CA-SCL-324-H; P-43-000171) as being previously recorded on archaeological site survey records in 1978 as part of an archeological survey. This survey did not evaluate these two resources for historical significance. Information regarding the historical status of the Rhoades Ranch was obtained by JRP via communications with the Santa Clara County Historical Heritage Coordinator. The Coordinator transmitted documentation of the Rhoades Ranch 2010 evaluation and subsequent designation as a county historic landmark. The property was then nominated and listed in the NRHP in 2013. JRP also reviewed its own previous studies and located a survey and evaluated report of the Anderson Dam and appurtenant structures from 2006. This 2006 report concluded that the property was not eligible for the NRHP and CRHR. A thorough discussion of these previous studies is in Section 5.3. In addition, JRP reviewed the National Park Service's National Register Information System online database; California Office of Historic Preservation, Directory of Properties in the Historic Property Data File for Santa Clara County; California Office of Historic Preservation, *California Inventory of Historic Resources* which includes resources on the California Register, State Historical Landmarks, and Points of Historical Interest; and the Santa Clara County Historical Resources list.[3] JRP conducted fieldwork at the project site on October 2, 2013, photographing and recording the properties in the APE.

The District has conducted various public outreach efforts for this Project that included historic resources. The District initiated scoping for this project by distributing the Notice of Preparation in August 2013 to federal and state agencies, regional and local land trusts, departmental agencies in Santa Clara County, City of Morgan Hill and City of San Jose,

[3] National Park Service, National Register Information System, online database: http://nrhp.focus.nps.gov/natreg/docs/Download.html (accessed April 2013); Office of Historic Preservation, *California Historical Resources*, Available at http://ohp.parks.ca.gov/ListedResources/?view=county&criteria=17, Accessed April 2012; Northwest Information Center, Sonoma State University conducted by Far Western, Information Center Response File No. 13-0537, November 5, 2013.

private property owners, and environmental interest groups for review and comment. The public review period ended September 25, 2013.[4]

On August 26, 2013, the District held an open public scoping meeting for the proposed Project at the Morgan Hill Community and Cultural Center. Approximately 50 people attended the meeting. An attendee posed a question regarding the potential moving of historic properties as a result of the proposed Project. The District responded that the possible realignment of Cochrane Road could result in the moving or removal of some buildings, including some that have “nationally historic designations.” The District indicated it was discussing the issue with the owners of the property.[5]

The District held a second meeting at District Headquarters in San Jose on September 5, 2013 for representatives of various local, state and federal agencies. According to the sign-in sheet, representatives from the following agencies attended the meeting: Santa Clara County Parks, and Santa Clara County Department of Planning and Development. Those attending did not have any comments or questions regarding historic resources.[6]

In addition to comments made during these meetings, the District received letters and email regarding the proposed Project. Among these was an August 28, 2013 email from Joe and Sheila Giancola, the current owners of property at 2290 Cochrane Road, the former Rhoades Ranch. The letter expressed concern that their property, as a local, state, and national historic resource, would be compromised by the Project and urged the District consider the impacts of the Project on their property. The Giancolas suggested the District notify the Santa Clara County Historical Heritage Commission, National Park Service, Secretary of the Interior, and Morgan Hill Historical Society, and that the District consider alternatives that would limit impacts to their property. The letter expressed concern that the proposed Project would “cause substantial adverse changes in the significance and or damage to the historical buildings on the property.”[7]

Among the agencies providing comments was the Santa Clara County Department of Planning and Development, Planning Office. Ignacio Gonzalez, Director of the Santa Clara County Department of Planning and Development sent a letter to the District on September 18, 2013.

[4] Santa Clara Valley Water District, “Anderson Dam Seismic Retrofit Project, Scoping Summary Report,” October 2013, 3-6.

[5] Santa Clara Valley Water District, Anderson Dam Seismic Retrofit Project, EIR Scoping Meeting – Draft Notes, August 26, 2013, Attachment to “Anderson Dam Seismic Retrofit Project, Scoping Summary Report,” October 2013.

[6] Santa Clara Valley Water District, Anderson Dam Seismic Retrofit Project, Sign-in Sheet and Special Agency Scoping Meeting – Draft Notes, September 5, 2013, Attachment to “Anderson Dam Seismic Retrofit Project, Scoping Summary Report,” October 2013.

[7] Joe and Sheila Giancola to Kurt Luenenburger, Santa Clara Valley Water District, August 28, 2013, Attachment to “Anderson Dam Seismic Retrofit Project, Scoping Summary Report,” October 2013.

Regarding historic resources, Gonzalez noted that the Project proposes to use the property at 2290 Cochrane Road as a staging area and may require acquisition of a portion of this property for the realignment of Cochrane Road. Gonzalez raised the point that 2290 Cochrane Road was listed in the NRHP, CRHR, and was a designated Santa Clara County Landmark. As such, the proposed Project would require a Landmark Alteration Permit for the proposed work on this property and a "formal architectural/historic evaluation should be prepared" to identify impacts of the proposed project on this historic resource. Gonzalez also noted that under CEQA Section 5020.1, the EIR should evaluate all possible alternatives to avoid a substantial adverse impact to the historical resource. The letter suggested the District contact Priya Cherukuru, the Historical Heritage Coordinator of Santa Clara County. Cherukuru also received a copy of the letter.[8]

No specific letter to interested parties was sent during preparation of this report.

The historic context is presented in Section 3, resource description in Sections 4, and historical significance evaluation of the property in Section 5. Analysis regarding project effects and impacts to historic resources is in Section 6. Refer to Section 7 for preparers' qualifications and to Section 8 for the bibliography.

[8] Ignacio Gonzalez, Director of the Santa Clara County Department of Planning and Development to Kurt Luenenburger, Santa Clara Valley Water District, September 18, 2013, Attachment to "Anderson Dam Seismic Retrofit Project, Scoping Summary Report," October 2013.

3 HISTORICAL OVERVIEW

The following historic overview provides background and context for the historic-era properties in the APE. The APE includes Anderson Dam and two properties on Cochrane Road in southern Santa Clara County immediately east of Morgan Hill. Anderson Dam, built in 1950, impounds water of Coyote Creek to create Anderson Lake. The property at 2290 Cochrane Road, first developed in the 1860s, is a former ranch complex and strawberry horticulture development farm. The adjacent property at 2390 Cochrane Road, built in 1951, is a single family residence on a small parcel that was once part of the 2290 Cochrane Road property. While this section provides background and context for all these built environment resources, it focuses most on the property at 2390 Cochrane Road because it is the single property in the APE that requires evaluation.

3.1 Early Settlement and Agricultural Development of Southern Santa Clara County

The APE is located in a part of Santa Clara County that was first settled in the 1830s with the granting of the 20,052-acre Rancho Refugio de la Laguna Seca to Juan Alvires in 1834 and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The APE is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants, these two vast ranchos were operated as cattle ranches. American settlers began to arrive in the Morgan Hill area in the late 1840s and early 1850s. Among the most notable in this region were Martin Murphy, Sr., Charles Weber, William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction and Martin Murphy, Sr. purchased Rancho Ojo de Agua de la Coche about the same time. Fisher died in 1850 and the land, which includes the current APE, passed to his wife, Liberta Cesena Fisher.[9]

Large landowners in the early period of American settlement such as Fisher and Murphy initially continued with the practice of cattle grazing on their ranches. Other agricultural endeavors included sheep ranching, dairying, and general farming. Sheep ranches and dairy farming were particularly prevalent in southern Santa Clara County. Stock raising continued to be the primary economic activity in Santa Clara County until the drought of 1864, which decimated the herds and caused financial ruin to many ranchers.[10]

[9] Archives and Architecture, LLC, “County of Santa Clara Historic Context Statement,” prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, “Historic Context Statement for the City of Morgan Hill,” prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[10] Archives and Architecture, LLC, “County of Santa Clara Historic Context Statement,” 37-38.

The 1864 drought propelled wheat cultivation to the fore of agricultural pursuits in the Santa Clara Valley. Wheat had been grown in this area since the 1850s and its acreage grew with each year. The easy cultivation and high fertility of the soil of the valley facilitated wheat production with little capital investment. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop. During the 1860s, this popular crop surpassed cattle ranching as the principal agricultural activity in the valley and by 1870, nearly all acreage in the rural areas of Santa Clara County was devoted to wheat and barley production. While wheat supplanted cattle ranching in the valley, some large stock ranches continued to operate in the outlying areas of the county such as in the eastern foothills, including the vicinity of the APE, and southwest of Gilroy. The largest of these ranches in the region were owned by the C. M. Weber estate, Henry W. and Charles Coe, Horace Willson, J. P. Sargent, and Henry Miller.[11]

Wheat's primacy began to wane around 1880, however, as farmers experienced poor yields and competition increased from Central Valley growers. Santa Clara County farmers responded by adopting a diversified farming approach, raising dairy cows, sheep, poultry, swine, hay, grapes, and fruit trees in an attempt to protect themselves during bad crop years in the 1870s and 1880s.[12]

The falling off of wheat opened the door for what would be the mainstay of Santa Clara Valley agriculture for decades to come: horticulture. Orchards had been planted during the Mexican and early American periods in the northern valley, but these were on a very small scale and generally for personal use. In 1856, the first experimental orchards were set out in the Willow Glen area and in the wake of their success, more extensive orchards were planted during the 1860s.[13]

In this early period of horticultural development in the Santa Clara Valley, French prunes were the first successful commercial orchard crop. This particular variety of plum had a low moisture content making it ideal for drying and a highly marketable crop that could be shipped long distances. Prunes became widely grown throughout the Santa Clara Valley and farmers also began to plant other stone fruit crops as orchard crops became recognized as a profitable enterprise. In addition to prunes, other widely planted orchard crops were apricots, peaches, and cherries, all irrigated with ground water and small-scale stream diversions. Because refrigerated shipping had not yet been developed, most of the fruit grown in the valley was dried. The completion of the Santa Clara & Pajaro Valley Railroad (which became part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 opened the large eastern US

[11] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 12, 13.
[12] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60.
[13] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 60.

market for Santa Clara Valley fruit via the newly completed transcontinental railroad, and further propelled the expansion of the horticultural industry in the 1870s and 1880s. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm produced enough income to support a family. By 1890, the transition to horticultural spread to every part of the county where irrigation water was available (Error! Reference source not found.).[14]

Photograph 1. Prune orchards near Morgan Hill ca. 1910. Photo courtesy of San Jose Public Library.

Fruit production continued to grow into the twentieth century. With the introduction of refrigerated rail cars, shipment of fresh fruit also became possible. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. At this time prunes were still the most popular tree fruit crops followed in order by apricots, peaches, and cherries. In the early twentieth century, the properties in the APE also switched from cattle ranching to tree fruit and nut production. Horticulture remained the principal agricultural industry in the Santa Clara Valley in succeeding decades, aided by the groundwater development projects of the Santa Clara Valley

[14] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53.

Water District and its construction of dams, as discussed below, which ensured sufficient water for irrigation.[15]

While many of the smaller farms were devoted to fruit production, some large farms persisted at the edge of the valley and in southern Santa Clara County. These operations continued to practice diversified farming strategies growing a wide range of crops and stock such as fruit orchards, vineyards, hay, grain, dairy cows, pigs, and poultry. In area around Morgan Hill and Madrone, cattle ranching and poultry farms continued on a very limited basis into the middle of the twentieth century. Many of the commercial poultry hatcheries were small and family owned and operated. Some large cattle ranches still operated as well including the Pine Ridge Ranch, east of the APE, owned and run by Henry and Charles Coe, and the Miller and Lux Company.[16]

3.2 Development of the Morgan Hill Area

The earliest communities in the Morgan Hill area began as stage stops along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill was Madrone, located about two miles southwest of the APE. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. A railroad station was not established at Morgan Hill until 1893.[17]

Subdivision of the large ranches in the Morgan Hill area began to occur in the 1890s. The lucrative orchard crops caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. Surveyor C.H. Phillips worked with local landowners to subdivide nearly all of the ranchland between Madrone and Gilroy. Phillips was well connected with the Southern Pacific Railroad and worked with the railroad to bring settlers to this area. Phillips subdivided more 40,000 acres including the town of Morgan Hill. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from town lots in Morgan Hill of one-half acre to ranging from five to 100 or more acres. Lots along Monterey Road sold off fairly quickly, while tracts further away were slower to sell. It was following this subdivision of the large

[15] Stephen Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53.
[16] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51.
[17] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 32, 33.

ranches that the shift from raising cattle and grain to horticulture occurred in this part of the valley (Error! Reference source not found.).[18]

Photograph 2. Morgan Hill ca. 1905 with train passing. Photo courtesy of San Jose Public Library.

Following the founding of Morgan Hill, the importance of Madrone as the regional shipping center declined as Morgan Hill took over as the main rail depot. Fruit dehydrators, canning and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[19]

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area was able to retain its rural character for a longer period (**Illustration 1**). It was far from the population growth of the San Jose region and did not experience the same growth pressures. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and US101 was built as a freeway bypassing the downtown area, which made it easier for this area to become a bedroom community to San Jose. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation

[18] Circa: Historic Property Development, “Historic Context Statement for the City of Morgan Hill,” 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 16.
[19] Circa: Historic Property Development, “Historic Context Statement for the City of Morgan Hill,” 36-38.

of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill towards the vicinity of Anderson Dam further altering the once rural and agricultural character of the area.[20]

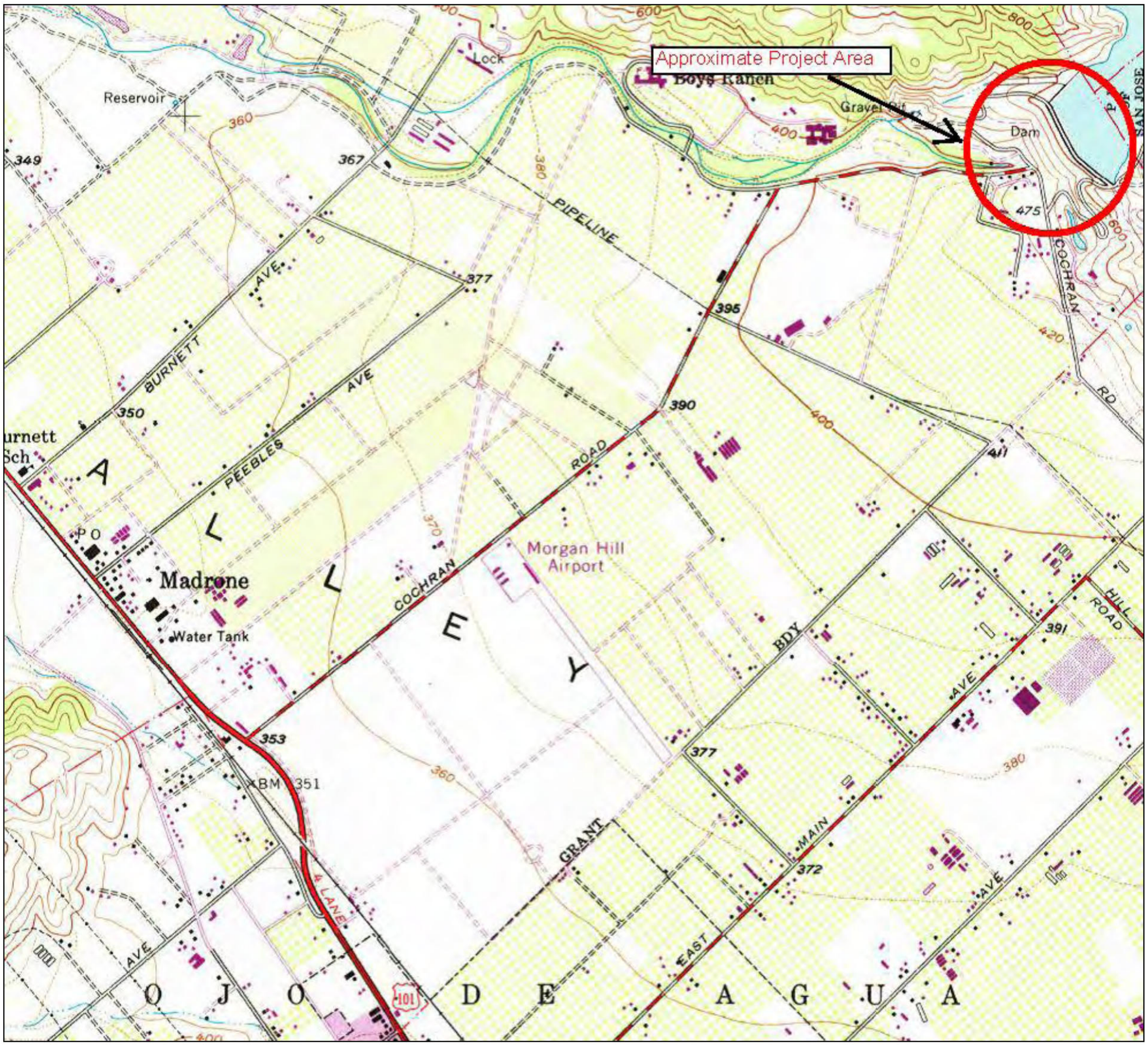

Illustration 1. USGS *Morgan Hill Quadrangle* from 1968 shows much of the area in the vicinity of the APE (circled) still in orchards. This image illustrates the Morgan Hill area before US101 freeway was constructed.

[20] USGS, *Morgan Hill Quadrangle,* 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

3.3 Construction of Anderson Dam[21]

Development of agriculture in the Santa Clara Valley relied on available groundwater and until around 1900 groundwater levels were sufficiently high that farmers irrigated from artesian wells. However, by 1915 a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67 percent of the area under irrigation, and the population of its urban centers was on the rise. Demand both by agriculture and domestic uses continued to rise and by 1930 the groundwater table had dropped to alarming levels leading to valley leaders and local engineers to seek a means to replenish the lowering ground water table.[22]

During the 1920s hydraulic engineers Fred H. Tibbetts and his partner, Stephen Kieffer, undertook a study of the valley's water problems and proposed a system of dams and conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters defeated establishment of a water conservation district in 1927 and 1928, voters approved the measure to establish Santa Clara Valley Water Conservation District (SCVWCD, now Santa Clara Valley Water District) in 1929 when water levels in local wells fell below 100 feet.[23]

By 1934, SCVWCD's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge. The original main storage dams were Calero, Almaden, Guadalupe, Vasona and Stevens Creek, built in 1935, and Coyote Reservoir, finished in 1936. Coyote Percolation Dam was also built at this time. Almaden and Calero were connected by the Almaden-Calero Canal, which shunted water from the relatively wet Almaden basin into the larger storage capacity

[21] This section is derived from: JRP Historical Consulting, LLC, JRP Historical Consulting, LLC, "Historic Resources Report, Santa Clara Valley Water District Dams," Prepared for Santa Clara Valley Water District, 2006.

[22] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934, passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.

[23] ASCE. *Historic Civil Engineering Landmarks,* 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," 6-10, January 31, 1936, Water Resources Center Archives(WRCA).

afforded by Calero Reservoir.[24] SCVWCD awarded construction contracts for the dams to several companies, following passage of a bond approved by SCVWCD voters and after receiving funds from the federal Public Works Administration.[25] SCVWCD's dams, as a system, conserved run-off and stored rainfall, which regulated the flow of water to respective creeks at a rate that was intended to give maximum absorption in gravel percolation areas downstream.[26] With construction of the dams, and the downstream features in the creek beds to improve percolation, it was not long before the dams began to store water and improve groundwater conditions. In 1937, groundwater levels reached 131 feet below the surface, whereas twenty years earlier it was only 56 feet. By 1943 the groundwater level in the valley returned to the average level of the 1920s (50 feet).[27]

The system of dams and reservoirs operated successfully into the following decade, but increased urbanization, wartime industrial requirements, and year-round irrigation in the Santa Clara Valley created greater demand for water. As a result, SCVWCD built Anderson Dam in 1950 and Lexington Dam in 1952 to augment the existing water conservation system (Error! Reference source not found.**3** and Error! Reference source not found.**4**).[28] The Anderson Dam is constructed across Coyote Creek where it emerges from a steep canyon in the Coast Range and into the Santa Clara Valley (Error! Reference source not found.**5**). From the dam Coyote Creek flows generally north into San Francisco Bay. In additions to the dam SCVWCD built a few small associated buildings: an outlet valve building, instrument building, and public restroom.

[24] ASCE. *Historic Civil Engineering Landmarks*. 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; *San Jose Mercury Herald*, November 17, 1934, December 15, 1934.
[25] *San Jose Mercury Herald*, December 15, 1934.
[26] *San Jose Mercury Herald*, November 17, 1934.
[27] ASCE. *Historic Civil Engineering Landmarks*. 28.
[28] California History Center, *Water in Santa Clara Valley*, passim.

Photograph 3. Anderson Dam under construction, 2290 and 2390 Cochrane Road are at the right-center of the photo, camera facing southeast.[29]

Photograph 4. Anderson Dam under construction, 2290 and 2390 Cochrane Road are at the bottom-center of the photo, camera facing northeast.[30]

[29] Photograph from the District Archives.
[30] Photograph from the District Archives.

Photograph 5. View from top of Anderson Dam, 2290 and 2390 Cochrane Road are in the center left of the photo. The buildings on these parcels are obscured by trees, camera facing southwest, October 2, 2013.

3.4 Strawberry Institute and the Property at 2390 Cochrane Road

The one-acre property at 2390 Cochrane Road is situated at the bend in Cochrane Road adjacent to the foot of Anderson Dam. This property, along with the adjacent property at 2290 Cochrane Road, was originally part of Rancho Refugio de la Laguna Seca bought by William Fisher in the 1840s. After Fisher's death in 1850, his wife, Liberta Cesena Fisher began selling off sections of the 19,997-acre ranch. By the 1860s, Alvora Cottle bought a 300-acre tract inclusive of the current properties at 2290 and 2390 Cochrane Road and appears to have built a house on the property and engaged in farming. After a few intervening transactions, D. Phegley acquired 188 acres of this land and operated it as a cattle ranch. Phegley sold the land in the 1890s, and following conveyances to several short-term owners, I.O. Rhoades bought the property in 1911, which by then had been reduced 160 acres. Rhoades was a railroad purchasing agent for Southern Pacific and converted the property to an orchard farm with prunes, apricots and walnuts.[31]

I.O. Rhoades transferred ownership of the land to his son, William, in 1920 and they cooperatively ran the ranch during the 1920s until I.O. Rhoades moved to southern California. William continued to operate the ranch and expanded its orchard land. He died in 1935 and in

[31] Urban Programmers, "Historical and Architectural Evaluation for the Parcel Located at 2280 Cochrane Road, Morgan Hill, California," April 10, 2012, 12; Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012.

1945, his widow Katherine Garnett Rhoades sold 14.31 acres, inclusive of 2290 and 2390 Cochrane Road, to Harold E. Thomas. The remaining 145-acre tract was sold to Sebastian and Luigia Borello that same year, which today is known as Borello Farms, situated immediately west and south of the APE.[32]

Harold E. Thomas was a plant pathologist and conducted pioneering research in strawberry propagation. He was a professor of plant pathology at the University of California from 1928 to 1945 and established the Strawberry Institute of California on the Rhoades property immediately after acquiring the ranch. Strawberry grower E. F. Driscoll established the Strawberry Institute in 1944 as a non-profit to assist the growers belonging to Driscoll Strawberry Associates.[33]

Called the “Father of the California Strawberry Industry,” Thomas obtained his PhD in 1928 from the University of California and continued to conducted research at the university on deciduous orchard tree root diseases and strawberry diseases. Thomas worked with the University of California Deciduous Fruit Field Station in Santa Clara and began strawberry breeding programs using wild strawberries to create disease-resistant varieties. In 1935, a field station employee, Earl V. Goldsmith became his research assistant. While with the University of California in the 1930s and 40s, Thomas' major contributions were the development of disease-resistant strawberry varieties. His work is published in University of California Agriculture Extension Circular No. 113 “Production of Strawberries in California,” and Bulletin No. 690, “The Shasta, Sierra, Lassen, Tahoe, and Donner Strawberries,” published in conjunction with Goldsmith. These two publications changed the character and scope of strawberry production in California and opened the potential of strawberries as a fresh market fruit. In 1945, the University introduced five new varieties of strawberries resulting from Thomas' and Goldsmith's work that were relatively virus-free and were far more vigorous than existing varieties. Two of these—the Shasta and Lassen—became prominent commercial varieties in the US.[34]

When Thomas acquired the land on Cochrane Road, he embarked upon a research program that rose to prominence in applied research and development of strawberry cultivars unrivaled in beauty and quality anywhere else in the world. The Strawberry Institute sought to solve disease, insect, variety, and other problems in strawberry production, and also furnished

[32] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012; Franklin Maggi and Leslie Masunaga, Archives and Architecture, LLC, California DPR 523 form, Rhoades Ranch, October 14, 2010.

[33] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012; Franklin Maggi and Leslie Masunaga, Archives and Architecture, LLC, California DPR 523 form, Rhoades Ranch, October 14, 2010.

[34] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012; Franklin Maggi and Leslie Masunaga, Archives and Architecture, LLC, California DPR 523 form, Rhoades Ranch, October 14, 2010.

disease-free stock to the grower members. In 1959 a for-profit corporation (Strawberry Institute Nursery), founded by Thomas, was established to separate the plant propagating work from the strictly service work of the Institute. In 1962, Institute members had about 1,600 acres in production. In 1966, the Strawberry Institute merged with Driscoll Strawberry Associates, Incorporated, which Thomas also directed for another ten years.[35]

During the era of the Strawberry Institute, several buildings were built on the former Rhoades Ranch including an office, three houses, an equipment building and several sheds. One of those houses is the study property at 2390 Cochrane Road. It was built in 1951 during the period in which the Strawberry Institute operated on the property. Thomas resided in the former Rhoades house at 2290 Cochrane Road and the house at 2390 Cochrane Road appears to have been built as a secondary residence along with other buildings and structures on the property constructed during the late 1940s and 1950s. It is not known who lived in the residence at 2390 Cochrane Road immediately following construction. By 1964, Robert M. Coyle resided in the house, renting it from Thomas. Coyle was not associated with the Strawberry Institute and was the principal of the Live Oak Union High School in Morgan Hill. In 1965, the current one-acre parcel that is 2390 Cochrane Road was subdivided from Thomas / Strawberry Institute property and sold to Robert M. Coyle and his wife Frances Jane Coyle on February 1, 1966. Coyle and his wife appear to have continued to live in this house until the 1970s. It is not known who occupied the house thereafter. Frances Jane Coyle has remained the owner of the property.[36]

[35] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012; Franklin Maggi and Leslie Masunaga, Archives and Architecture, LLC, California DPR 523 form, Rhoades Ranch, October 14, 2010.

[36] Santa Clara County Assessor, Property Information for 2390 Cochrane Road, Accessed via CoreLogic Real Estate Database; Franklin Maggi and Leslie Masunaga, Archives and Architecture, LLC, California DPR 523 form, Rhoades Ranch, October 14, 2010; Santa Clara County Recorder, Deed, Harold E. Thomas to Robert M. Coyle and Frances Jane Coyle, dated February 1, 1966, recorded February 2, 1966, OR:7269:130; R.L. Polk & Co., *Gilroy City Directory* (San Francisco: R.L. Polk & Co., 1964, 1967, 1971, 1979).

4 DESCRIPTION OF RESOURCES

This section provides a written description and photographs of resources in the APE. See the attached DPR 523 forms and National Register Registration Form in **Appendix B** for complete descriptions and additional photographs.

2390 Cochrane Road

The single family residence at 2390 Cochrane Road is situated on a sloping one acre parcel with Cochrane Road wrapping around its north and east sides. It is a wood-frame, single-story building with a medium pitched cross-gable roof covered in composition shingles. On the north end, the ground slopes down and the basement is finished into a living area (Error! Reference source not found.**6**). The exterior is sheathed in a combination drop, medium-width horizontal, and wide-width horizontal wood siding. The main entry door is located on the east side and is covered by a screen door. Additional entries are located basement level and a sliding glass door is on the west side. A cantilevered porch is on the northeast corner of the residence, the north end of which is enclosed. The house contains a wide array of window types: six-over-six and one-over-one wood frame windows, three-light wood casement windows and two-part aluminum framed horizontal sliding and casement windows. The house appears to have multiple additions. The parcel is surrounded on the south and west by the adjacent property that includes nearby buildings.

Photograph 6. Residence at 2390 Cochrane Road, camera facing southeast, October 2, 2013.

2290 Cochrane Road [37]

This 12-acre property is a ranch complex including four houses, a barn, an agricultural equipment building, remnants of a water tank, and other small ancillary buildings. The oldest house on the property is known as the Phegley House, built in the 1860s (Error! Reference source not found.**7**). It is a two-story National-style house with a T-shaped plan and cross-gabled roof. It is clad in lap siding and a large wooden porch and covered deck wraps the west and north side of the building. Windows are mostly wood-sash double-hung windows.

A second house on the property is known as the Rhoades House. It is a Spanish Eclectic house built in 1920 which is largely one-story, but has a two-story L-shaped section in the southwest corner. It has a low-pitched tile roof and its walls are clad in stucco. The arched main entrance is accessed from a brick porch. Fenestration is a mix of casement, top-hinged, and fixed multi-light windows.

Other residential buildings on the property include a single-story house built ca. 1945 that formerly functioned as an office (Error! Reference source not found.**8**). It is a long, narrow building with a gable roof and a mix of siding types including board and batten, horizontal wood, and faux-brick. Windows are also a mixture of one-over-one double-hung, horizontal sliding sash and fixed pane. Another residential building built ca. 1948 is a one-story stucco-clad Minimal Traditional-style house with an L-shaped plan and attached two-car garage. It has a long concrete entry porch covered with an attached roof with square wooden posts. The low-pitched gable roof is clad in composition shingles. The final residence on the parcel is a single-story contemporary Minimal Traditional built ca. 1960. The gable roof house has board and batten siding and its windows are largely horizontal sliding sash.

A horse barn on the property was built in the 1860s and had timber framing and vertical plank siding (**Error! Reference source not found.9**). The gable roof is glad in corrugated metal and has hay-doors at the front and rear and top hung sliding doors provide access to both ends of the building. On the sides are tall multi-pane windows, most of which are missing glass. Located southwest of the barn are the remnants of a wooden water tower. This structure was likely constructed during the nineteenth century. The original siding and tank are gone and all that remains are the structure and deck.

The final building on the parcel is an equipment shed built ca. 1945. It is a long, rectangular building with four top-hung sliding doors across the façade. The building has a gable roof and board and batten siding.

[37] JRP was not provided access to this property when it conducted its field survey in October 2013. Photographs were taken from public right-of-way.

Photograph 7. Phegley House, camera facing southeast, October 2, 2013.

Photograph 8. Office, camera facing southwest, October 2, 2013.

Photograph 9. Barn, camera facing northwest, October 2, 2013.

Anderson Dam

Anderson Dam is a rolled earth and rock fill dam, with a crest length of 1,385 feet, and height from Coyote Creek's streambed to the spillway crest of 625 feet (**Error! Reference source not found.10**). The dam has a freeboard of 19.5 feet, and is 40 feet wide at the top and 1,100 feet wide at the base. The dam's intake valves consist of three 60-inch by 84-inch sluice gates. There are three outlet valves, a 12-inch diameter polyjet valve, a 48-inch diameter butterfly valve, and a 42-inch diameter butterfly valve. Its outlet provides for release of a maximum of 550 cubic feet per second (cfs) through a 1,160-foot long, 49-inch diameter steel pipe. An ogee chute style spillway is located on the west side of the dam, and has a capacity of 57,400 cfs. The spillway weir is 223 feet in length. Anderson Reservoir has an 89,073 acre-feet capacity.

In addition to the dam, there are five small buildings at the dam site: A concrete block restroom on the west side of the reservoir, a smaller concrete block building also west of the reservoir, a third concrete masonry building located on the dam crest, and two buildings at the base of the dam.

Photograph 10. Anderson Dam, camera facing south, October 2, 2013.

5 EVALUATION

5.1 NRHP Criteria

JRP prepared this HRIER to assist the District with its compliance under NHPA Section 106, as amended, and the implementing regulations of the Advisory Council on Historic Preservation as these pertain to federally funded undertakings and their impacts on historic properties and with CEQA as it pertains to historical resources. Section 106 defines historic property as a historic district, site, building, structure or object included in or eligible for inclusion in the National Register of Historic Places. JRP used the NRHP criteria to evaluate the historic significance of resources in the APE. The eligibility criteria for listing properties in the NRHP are codified in 36 CFR Part 60 and explained in guidelines published by the Keeper of the National Register.

Eligibility for listing in the NRHP rests on twin factors of significance and integrity. A property must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm any historical significance a property may possess and render it ineligible. Likewise, a property can have complete integrity, but if it lacks significance, it is also ineligible.

Historic significance is judged by applying the NRHP criteria identified as Criteria A through D. The NRHP guidelines explain that a historic resource's "quality of significance in American history, architecture, archeology, engineering, and culture" is determined by meeting at least one of the four main criteria at the local, state, or national level:

- Criterion A: association with events or trends significant in the broad patterns of our history;
- Criterion B: association with the lives of significant individuals;
- Criterion C: a property that embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or that possesses high artistic values;
- Criterion D: has yielded, or is likely to yield information important to history or prehistory.

Criterion D is generally used to evaluate historic sites and archaeological resources. Although buildings and structures can occasionally be recognized for the important information they might yield regarding historic construction or technologies, the resource type within the current APE is well documented and, thus, not a source of important information in this regard.

Integrity is determined under NRHP guidelines by applying seven factors to a historic resource: location, design, setting, workmanship, materials, feeling, and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria, pertaining to the overall ability of the property to convey a sense of the historical time and place in which it was constructed.

5.2 CRHR Criteria of Significance

The State of California references cultural resources in CEQA, and archaeological and historical resources are specifically treated under Sections 21083.2 and 21084.1, respectively. California PRC Sections 5020.1 through 5024.6 (effective 1992) create the CRHR and set forth requirements for protection of historic cultural resources. The criteria for listing properties in the CRHR are set forth in the CEQA Guidelines and are as follows[38]:

Criterion 1: Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;

Criterion 2: Associated with the lives of persons important to local, California or national history;

Criterion 3: Embodies the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values;

Criterion 4: Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation;

Under CEQA Guidelines, Section 15064.5 (a), a "historical resource" is defined as:

- A resource listed in or eligible for the CRHR;
- A resource listed in a local register of historical resources, as defined in section 5020.1(k) of the PRC or identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the PRC;
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines historically significant, provided the determination is supported by substantial evidence in light of the whole record;
- A resource so determined by a lead agency as defined in PRC sections 5020.1(j) or 5024.1.
- Historical resources listed in, or determined eligible for, the NRHP are automatically listed in the CRHR, Section 5024 (d)(1)(2) of the PRC.

[38] CEQA—Public Resources Code [PRC] Division 13, Sections 21000-21178; CEQA Guidelines, Section 15064.5(a)(2)-(4) provide the criteria from Section 5024.1 of the California Public Resources Code, and the CRHR is defined in the California Code of Regulations Title 14, Chapter 11.5.

5.3 Previous Studies

Two recent previous studies of historic resources within the current APE have been conducted. In 2006, JRP surveyed and evaluated Anderson Dam and appurtenant structures and concluded that the property was not eligible for the NRHP and CRHR. This report was prepared for the District. Archives and Architecture, LLC surveyed and evaluated the Rhoades Ranch at 2290 Cochrane Road (APN 728-34-010) in 2010 and found it met Santa Clara County's criteria for historical significance under the county's Criteria 1, 2, and 3 pursuant to Santa Clara County Historic Preservation Ordinance, Division C17, Santa Clara County Code. The Santa Clara County Board of Supervisors concurred with these findings and declared the property a Designated Landmark on February 8, 2011 (CL11-001). The Rhoades Ranch was also nominated for the NRHP in 2012 and listed in the NRHP on April 7, 2013 as a historic district at the local level under NRHP Criteria A, B, and C and at the state level under Criteria A and B. The Rhoades Ranch is considered a historic property for Section 106 and as a historical resource for CEQA compliance. Because these two studies of the Anderson Dam and Rhoades Ranch were conducted recently, they were not re-surveyed and evaluated herein as part of the present study.[39]

5.4 Evaluation of 2390 Cochrane Road

JRP surveyed and evaluated one property in the APE that had not been previously inventoried: the single family residence at 2390 Cochrane Road (APN 728-34-011) in Santa Clara County. This report concludes that the property at 2390 Cochrane Road does not appear to meet the criteria for listing in the NRHP or CRHR. In addition to not meeting the NRHP/CRHR criteria and lacking historical significance, this property also lacks integrity of design, materials, and workmanship.

The residence at 2390 Cochrane Road was built in 1951 when the property was part of the adjacent property at 2290 Cochrane Road that was the Rhoades Ranch / Phegley Home Ranch / Strawberry Institute of California. The land on which this house sits was subdivided as a one-acre parcel from the adjacent property at 2290 Cochrane Road and sold in 1966. Because of the shared history of 2290 and 2390 Cochrane Road, a brief discussion of the current historic status of 2290 Cochrane Road will aid in understanding the evaluation 2390 Cochrane Road.. In 2010, the property at 2290 Cochrane Road, was surveyed and evaluated by Archives and Architecture, LLC and found eligible for the NRHP and CRHR and declared a Santa Clara

[39] JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006; Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, listed April 17, 2013, NRIS Reference No. 13000158; Santa Clara County Board of Supervisors, Rhoades Ranch Historic Landmark Designation Resolution (CL11-001), February 8, 2011; Franklin Maggi and Leslie Masunaga, Archives and Architecture, LLC, California DPR 523 form, Rhoades Ranch, October 14, 2010.

County Designated Landmark in 2011 (CL11-001). The same property was nominated for listing in the NRHP in 2012 and listed on April 7, 2013 as a historic district, with local and statewide significance. The historic property at 2290 Cochrane Road is significant under NRHP Criterion A, for its association with agricultural development of the region; NRHP Criterion B, for its association with Harold E. Thomas; and NRHP Criterion C, for distinctive architecture. Its period of significance is ca. 1863-1966.

The property at 2390 Cochrane Road does not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). This one-acre parcel and residence shares some of its early history with the adjacent property at 2290 Cochrane Road, but it does not have significance for this association. The property at 2390 Cochrane Road was not surveyed and is not included in any of the studies of 2290 Cochrane Road, and it is from the same time period as two residences on the historic property built after World War II that are non-contributors to the historic district, described as follows:

> The two houses, although associated with the Thomas period of ownership, are not distinctive modern-era buildings and are not known to be identified directly with significant personages. These two residential buildings do not directly contribute to the historic significance of the property, but reflect the continued evolution of the site into the recent past.[40]

This property at 2390 Cochrane Road shares the same characteristics of the above non-contributing residences on the Rhoades Ranch parcel. It does not have an important association with agricultural development. This residence was built well after the establishment of the Rhoades Ranch property as a ranch in the 1860s and also after the establishment of the Strawberry Institute in 1945. As a single-family residential building on the periphery of the ranch complex, it does not contribute to the Rhoades Ranch historic district conveying its important association with agricultural development.

Under NRHP Criterion B/CRHR Criterion 2, this property is not significant for an association with the lives of persons important to history. Research did not determine who lived in this house immediately after it was built in 1951, but it was not Harold E. Thomas. Robert M. Coyle and Frances Jane Coyle occupied the house by 1964 and purchased it in 1966. It appears they remained residents until the 1970s. Robert M. Coyle was a principal at a local high school. It does not appear that either of these individuals made demonstrably important contributions to history at the local, state, or national level.

[40] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012.

This residence is a Minimal Traditional style built in 1951. Minimal Traditional style houses were a continuation of small house designs of the 1920s and 1930s with some Modern style influences. The style is characterized by an irregular plan, low to medium-pitched cross-gable or hip roof, lack of ornamentation and stucco or horizontal wood siding. The style was enormously popular following World War II as a practical, affordable house and was built in large numbers throughout California. This residence at 2390 Cochrane Road is a modest example of the style which lacks architectural distinction and is therefore not significant as an important example of a type, period, or method of construction (NRHP Criterion C / CRHR Criterion 3). This property is also not a significant or likely source of important information about historic construction materials or technologies (NRHP Criterion D / CRHR Criterion 4).

In addition to lacking historical significance, multiple additions to the house have diminished this property's historic integrity. While the property retains its integrity of location as well as much of its setting, alterations to the house at 2390 Cochrane Road diminished the property’s integrity of design materials, design, workmanship, feeling, and association.

6 PREPARERS' QUALIFICATIONS

JRP Partner Christopher McMorris (M.S. in Historic Preservation, Columbia University) provided general direction for this project and edited this report, contributing to the historic evaluations. Mr. McMorris has over 15 years of experience conducting historic resource studies and qualifies as an architectural historian and historian under the United States Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

JRP Staff Historian Steven J. Melvin was the lead historian for this project. Mr. Melvin conducted fieldwork and research, wrote the contextual statement and evaluations, and prepared the HRIER and DPR 523 forms. Mr. Melvin received an M.A. in Public History from California State University, Sacramento and has over eight years of experience conducting historical research and evaluating historic resources for the NRHP. Based on his level of experience and education, Mr. Melvin qualifies as an architectural historian and historian under the Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

Research Assistant Heather Miller (M.A., Public History, California State University, Sacramento – in progress) assisted in fieldwork, research, and preparation of the HRER and DPR 523 form.

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APPENDIX A

Figures

APPENDIX B

DPR 523 Forms and NRHP Registration Form

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______________________
HRI # ______________________
Trinomial ______________________
NRHP Status Code 6Z

Other Listings ______________________
Review Code __________ Reviewer ______________________ Date __________

***Resource Name or #** (Assigned by recorder): 2390 Cochrane Road

P1. Other Identifier: Assessor Parcel Number (APN) 728-34-011

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Morgan Hill **Date:** 1955 (photorevised 1980) **T:** ; **R:** ; **Sec:** ; **B.M.**

c. Address: 2390 Cochrane Road City: Morgan Hill Zip: 95037

d. UTM: (give more than one for large and/or linear resources) Zone: ______; ______________mE/ ______________mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single family residence at 2390 Cochrane Road is situated on a sloping one acre parcel with Cochrane Road wrapping around its north and east sides. It is a wood-frame, single-story building with a medium pitched cross-gable roof covered in composition shingles. On the north end, the ground slopes down and the basement is finished into a living area (**Photographs 1** & **2**). The exterior is sheathed in a combination drop, medium-width horizontal, and wide-width horizontal wood siding. The main entry door is located on the east side and is covered by a screen door. Additional entries are located basement level and a sliding glass door is on the west side (**Photograph 3**). A cantilevered porch is on the northeast corner of the residence, the north end of which is enclosed. The house contains a wide array of window types: six-over-six and one-over-one wood frame windows, three-light wood casement windows and two-part aluminum framed horizontal sliding and casement windows. The house appears to have multiple additions. The parcel is surrounded on the south and west by the adjacent property that includes nearby buildings.

***P3b. Resource Attributes:** (List attributes and codes) HP2—Single Family Property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Camera facing southeast, October 2, 2013

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1951 (Santa Clara County Assessor)

***P7. Owner and Address:**
Frances J. Coyle
P.O. Box 185
Morgan Hill, CA
95038

***P8. Recorded by:** (Name, affiliation, address)
Steven J. Melvin & Heather Miller
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded:** October 2, 2013

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," prepared for the Santa Clara Valley Water District, 2014.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list)

Primary # ______________________________________
HRI # ____

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder): 2390 Cochrane Road

B1. Historic Name: none

B2. Common Name: none

B3. Original Use: residence B4. Present Use: residence

***B5. Architectural Style:** Minimal Traditional

***B6. Construction History:** (Construction date, alteration, and date of alterations) Built in 1951; multiple additions and new windows: dates unknown.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**

***B8. Related Features:** _________

B9. Architect: unknown b. Builder: unknown

***B10. Significance: Theme:** n/a **Area:** n/a

Period of Significance: n/a **Property Type:** n/a **Applicable Criteria:** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The property at 2390 Cochrane Road does not appear to meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR), nor does it appear to be an historical resource for the purposes of CEQA. This property has been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code.

(See Continuation Sheet.)

B11. Additional Resource Attributes:

***B12. References:** Santa Clara County Assessor; Santa Clara County Recorder; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement"; Circa, "Historic Context Statement for the City of Morgan Hill"; USGS, *Morgan Hill Quadrangle*; Franklin Maggi and Sarah Winder, National Register Nomination Form, Rhoades Ranch; See also footnotes.

B13. Remarks:

***B14. Evaluator:** Steven J. Melvin

***Date of Evaluation:** November 2013

(This space reserved for official comments.)

B10. Significance (continued):

Historic Context

Early Settlement and Agricultural Development of Southern Santa Clara County

This parcel at 2390 Cochrane Road is located in a part of Santa Clara County that was first settled in the 1830s with the granting of the 20,052-acre Rancho Refugio de la Laguna Seca to Juan Alvires in 1834 and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The study parcel is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants, these two vast ranchos were operated as cattle ranches. American settlers began to arrive in the Morgan Hill area in the late 1840s and early 1850s. Among the most notable in this region were Martin Murphy, Sr., Charles Weber, William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction and Martin Murphy, Sr. purchased Rancho Ojo de Agua de la Coche about the same time. Fisher died in 1850 and the land, including 2390 Cochrane Road, passed to his wife, Liberta Cesena Fisher.[1]

Cattle and wheat were the mainstays of Santa Clara Valley agriculture until the 1880s when horticulture became the primary agricultural endeavor. In this initial period of horticultural development in the Santa Clara Valley, French prunes were the first successful commercial orchard crop. Prunes became widely grown throughout the Santa Clara Valley and farmers also began to plant other stone fruit crops as orchard crops became recognized as a profitable enterprise. In addition to prunes, other widely planted orchard crops were apricots, peaches, and cherries, all irrigated with ground water and small-scale stream diversions. The completion of the Santa Clara & Pajaro Valley Railroad (which became part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 opened the large eastern US market for Santa Clara Valley fruit via the newly completed transcontinental railroad, and further propelled the expansion of the horticultural industry. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm produced enough income to support a family. By 1890, the transition to horticultural spread to every part of the county where irrigation water was available.[2]

Fruit production continued to grow into the twentieth century. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. At this time prunes were still the most popular tree fruit crops followed in order by apricots, peaches, and cherries. Horticulture remained the principal agricultural industry in the Santa Clara Valley in succeeding decades, aided by the groundwater development projects of the Santa Clara Valley Water District and its construction of dams, as discussed below, which ensured sufficient water for irrigation.[3]

Development of the Morgan Hill Area

The earliest communities in the Morgan Hill area began as stage stops along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill was Madrone, located about two miles southwest of the study parcel. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. A railroad station was not established at Morgan Hill until 1893.[4]

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[2] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53.
[3] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53.
[4] Circa, "Historic Context Statement for the City of Morgan Hill," 32, 33.

Subdivision of the large ranches in the Morgan Hill area began to occur in the 1890s. The lucrative orchard crops caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from town lots in Morgan Hill of one-half acre to ranging from five to 100 or more acres. It was following this subdivision of the large ranches that the shift from raising cattle and grain to horticulture occurred in this part of the valley.[5]

Following the founding of Morgan Hill, it took over as the main rail depot in the area. Fruit dehydrators, canning and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[6]

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area was able to retain its rural character for a longer period. It was far from the population growth of the San Jose region and did not experience the same growth pressures. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and US101 was built as a freeway bypassing the downtown area, which made it easier for this area to become a bedroom community to San Jose. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill towards the vicinity of Anderson Dam further altering the once rural and agricultural character of the area.[7]

Construction of Anderson Dam

Development of agriculture in the Santa Clara Valley relied on available groundwater and until around 1900 groundwater levels were sufficiently high that farmers irrigated from artesian wells. However, by 1915 a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67 percent of the area under irrigation, and the population of its urban centers was on the rise. Demand both by agriculture and domestic uses continued to rise and by 1930 the groundwater table had dropped to alarming levels leading to valley leaders and local engineers to seek a means to replenish the lowering ground water table.[8]

During the 1920s a system of dams and conservation facilities were proposed to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. Voters approved a measure to establish Santa Clara Valley Water Conservation District (SCVWCD, now Santa Clara Valley Water District) in 1929 when water levels in local wells fell below 100 feet.[9]

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[5] Circa, "Historic Context Statement for the City of Morgan Hill," 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 16.
[6] Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.
[7] USGS, *Morgan Hill Quadrangle,* 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.
[8] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934, passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.
[9] ASCE. *Historic Civil Engineering Landmarks,* 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," 6-10, January 31, 1936, Water Resources Center Archives(WRCA).

By 1934 the District's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge. The original main storage dams were Calero, Almaden, Guadalupe, Vasona and Stevens Creek, built in 1935, and Coyote Reservoir, finished in 1936. Coyote Percolation Dam was also built at this time. Almaden and Calero were connected by the Almaden-Calero Canal, which shunted water from the relatively wet Almaden basin into the larger storage capacity afforded by Calero Reservoir.[10] The District's dams, as a system, conserved run-off and stored rainfall, which regulated the flow of water to respective creeks at a rate that was intended to give maximum absorption in gravel percolation areas downstream.[11] With construction of the dams, and the downstream features in the creek beds to improve percolation, it was not long before the dams began to store water and improve groundwater conditions.[12]

The system of dams and reservoirs operated successfully into the following decade, but increased urbanization, wartime industrial requirements, and year-round irrigation in the Santa Clara Valley created greater demand for water. As a result, SCVWCD built Anderson Dam in 1950 and Lexington Dam in 1952 to augment the existing water conservation system (**Illustration 1**).[13] The Anderson Dam is constructed across Coyote Creek where it emerges from a steep canyon in the Coast Range and into the Santa Clara Valley. From the dam Coyote Creek flows generally north into San Francisco Bay.

Illustration 1. Anderson Dam under construction 1950. The arrow points to the future location of 2390 Cochrane Road, which had not yet been built, camera facing northeast.[14]

[10] ASCE. *Historic Civil Engineering Landmarks*. 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; *San Jose Mercury Herald*, November 17, 1934, December 15, 1934.
[11] *San Jose Mercury Herald*, November 17, 1934.
[12] ASCE. *Historic Civil Engineering Landmarks*. 28.
[13] California History Center, *Water in Santa Clara Valley*, passim.
[14] Photograph from the District Archives.

Strawberry Institute and the Property at 2390 Cochrane Road

The one-acre property at 2390 Cochrane Road is situated at the bend in Cochrane Road adjacent to the foot of Anderson Dam. This property, along with the adjacent property at 2290 Cochrane Road, was originally part of Rancho Refugio de la Laguna Seca bought by William Fisher in the 1840s. After Fisher's death in 1850, his wife, Liberta Cesena Fisher began selling off sections of the 19,997-acre ranch. By the 1860s, Alvora Cottle bought a 300-acre tract inclusive of the current properties at 2290 and 2390 Cochrane Road and appears to have built a house on the property and engaged in farming. After a few intervening transactions, D. Phegley acquired 188 acres of this land and operated it as a cattle ranch. Phegley sold the land in the 1890s, and following conveyances to several short-term owners, I.O. Rhoades bought the property in 1911, which by then had been reduced 160 acres. Rhoades was a railroad purchasing agent for Southern Pacific and converted the property to an orchard farm with prunes, apricots and walnuts.[15]

I.O. Rhoades transferred ownership of the land to his son, William, in 1920 and they cooperatively ran the ranch during the 1920s until I.O. Rhoades moved to southern California. William continued to operate the ranch and expanded its orchard land. He died in 1935 and in 1945, his widow Katherine Garnett Rhoades sold 14.31 acres, inclusive of 2290 and 2390 Cochrane Road, to Harold E. Thomas. The remaining 145-acre tract was sold to Sebastian and Luigia Borello that same year, which today is known as Borello Farms, situated immediately west and south of the APE.[16]

Harold E. Thomas was a plant pathologist and conducted pioneering research in strawberry propagation. He was a professor of plant pathology at the University of California from 1928 to 1945 and established the Strawberry Institute of California on the Rhoades property immediately after acquiring the ranch. Strawberry grower E. F. Driscoll established the Strawberry Institute in 1944 as a non-profit to assist the growers belonging to Driscoll Strawberry Associates.[17]

Called the “Father of the California Strawberry Industry,” Thomas obtained his PhD in 1928 from the University of California and continued to conducted research at the university on deciduous orchard tree root diseases and strawberry diseases. Thomas worked with the University of California Deciduous Fruit Field Station in Santa Clara and began strawberry breeding programs using wild strawberries to create disease-resistant varieties. In 1935, a field station employee, Earl V. Goldsmith became his research assistant. While with the University of California in the 1930s and 40s, Thomas' major contributions were the development of disease-resistant strawberry varieties. His work is published in University of California Agriculture Extension Circular No. 113 “Production of Strawberries in California,” and Bulletin No. 690, “The Shasta, Sierra, Lassen, Tahoe, and Donner Strawberries,” published in conjunction with Goldsmith. These two publications changed the character and scope of strawberry production in California and opened the potential of strawberries as a fresh market fruit. In 1945, the University introduced five new varieties of strawberries resulting from Thomas' and Goldsmith's work that were relatively virus-free and were far more vigorous than existing varieties. Two of these—the Shasta and Lassen—became prominent commercial varieties in the US.[18]

When Thomas acquired the land on Cochrane Road, he embarked upon a research program that rose to prominence in applied research and development of strawberry cultivars unrivaled in beauty and quality anywhere else in the world. The Strawberry Institute sought to solve disease, insect, variety, and other problems in strawberry production, and also furnished disease-free stock to the grower members. In 1959 a for-profit corporation (Strawberry Institute Nursery), founded by Thomas, was established to separate the plant propagating work from the strictly service work of the Institute. In 1962,

[15] Urban Programmers, "Historical and Architectural Evaluation for the Parcel Located at 2280 Cochrane Road, Morgan Hill, California," April 10, 2012, 12; Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012.
[16] Maggi and Winder, National Register of Historic Places Registration Form, Rhoades Ranch; Franklin Maggi and Leslie Masunaga, Archives and Architecture, LLC, California DPR 523 form, Rhoades Ranch, October 14, 2010.
[17] Maggi and Winder, National Register of Historic Places Registration Form, Rhoades Ranch; Maggi and Masunaga, DPR 523 form, Rhoades Ranch.
[18] Maggi and Winder, National Register of Historic Places Registration Form, Rhoades Ranch; Maggi and Masunaga, DPR 523 form, Rhoades Ranch.

Institute members had about 1,600 acres in production. In 1966, the Strawberry Institute merged with Driscoll Strawberry Associates, Incorporated, which Thomas also directed for another ten years.[19]

During the era of the Strawberry Institute, several buildings were built on the former Rhoades Ranch including an office, three houses, an equipment building and several sheds. One of those houses is the study property at 2390 Cochrane Road. It was built in 1951 during the period in which the Strawberry Institute operated on the property. Thomas resided in the former Rhoades house at 2290 Cochrane Road and the house at 2390 Cochrane Road appears to have been built as a secondary residence along with other buildings and structures on the property constructed during the late 1940s and 1950s. It is not known who lived in the residence at 2390 Cochrane Road immediately following construction. By 1964, Robert M. Coyle resided in the house, renting it from Thomas. Coyle was not associated with the Strawberry Institute and was the principal of the Live Oak Union High School in Morgan Hill. In 1965, the current one-acre parcel that is 2390 Cochrane Road was subdivided from Thomas / Strawberry Institute property and sold to Robert M. Coyle and his wife Frances Jane Coyle on February 1, 1966. Coyle and his wife appear to have continued to live in this house until the 1970s. It is not known who occupied the house thereafter. Frances Jane Coyle has remained the owner of the property.[20]

Evaluation

The residence at 2390 Cochrane Road was built in 1951 when the property was part of the adjacent property at 2290 Cochrane Road that was the Rhoades Ranch / Phegley Home Ranch / Strawberry Institute of California. The land on which this house sits was subdivided as a one-acre parcel from the adjacent property at 2290 Cochrane Road and sold in 1966. Because of the shared history of 2290 and 2390 Cochrane Road, a brief discussion of the current historic status of 2290 Cochrane Road will aid in understanding the evaluation 2390 Cochrane Road. In 2010, the property at 2290 Cochrane Road, was surveyed and evaluated by Archives and Architecture, LLC and found eligible for the NRHP and CRHR and declared a Santa Clara County Designated Landmark in 2011 (CL11-001). The same property was nominated for listing in the NRHP in 2012 and listed on April 7, 2013 as a historic district, with local and statewide significance. The historic property at 2290 Cochrane Road is significant under NRHP Criterion A, for its association with agricultural development of the region; NRHP Criterion B, for its association with Harold E. Thomas; and NRHP Criterion C, for distinctive architecture. Its period of significance is ca. 1863-1966.

The property at 2390 Cochrane Road does not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). This one-acre parcel and residence shares some of its early history with the adjacent property at 2290 Cochrane Road, but it does not have significance for this association. The property at 2390 Cochrane Road was not surveyed and is not included in any of the studies of the Rhoades Ranch / Phegley Home Ranch / Strawberry Institute, and it is from the same time period as two residences on the historic property built after World War II that are non-contributors to the historic district, described as follows:

> The two houses, although associated with the Thomas period of ownership, are not distinctive modern-era buildings and are not known to be identified directly with significant personages. These two residential buildings do not directly contribute to the historic significance of the property, but reflect the continued evolution of the site into the recent past.[21]

This property at 2390 Cochrane Road shares the same characteristics of the above non-contributing residences on the Rhoades Ranch parcel. It does not have an important association with agricultural development. This residence was built well after the establishment of the Rhoades Ranch property as a ranch in the 1860s and also after the establishment of the

[19] Maggi and Winder, National Register of Historic Places Registration Form, Rhoades Ranch; Maggi and Masunaga, DPR 523 form, Rhoades Ranch.
[20] Santa Clara County Assessor, Property Information for 2390 Cochrane Road, Accessed via CoreLogic Real Estate Database; Maggi and Masunaga, DPR 523 form, Rhoades Ranch; Santa Clara County Recorder, Deed, Harold E. Thomas to Robert M. Coyle and Frances Jane Coyle, dated February 1, 1966, recorded February 2, 1966, OR:7269:130; R.L. Polk & Co., *Gilroy City Directory* (San Francisco: R.L. Polk & Co., 1964, 1967, 1971, 1979).
[21] Maggi and Winder, National Register of Historic Places Registration Form, Rhoades Ranch.

Strawberry Institute in 1945. As a single-family residential building on the periphery of the ranch complex, it does not contribute to the Rhoades Ranch historic district conveying its important association with agricultural development.

Under NRHP Criterion B/CRHR Criterion 2, this property is not significant for an association with the lives of persons important to history. Research did not determine who lived in this house immediately after it was built in 1951, but it was not Harold E. Thomas. Robert M. Coyle and Frances Jane Coyle occupied the house by 1964 and purchased it in 1966. It appears they remained residents until the 1970s. Robert M. Coyle was a principal at a local high school. It does not appear that either of these individuals made demonstrably important contributions to history at the local, state, or national level.

This residence is a Minimal Traditional style built in 1951. Minimal Traditional style houses were a continuation of small house designs of the 1920s and 1930s with Modern style influences. The style is characterized by an irregular plan, low to medium-pitched cross-gable or hip roof, lack of ornamentation and stucco or horizontal wood siding. The style was enormously popular following World War II as a practical, affordable house and was built in large numbers throughout California. This residence at 2390 Cochrane Road is a modest example of the style which lacks architectural distinction and is therefore not significant as an important example of a type, period, or method of construction (NRHP Criterion C / CRHR Criterion 3). This property is also not a significant or likely source of important information about historic construction materials or technologies (NRHP Criterion D / CRHR Criterion 4).

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, the multiple additions to the house have diminished this property's integrity of materials, design, and workmanship.

Photographs (continued):

Photograph 2: Camera facing southwest, October 2, 2013.

Photograph 3: Camera facing northwest, October 2, 2013.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) Rhoades Ranch

P1. Other Identifier: Phegley Home Ranch / Strawberry Institute of California

***P2. Location:** **Not for Publication** **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Morgan Hill **Date** 1955 photorevised 1980 **T**.9S.; **R**.3E.; Mount Diablo **B.M.**
c. Address 2290 Cochrane Rd. City Morgan Hill Zip 95037
d. UTM: (Give more than one for large and/or linear resources) Zone 10S; 621471mE/ 413921mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor's Parcel Number: 728-34-010,
south side of Cochrane Road west of Coyote Road.

***P3a Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Located near the base of the Leroy Anderson Dam and Reservoir, this 12-acre site is nestled in the northeast corner of what was once a larger 160-acre ranch that was established in the 1860s when Rancho Laguna Seca was first subdivided. Most of this early settlement site is now known as Borello Farms, a 123-acre active ranch on an adjacent property to the south and west. The adjacent Borello Farm site is planned for a 244 large-lot gated community that is to be developed over the next decade. The subject site is on a rise near the mouth of Coyote Creek, and overlooks the orchards of Borello Farms. This overlook is where the ranch headquarters was located prior to the property split, and contains houses and ancillary buildings associated with the historic ranch. The larger setting remains agricultural for the time being, although the historic landscape was modified irreversibly with the construction of Anderson Dam in 1949-1950. The Santa Clara Valley Water District now owns the properties to the north and east of the subject site. *(Continued on*

***P3b. Resource Attributes:** (List attributes and codes) HP3. Multiple family property

***P4 Resources Present:** Building Structure Object Site District Element of District Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #)
View facing southeast, September 2010.

***P6. Date Constructed/Age & Sources:**
Historic Prehistoric Both
C1860s, 1920, and later, to +140 years old, various.

***P7. Owner and Address:**
Joe & Sheila Giancola
2290-A Cochrane Rd.
Morgan Hill, CA 95037

***P8. Recorded by:** (Name, affiliation, and address)
F. Maggi & L. Masunaga
Archives & Architecture
PO Box 1332
San Jose CA 95109-1332

***P9. Date Recorded:** 10/14/2010

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none".)
None

***Attachments:** NONE Location Map Sketch Map Continuation Sheet Building, Structure and Object Record Archaeological Record District Record Linear Feature Record Milling State Record Rock Art Record Artifact Record Photograph Record Other (List)

(Continued from page 1, DPR523a, P3a Description)

The property that remains of the original 160-acre ranch represents a continuum of significant and supporting design elements from the mid-nineteenth to mid-twentieth centuries. Although much of the surrounding associated agricultural lands will soon be developed, the site preserves the feelings and associations of a headquarters of an important early Northern California agricultural ranch.

The main owner-occupied house, completed in 1920, shares the site with four other houses that today function as rentals. Other buildings and structures exist on the site, including an early barn, an agricultural equipment building, remnants of a water tank, and other minor ancillary structures related to the residences. The site also contains mature landscaping associated with various eras of site occupation, as well as some older mature vegetation near the riparian corridor of Coyote Creek that is located along the northern boundary of the site. The site has one small adjacent parcel under separate ownership that fronts on Coyote Road and is partially embedded into the site. That adjacent site is not a part of this recording. Coyote Road runs along the east boundary of the site at the base of the foothills, and extends from Cochrane Road to East Main Avenue about a mile to the southeast.

The entry to the subject site is from Cochrane Road at the northwest corner of the property. A nearby adjacent driveway (to the west) provides access to the perimeter road of Borello Farms. This drive leads to a complex of agricultural buildings to the south of the subject property.

Contributing building/structures:

(1) Phegley House (circa 1860s)
This two-story National-style house is associated with the earliest known occupation of the site. It is unique within Santa Clara County, a two-story single-wall (board wall) house constructed during the early American settlement period of Santa Clara County. The 12" vertically installed boards were manufactured during the first decades of lumber manufacturing in the state. Facing west towards the entry to the site from Cochrane Road, the house sits above the creek and road where the foothills begin their rise near the mouth of Coyote Creek. This site is a natural early habitation location, and may have been the original settlement site of Martin Murphy Sr. when he and his family moved from the Central Valley into the South County area (Munro-Fraser 1881). Early boundary descriptions referenced the large Sycamore trees that framed the creek. Large Eucalyptus trees provide a focal point and identify this house site from the valley below. Eucalyptus trees were first planted in California from seeds brought from Australia during the Gold Rush, and were propagated and marketed extensively beginning in the mid-1850s. The mature Eucalyptus trees near this building were likely planted during the nineteenth century.

The building is T-shaped with a two-story cross-gabled front volume and a rear one-and-one-half story offset rear wing. A one-story hipped shed is nested along the rear wing on the south side. The steeply pitched roof is characteristic of the 1860s, with a cross-gabled front volume that rises above the rear-gabled wing, enclosed soffits, and wide fascia trim. The lap siding is also of 1860s vintage. A chimney rises through the peak of the roof of the rear wing.

A large wooden porch and covered deck wraps the west and north side of the building. Covered with a low-slope hipped roof with false-bead ceiling boards, framed with large square wood columns, and enclosed with a solid balustrade of v-grove siding, the porch was likely added to the building in the second decade of the twentieth century when the ranch was acquired by the Rhoades family, and was renovated again after 1945. The porch deck on the north side of the building faces the riparian corridor of Coyote Creek. The porch/deck can only be accessed from steps centered at the front façade, leading to a front door that is centered in the front façade and framed by recessed wood panels.

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Fenestration appears to have been replaced at the time of the porch addition, and is mostly wood-sash double-hung windows with dog-ears. Replacement doors and other improvements were probably made at that time, and other foundation work and improvements were done later.

(1a) Phegley House garage (pre-1920)
South of the Phegley House is a small one-story garage. It is a simple front and rear gabled volume with a front garage door and side windows. Although clad with channel-rustic siding (typical of nineteenth century construction), it may have been built after the Rhoades acquired the property in 1911, but prior to when they constructed their large house.

(2) Horse Barn (circa 1860s)
This moderate-sized timber-framed horse barn located uphill from the houses near Coyote Road was likely constructed during the same decade as the Phegley House. Rectangular in size and one-and-one-half stories in height, it is an unusually shaped barn for the region. It is front and rear gabled, with and an upstairs hay storage area loaded from both front and rear hay-doors above the sliding doors at both ends. The floor is made of wood, and has three interior horse stalls in the right rear corner.

The siding is a wide-board v-groove profile that is not usually found in Santa Clara County, but may be associated with a transition period in the mid-1860s before channel-rustic siding became the norm throughout Northern California. The tall 6/6 double hung windows are also characteristic of the mid-1860s with their thin mullions. Most of the glazing is missing.

The roof has been covered with galvanized corrugated metal panels that cover what may be original shingles.

(3) Water tower remnant structure (pre-1920)
Located southwest of the barn is the remaining structure of what was once a large watertower. This structure appears on an early 1920s photo of the site, and was likely constructed during the nineteenth century. The original siding and tank are now gone, and all that remains are the structure and deck.

(4) Rhoades House and garage (1917-1920)
Designed by the architectural firm of Higbie and Hill, with construction beginning in 1917 but completion not occurring until after World War I, this Spanish Eclectic house and garage is sited within a grove of large Oak trees at the rise above the orchards of Borello Farms to the west and south. At the time of construction, the property included the Borello Farms acreage, and the front of the house overlooked the orchards below.

The building has a large, mostly square footprint (one narrow wing extends the front façade northward, and at the rear buttresses frame a shallow bump-out), and an interior court. Mostly one-story in height, a two-story L-shaped section rises at the southwest corner of the building and extends northward across the front of the square, but stops short of the one-story wing. The two-story section frames the interior courtyard. The massing of the house is a maze of undulating forms, creating the illusion of a house larger than its already large size. The one-story sections have flat tops and parapets faced with decorative tiles about a foot down from the coping. This short tile mansard sits above flared stucco cornices. The tile decorative feature wraps the building except for the intrusion of some large buttresses on the south and east facades that frame canopy roof (south façade) with a jog in the building line (rear façade).

The second story is covered by a moderately sloped tile covered roof that extends down to large sweeping eaves. These eaves contain scroll-cut rafter tails with notched-in gutters. The scroll-cut boards are found again in the cantilevered canopy outriggers over the rear door and side windows. Both the canopies and the second-story roofs are framed and cornered by large scroll-cut braces.

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(Continued from previous page)

On the front façade a partially cantilevered wing protrudes from the building shape, but is contained in the composition by the line of the decorative tile. The parapet encloses a balcony that overlooks the entry. The horizontal line of the coping is drawn into the stucco of the two-story section, providing a base to the window sills. The horizontality is further emphasized by a stucco watertable at the base of the walls. The watertable line originates on the north façade of the wing where it abuts a small buttress, continues into the caps of two large bollards at the front entry, and then terminates after wrapping the rear corner of the building against a large buttress mid-façade. Above the watertable is a false base of stepped-out stucco, further emphasizing the horizontality, and monumentalizing the wall profile.

The striking arched entryway with its key at the apex and trimmed with decorative archivolt is nested into a solid stucco-covered L-shaped railing of monumental proportions. The steps drop to the side into a narrow entry patio framed by large square bollards. The thick railing is embellished with flares in its vertical plane, and a quarter bottom-curve provides a counterpoint to the curves of the arch nearby. The front entry arch covers a deep recess into which the custom arched door and its frame provides a grant entry into the house.

The fenestration is a mix of casement, top-hinged, and fixed multi-light windows. Most of the windows have multi-light fixed transoms. The front projected wing contains a six-part window with a semi-arch, and centered in the second story of the front façade is a recessed tri-partite window unit framed with four slender twisted columns. The center section is solid and contains an ornately trimmed cast panel.

Additional character-defining features include second-story planter boxes with doubled corbels, two stucco chimneys with solid gabled caps, ornamental carriage-style exterior wall lamps, integrated foundation/planters, and rectangular stucco insets.

The detached garage is similar in character to the house. It is wrapped with a tile mansard and contains matching multi-light windows. The garage door is a replacement. A rock retaining wall follows the driveway along the south side of the house. Foundations remain of a garden room that no longer exists.

(5) Equipment building (circa 1945+)
This long structure was built to house farm equipment, and has four sliding doors facing a driveway circulation area near the large older barn and a house to the southwest. The building is simple in shape, with end gables, and board and batten siding. The concrete base and interior framing indicate mid-century construction.

(6) Office (Board-and-batten house and garage) (circa 1945+)
Located at the northeast corner of the site, this house was originally built as an office. It is a long narrow structure with step-backed gables and a mix of siding types. The building was expanded over time, and later converted to residential use.

Non-contributing buildings/structures

(7) Stucco house (circa late 1940s)
Located in the center of the site between the Rhoades House and the equipment building, this one-story stucco-clad Minimal Traditional-styled house is L-shaped and has an attached two-car garage. It has a raised floor and a long concrete entry porch covered with an attached roof with slender 4x4 columns. The end gables have vertically installed dog-eared planks, and the windows are framed with false shutters. The garage may have been added, as were some aluminum sash windows during the 1960s or 1970s.

(8) Board-and-batten house and shed (date unknown)
The one-story house located east of the Phegley house above Cochrane Road is a contemporary house, with board and batten siding, and a detached garage.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI #
Trinomial

***Resource Name or #** (Assigned by recorder) Rhoades Ranch

***Map Name:** USGS Morgan Hill ***Scale:** n.t.s. ***Date of Map:** 1955 photorevised 1980

* Required information

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 3S

***Resource Name or #** (Assigned by recorder) Rhoades Ranch

B1. Historic Name: Phegley Home Ranch

B2. Common Name: None

B3. Original use: Ranch B4. Present Use: Multi-family property

***B5. Architectural Style:** National / Spanish Eclectic / Minimal Traditional

***B6. Construction History:** (Construction date, alterations, and date of alterations)

Early building and barn constructed circa 1860s. Spanish Eclectic house completed by 1920. Equipment building, office, and stucco house constructed circa 1945-1950. Additional house constructed date unknown during the second half of the twentieth century.

***B7. Moved?** No Yes **Unknown Date:** n/a **Original Location:** n/a

***B8. Related Features:**

Borello Farms to the south and west originally part of larger ranch.

B9a Architect: Higbie & Hill (Rhoades House) b. Builder: Morrison (Rhoades House)

***B10. Significance:** **Theme** Agriculture, Architecture **Area** South County

Period of Significance c1860s – 1976 **Property Type** Ranch **Applicable Criteria** 1,2, and 3

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

This 12.27-acre site on Cochrane Road at the base of Anderson Reservoir is the historic headquarters of what was once a large ranch in South Santa Clara County (located to the east of Morgan Hill). This ranch was developed in the 1860s during Santa Clara County's Early American Period as a 248-acre portion of the rancho La Laguna Seca. La Laguna Seca was established in 1834 when Mexican Governor José Figueroa granted four leagues of land in Coyote Valley to Juan Alvires. During 100 years of agricultural production, this site evolved from a cattle ranch to a horticultural farm where prunes, apricots, and walnuts were grown. By the mid-twentieth century, the site, reduced to its present size, became the location of an experimental strawberry facility where propagation work took place that created many disease-resistant varieties now grown throughout the world. A number of significant people have been involved in this ranch: early owner James F. Phegley, a South County rancher who served on Santa Clara County's Board of Supervisors, Ira Osborne Rhoades, a railroad purchasing agent who retired to the ranch and became involved in a leadership role in the statewide California Prune and Apricot Growers Association, and Dr. Harold E. Thomas, a plant pathologist who helped found, and was Director of, the non-profit Strawberry Institute of California. Today, the site continues to reflect these early associations, and is a significant historic resource within Santa Clara County.

(Continued on next page, DPR523L)

B11. Additional Resource Attributes: (List attributes and codes) HP33. Farm/ranch

***B12. References:**

(See page 11)

B13. Remarks: Proposed landmark nomination

***B14. Evaluator:** Franklin Maggi

***Date of Evaluation:** 10/14/2010

(This space reserved for official comments.)

*Resource Name or # (Assigned by recorder) Rhoades Ranch

*Recorded by Franklin Maggi & Leslie Masunaga *Date 10/14/2010 ☒ Continuation ☐ Update

(Continued from previous page, DPR523b, B10 Significance)

The four leagues of La Laguna Seca translate to about 20,000 acres, and the subject property is located near the southeast corner of that Mexican-era land grant. La Laguna Seca was purchased by Capt. William Fisher in 1845. Fisher returned to California from Mexico with his wife Liberata Cesena in 1846, but died in 1850 soon after moving to the ranch. Liberata married Dr. George H. Bull in 1851. Following his death in 1856, she remarried a third time to Caesar Piatti in 1858, who had immigrated to the United States from Italy during the Gold Rush.

The rancho did not receive its patent from the United States Land Commission until Nov. 2, 1865, when the title was cleared to L. Bull et.al. (the heirs of William Fisher). Liberata had applied for that patent in the 1850s, and had the property first surveyed at that time (the notes to this 1850s field survey were lost in the 1906 Earthquake). The rancho extended northward from the subject site and included most of Coyote Valley. At its southeastern corner is the mouth of Coyote Creek and the entry to what was once known as Coyote Canyon.

In the 1840s and early 1850s, the ranch lands in South Santa Clara County were vast and sparsely settled. By the time of the patent in 1865, Liberata had already subdivided and distributed much of the rancho. In 1861, Cesar Piatti conveyed a 635-acre parcel at the south end of the rancho to José Jesus Bernal (Deeds O:35). A year and a half later, Bernal and his wife Susana Gulanc de Bernal surveyed and sold a smaller portion of 300 acres of this larger parcel (containing the subject parcel) to Alvora Cottle (Deeds Q:157).

Cottle was a lawyer and native of Missouri, and appears to have briefly settled in Santa Clara County in 1860. He had two children with his wife Lyda when he came to California, and they had two additional children in the 1860s. He later moved his family to Southern California where he was a farmer. A number of Cottle family members had also arrived in Santa Clara County in the 1850s or early 1860s (Alvora was their uncle). It is likely that Alvora Cottle built the extant two-story house, known later as the old Phegley House, during the early 1860s (most likely about 1865 - the year the title was cleared). Cottle further subdivided the 300 acres during the 1860s, selling a portion to Simon and Margaret Mathews in 1867 (Deeds Z:88), and another parcel (containing the subject property) to Peter and Frances Quivey at an undetermined date.

Peter Quivey was an early California pioneer who died in 1869. Cottle had financed the sale to the Quiveys, and in 1870 (a year and a half after Peter's death), Frances Quivey defaulted on the loan. The property was sold on May 24, 1871 by County Sheriff Harris to George Jefferson (recorded Sept 5, 1871, Deeds 7:189). Jefferson then sold the property to Daniel Phegley (Deeds 21:444).

Daniel and Nancy Phegley, and their son James and his wife Mary, settled in Santa Clara County in 1870, and according to the 1870 Federal Census, had acquired the property near Madrone in what was then called the Burnett Township by August 1870. Originating from Missouri, James and Mary Phegley brought three children with them to California. Mary bore a fourth child in California in the Fall of 1869. It is likely that the extant house on the subject property had already been constructed when they settled on the subject property.

James Phegley remained on the subject property with his family for about seven years, and then moved to Gilroy where he operated a grocery store and expanded his cattle ranch holdings. He had been educated at the Arcadia Academy in Iron County Missouri. While living in Gilroy, he served as Constable, and in 1886 was elected Supervisor of the First District of Santa Clara County. The Madrone ranch continued to be owned by the Phegley family until the 1890s, and is referenced in later official records as the Phegley Home Ranch. The Phegleys retired to Pacific Grove by 1910, and James Phegley died in 1915.

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By the late 1890s, Phegley had sold the property near Madrone to William Osterman. Osterman has not been clearly identified with this property, and may have been a Central Valley farmer. Other short-term owners were connected with the property until 1911 when IO Rhoades bought the property, then about 160 acres, from H. S. Hersman (Deeds 380:111).

Ira Osborne Rhoades (who went by the name IO Rhoades) was a railroad purchasing agent for Southern Pacific in San Francisco when he bought the ranch near what had then become Morgan Hill. Rhoades had previously been a purchasing agent for the Union Pacific and then the Oregon Short Line. He was hired by Southern Pacific in 1905 and worked in San Francisco until he retired in 1917. That year he began construction on the large Spanish Eclectic house at his Cochrane Road ranch. The ranch was converted to horticultural use during the teens by IO Rhoades and his son William. Although ownership of the property was transferred to his son William in 1920, by that year Ira was involved with the California Prune and Apricot Growers Association (now known as Sunsweet). Elected to the state-wide board of directors in 1922, for a time he functioned as both president and interim-general manager. Ira and his wife Katherine remained residents of San Francisco in the 1920s, and later moved to Southern California.

William had co-owned and managed the ranch since its purchase in 1911, and planted 125 acres in orchard by 1922. William had been born in Nebraska, and attended MIT in Boston. After working at Westinghouse, he joined his parents in San Francisco in 1909, and moved to the ranch during the teens. Entering World War I after attending officer's training school at the Presidio at San Francisco, he returned to the ranch after the war. He married Katherine Garnett in 1917.

On March 10, 1945, ten years after William died in 1935, Katherine Garnett Rhoades sold 14.31 acres (the subject property) to Harold E. Thomas (OR 1429:108). The larger 145-acre portion was sold to Sebastian and Luigia Borello that same year, which today is known as Borello Farms. The 14.31 portion is what generally remains today as the subject property, with only a one-acre portion along Coyote Road partitioned and sold in 1965, and about one-acre along the north property line sold to the Santa Clara Valley Water District in 1983.

Harold E. Thomas was professor of plant pathology at the University of California from 1928 to 1945. He is renowned for his pioneering research on the strawberry. In 1945 he bought the upper portions of the Rhoades Ranch and became Director of the Strawberry Institute of California, which had been organized by E. F. Driscoll in 1944 as a non-profit to assist the growers belonging to Driscoll Strawberry Associates.

Called the "Father of the California Strawberry Industry," Thomas obtained his Ph.D in 1928 after studying *Armillaria mellea*, a root destroying fungus primarily found in deciduous orchard crops of California. The study of deciduous orchard tree root diseases as well as strawberry diseases was his area of responsibility while on the U.C. faculty. Continuing the research of others on strawberry diseases that threatened the California industry, Thomas enlarged strawberry breeding programs to include wild strawberries to create disease-resistant varieties, working with the University of California Deciduous Fruit Field Station in Santa Clara. In 1934 he married Helene Diepen who worked at the Field Station, and the following year another Field Station employee, Earl V. Goldsmith (1892-1954) became his research assistant. In 1939 he published University of California Agriculture Extension Circular 113 "Production of Strawberries in California," and in 1945 "The Shasta, Sierra, Lassen, Tahoe, and Donner Strawberries" was published as Bulletin 690 in conjunction with Goldsmith. These two publications changed the character and scope of strawberry production in California and opened the potential of strawberries as a fresh market fruit.

When the Thomas' acquired the Morgan Hill ranch, Harold embarked upon a research program that rose to prominence in applied research and development of strawberry cultivars unrivaled in beauty and quality anywhere else in the world. The Institute sought to solve disease, insect, variety, and other problems in strawberry production, and also furnished disease-free stock

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to the grower members. In 1959 a for-profit corporation (Strawberry Institute Nursery), founded by Thomas, was established to separate the plant propagating work from the strictly service work of the Institute. In 1962, Institute members had about 1,600 acres in production. In 1966, the Strawberry Institute merged with Driscoll Strawberry Associates, Inc., which Thomas also directed for another ten years.

Within the work of Thomas and Goldsmith, the Shasta and Lassen varieties of strawberries have become important in the United States, and the Donner is now an important variety in Japan. The Goldsmith (Z5A) was patented and introduced by the Strawberry Institute commercially in 1958, and the Solana, which was named in 1957, was created in 1937 by Thomas and Goldsmith. By 1956, 55 percent of the national strawberry production was in California, with the Shasta and Lassen as chief varieties. Harold Thomas died in Morgan Hill in 1986 at age 86.

Hill and Higbie
The Rhoades House was designed by the firm of Hill and Higbie (Andrew Putnam Hill Jr. and Howard Higbie). Andrew Hill, Jr. was the son of Andrew P. Hill, the renowned photographer and California landscape painter. Andrew P. Hill Jr. (1886-1973) was an architect with a substantial career in California prior to becoming a State architect. He was trained in industrial arts education at San Jose State College and in architecture at Stanford University. After teaching at San Jose State College from 1910 to 1917, he continued teaching while establishing a part-time architectural practice. During this time he was commissioned to do a small number of residential projects that are now considered distinguished works in the post-World War I period. During this time he partnered on some projects with Howard Higbie. By 1923, Hill was appointed Assistant Superintendent of the San Jose city schools, and over the next 27 years worked at various school superintendent jobs in California.

Howard Wetmore Higbie (1879-1958), was born in New York. He was educated at Columbia University, and practiced as an architect in New York before moving to San Jose with his wife Jane in 1912. Higbie was the architect for a number of houses and apartment buildings in the 1920s and 1930s, designed in the Spanish-Eclectic style, and other design work of his included residences and public buildings. He also designed a wing of the Santa Clara County Hospital.

EVALUATION

The intent of this evaluation is to determine the eligibility of the property for designation as a County of Santa Clara Landmark. The property has not been previously surveyed or listed on any local, state, or federal registers of historic resources.

Under Division C17 of the Santa Clara County Code, the Board of Supervisors has adopted a Historic Preservation Ordinance that regulates the identification, designation, and treatment of historic properties. The Ordinance is for the preservation, protection, enhancement, and perpetuation of resources of architectural, historical, and cultural merit within Santa Clara County and to benefit the social and cultural enrichment, and general welfare of the people.

The Board of Supervisors may designate those historic resources as "landmarks" which meet the following designation criteria:

> *A. Fifty years or older. If less than 50 years old, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the historic resource and/or the historic resource is a distinctive or important example of its type or style; and of the local area, California, or the nation.*
>
> The site contains five residential buildings, two barns, remnants of a water tower, and a number of small assessory garages and ancillary buildings. All of these buildings and structures appear to be at least 50 years in age.

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B. Retains historic integrity. If a historic resource was moved to prevent demolition at its former location, it may still be considered eligible if the new location is compatible with the original character of the property;

The property maintains much of its historic integrity as per the National Register's seven aspects of integrity. The historic houses (the Phegley House and the Rhoades House), maintain their original location on the ranch, in the historic headquarters area of the larger 160-acre ranch created in the 1860s. The property today is located in a rural environment as it has been since the property was configured, although Anderson Dam, built in 1949-1950 is clearly visible to the northeast. The subject property retains its late-nineteenth century and early-twentieth century rural ranch scale and feeling, although the larger ranch property was sold off in 1945 and is now under separate ownership.

The Rhoades House has changed little since its construction, and continues (through its massing and detailing) to illustrate its associations with local architect-designed work. The Phegley House was renovated during the early-twentieth century, but retains its distinctive 1860s character and composition that is expressed through its preserved materials, workmanship, and early National-style construction technology. The alterations, such as the porch and windows, have not had a significant impact on the overall character of the house. The horse barn has changed little since its early construction, and little changes have occurred to the equipment barn.

Some buildings have been lost, such as what is believed to have been a large propagation shed to the rear of the Rhoades House that was built in the late-1940s, and demolished in 2003. Other smaller sheds that have been identified in historic photos are no longer extant. The office building and two secondary houses on the property were built after World War II. The office building has been expanded and converted to residential use, but still retains its circa 1945 character. The two houses, although associated with the Thomas period of ownership, are not distinctive modern-era buildings and are not known to be identified directly with significant personages. These two residential buildings do not directly contribute to the historic significance of the property, but reflect the continued evolution of the site into the recent past.

C. Meets one or more of the following criteria of significance:

1. Associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

The property represents today, to some degree, agricultural development patterns in the South County area, with buildings spanning 150 years of occupation and agricultural use. The association of this site however, with Dr. Thomas and the Strawberry Institute and related organizations from 1945 to 1976, is of historic significance within California, due to the contributions that Dr. Thomas and the Institute’s work had to the development of California’s strawberry industry. **The property meets Criterion 1 under the County’s ordinance for landmark designation.**

2. Associated with the lives of persons important to local, California or national history;

James Phegley is of some importance to Santa Clara County, serving as a Supervisor of the First District in the late-nineteenth century. Ira Osborne Rhoades is also a person of some importance locally, as a regional representative, President, and Interim General Manager of the California Prune and Apricot Growers Association during the early part of the twentieth century. Harold E. Thomas is a recognized twentieth century

(Continued on next page)

***Resource Name or #** (Assigned by recorder) Rhoades Ranch

***Recorded by** Franklin Maggi & Leslie Masunaga ***Date** 10/14/2010 ☒ **Continuation** ☐ **Update**

(Continued from previous page)

figure in California, considered to be the "Father of the California Strawberry Industry," and was eulogized by the University of California Academic Senate in 1987, following his death. **The property meets Criterion 2 under the County's ordinance for landmark designation.**

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values;

Both the Phegley House, the horse barn, and the Rhoades house are distinctive architectural specimens. The Phegley House is a unique and rare two-story board-wall house that was constructed during California's Early American Period. The horse barn is unusual in the region, and represents an early transition period in California's rural architectural development. The Rhoades house is a distinguished example of Spanish Eclectic architecture for 1917, an innovative design by two important local architects, Andrew Hill Jr. and Howard Higbie. **The property meets Criterion 3 under the County's ordinance for landmark designation.**

4. Yielded or has the potential to yield information important to the pre-history or history.

The pre-history of the site was not investigated for its potential to yield important information. There is no known Spanish-Mexican era occupation of the property, as the Juan Hernandez hacienda of Ojo de Agua de la Coche rancho was located across the valley from this site. An early historian, E.J. Munro-Fraser said in 1881 that Martin Murphy Sr. had initially settled with his family at the mouth of the Coyote Creek (i.e. entry to Coyote Canyon). Other reports indicated he lived at the Hernandez adobe site until building a house with his son Daniel on the rancho San Francisco de las Llagas. Early surveyors maps show no structures at the subject site to confirm that Martin Murphy Sr. had initially settled on the subject property. It does not appear from information found that the site is potentially significant due to historical archaeology. **The property does not appear to meets Criterion 4 under the County's ordinance for landmark designation.**

(Continued from page 5, DPR523b, B12 References)

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Foote, H., *Pen Pictures from the "Garden of the World,"* 1888.
Guinn, J.M., *History of the State of California and Biographical Record of the Coast Counties*, 1904.
Hall, F., *History of San Jose*, 1871.
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San Jose Evening News,
Railroad Man to Quit, July 28, 1917.
Growers Ask for Contract Change, January 24, 1922.
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New Purchasing Agent of Southern Pacific Company, June 13, 1905.
James Fletcher Phegley died age 76, Feb. 13, 1915.
Santa Clara County Clerk-Recorder, maps, deed, and official records.
Sawyer, E., *History of Santa Clara County*, 1922.
United States Federal Census, 1860–1930.
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Phegley House (1), viewed facing northeast

Phegley House (1), viewed facing northwest.

Phegley Garage (1a), viewed facing west.

Horse barn (2), viewed facing southeast.

Watertower (3), viewed facing northwest.

Rhoades House at entry (4), viewed facing northeast.

Rhoades House (4) south side, viewed facing northwest.

Rhoades House (4) rear entry, viewed facing west.

Rhoades House (4) north side, viewed facing south.

Rhoades House garage, viewed facing south.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

CONTINUATION SHEET

Primary #
HRI #
Trinomial

 ***Resource Name or #** (Assigned by recorder) Rhoades Ranch

***Recorded by** Franklin Maggi & Leslie Masunaga ***Date** 10/14/2010 **Continuation** **Update**

Equipment Barn (5), viewed facing northeast.

Office (6), viewed facing west.

Stucco House (7), viewed facing east.

Board and Batten House (8), viewed facing northeast.

Narrative Description

(Describe the historic and current physical appearance of the property. Explain contributing and noncontributing resources if necessary. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, setting, size, and significant features.)

Summary Paragraph

Located near the base of the Leroy Anderson Dam and Reservoir in southern Santa Clara County, this 12-acre site is nestled in the northeast corner of what was once a larger 160-acre ranch that was established in the 1860s when the Mexican era *Rancho Laguna Seca* was first subdivided. Most of the early ranch area is now known as Borello Farms, a 123-acre active ranch on an adjacent property to the south and west. The subject site is on a rise adjacent Coyote Creek, and overlooks the orchards of Borello Farms. This overlook is the original ranch headquarters site, and was also the site of the Strawberry Institute of California, which was developed subsequent to the property split. The larger setting remains agricultural, although the historic landscape was modified with the construction of Anderson Dam in 1949-1950. The Santa Clara Valley Water District now owns undeveloped properties to the north and east of the subject site. The property today represents a continuum of significant and supporting design elements from the mid-nineteenth to mid-twentieth centuries including much of its natural setting. Although the surrounding associated agricultural lands has been and will continue to be subject to urban development, the site preserves the feelings and associations of the headquarters of an early Northern California ranch, is the site of a 1920 Mission/Spanish Colonial Revival residence that represents the work of master local architects, and was the headquarters of the Strawberry Institute, an institution important in the agricultural history of California.

Narrative Description

The main owner-occupied house (known as the Rhoades House), completed in 1920, shares the site with four other houses that today function as rentals. Other buildings and structures exist on the site, including an early barn, an agricultural equipment building, remnants of a water tank, and other minor ancillary structures related to the residences. The site also contains mature landscaping associated with various eras of site occupation, as well as some native vegetation near the riparian corridor of Coyote Creek that is located along the northern boundary of the site. The site has one small adjacent parcel under separate ownership that fronts on Coyote Road and is partially embedded into the site. That adjacent site is not a part of this nomination. Coyote Road runs along the east boundary of the site at the base of the foothills, and extends from Cochrane Road to East Main Avenue about a mile to the southeast.

The entry to the subject site is from Cochrane Road at the northwest corner of the property. A nearby adjacent driveway (to the west) provides access to the perimeter road of Borello Farms. This drive leads to a complex of agricultural buildings to the south of and not a part of the subject property.

Contributing building/structures:

(1) Phegley House (ca. 1863)
This two-story National folk house represents the earliest known occupation of the site. It is a two-story single-wall (board wall) house constructed in the early 1860s during the early American settlement period of Santa Clara County. Single-wall houses are one of the earliest American-era building types in California, when the availability of large redwood lumber planks allowed for quick assembly of buildings. The construction technology was popular from the mid-1850s to the late-1860s during the pre-railroad era in California.

National folk houses are common across the nation, particularly in the South and the Midwest, and were a result at mid-nineteenth century of the availability (via the emerging railroads) of manufactured lumber in newly developing areas that were a distance from water transport. The Phegley House is a sub-type of National folk houses known as I-house, a type characterized by two-story buildings two-rooms wide and one deep, often with rear additions. With roots in British folk housing, I-houses were popular due to the larger sizes possible at moderate cost. Although the railroad did not connect rural areas in California until the late 1860s and later, settlers in California were aware of the technology from the Midwest and South, and were able to obtain redwood lumber harvested from the large forested Coastal Range.

Facing west towards the entry to the site from Cochrane Road, the house sits above the creek and road where the foothills begin their rise near the mouth of Coyote Canyon. This site is a natural early habitation location. Early boundary descriptions referenced the large Sycamore trees that framed the creek. Large Eucalyptus trees provide a focal point and

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

[X] A Property is associated with events that have made a significant contribution to the broad patterns of our history.

[X] B Property is associated with the lives of persons significant in our past.

[X] C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

[ ] D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply.)

Property is:

[ ] A Owned by a religious institution or used for religious purposes.

[ ] B removed from its original location.

[ ] C a birthplace or grave.

[ ] D a cemetery.

[ ] E a reconstructed building, object, or structure.

[ ] F a commemorative property.

[X] G less than 50 years old or achieving significance within the past 50 years.

Areas of Significance

(Enter categories from instructions.)

CRITERION A: AGRICULTURE, EXPLORATION/
SETTLEMENT

CRITERION B: AGRICULTURE

CRITERION C: ARCHITECTURE

Period of Significance

ca. 1863-1966

Significant Dates

1945-1966 (association with Strawberry Institute)

ca. 1860s (first period of construction)

1920 (Rhoades House completed)

Significant Person

(Complete only if Criterion B is marked above.)

Thomas, Harold E.

Cultural Affiliation

N/A

Architect/Builder

Higbie, Howard Wetmore (architect)

Hill, Andrew P. Jr. (architect)

Criterion C: Architecture

The Rhoades House is the work of the local firm of Higbie and Hill, a partnership of two local master architects during the late teens and early 1920s. The Rhoades house is a distinctive example of Mission/Spanish Colonial Revival architecture for the period, under construction in 1917 and completed in 1920. It was an innovative design by Howard Higbie and Andrew P. Hill, Jr. The Rhoades House has changed little since its construction, and continues (through its massing and detailing) to illustrate its associations with a significant architect-designed work, and is recognized as such by government agencies.

Prior to World War I, most designs of Spanish influences in California were variations of the Mission Revival style that had its roots in the late nineteenth century. The Mission Revival style bears almost no direct connection to the Mission architecture of Old California for which the name is derived, but it is rather a conglomeration of late Arts and Crafts "simplicity" (honest use of materials), tile roofs, stucco walls and pseudo-Mexican Colonial design elements. The focus of the style on Mexican-California changed with the Panama-California Exposition held in San Diego in 1915. The Exposition represented a much more precise and elaborate representation of Spanish Colonial architecture and received wide attention. Architects, inspired by what they had seen at the expo, began to look directly to Spain and its colonies for inspiration, and finding a rich history to pull from, the style evolved into what many refer to as Mission/Spanish Colonial Revival. Detailing included Spanish or Mission tile roofs, raised and inset plaster ornament, arched porches and arched picture windows, shaped buttresses, and often carved timbers and rafters. This style reached its climax in the 1920s and 1930s and then passed rapidly from favor by the 1940s.

The Rhoades House is individually significant, and has changed little since its construction, and continues (through its massing and detailing) to represent the creative work in the Mission/Spanish Colonial Revival style of local master architects, Howard Higbie and Andrew P. Hill, Jr. This house is a unique representation of the Mission-influenced Spanish Colonial style found in the American Southwest. While it showcases many character-defining features like the prominent arched entryway and the massing, it does so in an uncommon way not found outside of the work of Hill and Higbie, as evidenced by the addition of a larger-than-normal entryway, scroll-cut rafter tails and braces along the second story roof and the prominent water table line along the base of the outside walls. The mannerist design of the Mission Revival and Spanish Colonial forms are mixed with Craftsman details manifest to embody a distinguished design of the early twentieth century. Minor changes to the building and the surrounding property landscape have not affected the integrity of the property, having been done in a thoughtful manner that remains consistent with the period of significance.

Andrew Hill, Jr. was the son of Andrew P. Hill, the renowned photographer and California landscape painter. Andrew P. Hill Jr. (1886-1973) was an architect with a short, but defining career in California prior to becoming a State architect. He was trained in industrial arts education at San Jose State College and in architecture at Stanford University. After teaching full time at San Jose State College from 1910 to 1917, he continued to teach part-time while establishing an architectural practice. During this time he was commissioned to do a small number of residential projects that are now considered distinguished local works in the post-World War I period. During a portion of this period Hill partnered on projects with architect Howard Higbie.

Howard Wetmore Higbie (1879-1958) was born in New York and was educated at Columbia University. Higbie practiced as an architect in New York before moving to San Jose with his wife Jane in 1912. Jane was a prominent Interior Designer/Decorator, and is known to have participated in the designing and outfitting the interiors of buildings designed by her husband Howard. Howard Higbie was the architect for a number of houses and apartment buildings in the 1920s and 1930s throughout Santa Clara County, and often designed in the Spanish-Eclectic and Mediterranean Revival styles. His design work portfolio included public buildings as well as residences.

Works of Higbie and Hill have been recognized collectively and individually throughout the San Francisco Bay area for their architectural significance. In San Jose, their 1923 Pomeroy House and 1924 Lynnwood Apartments are designated City Landmark Structures. In Saratoga, their 1924 design for the family of Joan Fontaine is historically significant. In Campbell, the 1923 Campbell Women's Club is listed as one of the City's significant historic structures. During the brief years that the firm existed in the early twentieth century, their residential designs ranged from South San Francisco to Morgan Hill.

The other buildings identified as contributors to the Rhoades Ranch are associated with the property's use as a ranch, rather than specific architectural distinction as the work of a master architect. The Rhoades Ranch contributing properties do represent a significant and distinguishable entity whose components may lack individual distinction.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______________
HRI # ______________
Trinomial ______________
NRHP Status Code 6Z

Other Listings ______________
Review Code ______ Reviewer ______________ Date ______

***Resource Name or #** (Assigned by recorder) Anderson Dam

P1. Other Identifier: Leroy Anderson Dam

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Morgan Hill **Date** 1955 (1980) **T**9S; **R** 1E; MD **B.M.**
c. Address City Zip
d. UTM: (give more than one for large and/or linear resources) Zone: 10; 621496 mE, 4114169 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Anderson Dam is a rolled earth and rock fill dam, with a crest length of 1,385 feet, and height from Coyote Creek's streambed to the spillway crest of 625 feet, and 240 feet in height over all. **(Photograph 1)** The dam has a freeboard of 19.5 feet, and is 40 feet wide at the top and 1,100 feet wide at the base. The dam's intake valves consist of three 60-inch by 84-inch sluice gates. There are three outlet valves, a 12-inch diameter polyjet valve, a 48-inch diameter butterfly valve, and a 42-inch diameter butterfly valve. Its outlet provides for release of a maximum of 550 cfs through a 1,160-foot long, 49-inch diameter steel pipe. (See continuation sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)
***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1, camera facing northwest.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1950, Water Utility Operations Division, Santa Clara Valley Water District, "Dam Safety Program Report."

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
R. Herbert/J. Cheney
JRP Historical Consulting LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006
***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006.

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record
☐ Other (list) ______________

Primary # ______________________
HRI # ______________________

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z
***Resource Name or #** (Assigned by recorder) Anderson Dam

B1. Historic Name: Leroy Anderson Dam
B2. Common Name: Anderson Dam
B3. Original Use: Water storage, ground water recharge, flood control, and recreation. B4. Present Use: Water storage, ground water recharge, flood control, and recreation.
***B5. Architectural Style:** n/a
***B6. Construction History:** (Construction date, alteration, and date of alterations) Constructed 1950; inlet tower extended 1960; spillway enlarged and crest modified 1987 and 1988; new inlet structure for outlet works 1988-1989.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**
***B8. Related Features:**

B9. Architect: G.W. Hunt (Chief Engineer) b. Builder: Guy F. Atkinson Company
***B10. Significance: Theme** n/a **Area** n/a
Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Anderson Dam and its associated outlet and control structures are the resources studied for this evaluation. It does not appear that the dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources (and thus are not historically significant under CEQA guidelines).

The resource inventoried in this form, the Anderson Dam complex, is associated directly with the Santa Clara Valley Water District's water development system in the Santa Clara Valley of California. Anderson Dam was constructed in 1950 by the South Santa Clara Valley Water Conservation District to raise the water table, supply irrigation water and flood protection to Santa Clara Valley. Its construction created a storage reservoir. (See continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes)
***B12. References:**
See footnotes; USGS maps, local newspapers, engineering reports, *Dam Safety Program Report*, Santa Clara Valley Water District October 2004, *Index to Documents Relevant to the Modifications and Repairs of Santa Clara Valley Water District Dams,* Santa Clara Valley Water District, September 1995, etc.

(Sketch Map with north arrow required.)

B13. Remarks:

***B14. Evaluator:** Rand Herbert

***Date of Evaluation:** August 2006

(This space reserved for official comments.)

P3a. Description (continued):

An ogee chute style spillway is located on the west side of the dam, and has a capacity of 57,400 cfs. **(Photograph 2)** The spillway weir is 223 feet in length. Behind the dam, Anderson Reservoir has an 89,073 acre-feet capacity. The Anderson Dam functions together with the Coyote Dam. As the dams are operated as a system, the State of California Department of Water Resources, Division of Safety of Dams (DSOD) imposes a restriction on the capacity of the two dams.

A modern restroom has been constructed at the dam's west side. It is a concrete block building, topped with a front gable metal roof that contains a monitor skylight. **(Photograph 3)** Another concrete block building located on the west side of the dam and reservoir is topped with a flat roof. **(Photograph 4)** This building contains a set of flush doors and one flush single-leaf door. **(Photograph 4)** A third concrete masonry building is located on the dam and is topped with a flat roof. A single, slab single-leaf door serves as its entrance.

At the rear of the dam (north side) is a building with a removable shed roof, its walls sided in stucco. A flush single-leaf metal door accesses this instrument building. Also at the rear of the dam, near the outlet chute, is another control building that is topped with a flat roof, sided in poured concrete and accessed by a flush metal door. **(Photograph 5)**

B10. Significance (continued):

At the turn of the twentieth century the Santa Clara Valley was a predominantly agricultural region with a small urban area concentrated in San Jose and several other small towns. Groundwater levels at this time were sufficiently high that wells often flowed under artesian pressure. However, by 1915 a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67% of the area under irrigation, and the population of its urban centers was on the rise. By the end of the decade the groundwater table had dropped 50 feet in four years, increasing pumping costs and causing the ground to subside.[1] These factors led valley leaders and local engineers to seek a means to replenish the lowering ground water table.

During the 1920s, engineers Fred H. Tibbetts and Stephen Kieffer undertook a study of the problem and proposed a system of dams and water conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters defeated establishment of a water conservation district in 1927 and 1928, when water levels in local wells fell below 100 feet in 1929, the voters approved the measure and established the SCVWCD. By 1934 the district's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge.[2]

The system of dams and reservoirs operated successfully but the continued urban and agricultural growth in the Santa Clara Valley created greater demand for water and additional dams were constructed in the 1950s. Lenihan Dam, known as Lexington Dam, was one of three dams constructed during this period by the SCVWCD. The South Santa Clara Valley

[1] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934, passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.
[2] ASCE, *Historic Civil Engineering Landmarks,* 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District" (January 31, 1936), 6-10, WRCA.

Water Conservation District, serving the southern portion of Santa Clara County, also constructed two dams for the same purposes during the 1950s.

Evaluation Considerations

In 2003, JRP Historical Consulting Services evaluated another dam, the Almaden Dam, of the Santa Clara Valley Water District, in its report, "Historical Resources: Almaden Dam, Santa Clara Valley Water District." At that time, JRP Historical Consulting determined that Almaden Dam, by itself, was not eligible for the National Register of Historic Places or the California Register of Historic Resources because "[it] is part of a larger system, the other parts of which are not part of this evaluation. By itself, the dam would not be considered sufficiently significant to appear eligible for the National Register of Historic Places under Criterion A at either the local, state, or national level. It is possible that the system as a whole, should it be inventoried and evaluated, could qualify as a significant property assuming it has retained its over all integrity."[3] The entire system of Santa Clara Valley District system of dams is the subject of this current evaluation and it still does not appear that Anderson Dam or its appurtenances meet the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

The San Francisco Section of the American Society of Civil Engineers recognized the Santa Clara Valley Water Conservation District system (of which Anderson Dam is a part) in 1976 as a "historic civil engineering landmark." While this designation imparts no particular regulatory status, it represented an acknowledgment of the system's significance to interested northern California civil engineers.[4] The report prepared by the ASCE section listed two "special notes" regarding the SCVWCD system as a whole:

1. This system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin.
2. This water supply development facilitated the post World War II growth of the Santa Clara Valley into one of the major metropolitan areas of the country.[5]

However, even with this designation in mind, it does not appear that Anderson Dam and its outlet structures meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources.

It is difficult to establish a single standard for what might constitute significance for a dam because there are several areas in which that significance might come into play. In general, however, the test would be some type of importance that is not common to other dams in the region or state. Innovation might be one test: for example, was the dam the first to be built specifically to recharge a local aquifer? This was one of the reasons the ASCE San Francisco section considered the

[3] JRP Historical Consulting, "Historic Resources Report: Almaden Dam, Santa Clara Valley Water District," (Davis, California: 2003).

[4] ASCE, *Historic Civil Engineering Landmarks,* 29. The Historic Civil Engineering Landmark Program recognizes historically significant local, national, and international civil engineering projects, structures, and sites. The Historic Civil Works award recognizes projects that were built prior to the advent of engineering as a discipline in the 18th century. The objectives of the program are to: 1) Encourage all civil engineers to become more aware of the history and heritage of their own profession; 2) Increase appreciation by the public of civil engineering contributions to the progress and development of the United States and the world. 3) Identify and designate national historic civil engineering works that have made a significant contribution to the development of the United States and to the profession of civil engineering in particular. 4) Encourage, where appropriate and feasible, the preservation of significant historic civil engineering works. 5) Provide a documented archive of Civil Engineering Historic Landmarks for the use of engineering students, professional writers, researchers, and historians. 6). Promote the inclusion of information on Historic Civil Engineering Landmarks in encyclopedias, guidebooks, and maps used by the general public. (From the ASCE web site, http://www.asce.org /history/hp_r esguide2.html)

[5] ASCE, *Historic Civil Engineering Landmarks,* 28.

SCVWCD system an engineering landmark. While Anderson Dam is a part of the Santa Clara Valley Water District, its construction in 1950 was to augment the existing water conservation system that was already in operation since the 1930s. Anderson Dam and its appurtenances were constructed using well established engineering techniques like those used by the District's original water conservation system of dams, constructed in the 1930s. Size or engineering achievement might be another test, if a dam was unusual for its design, or represented a breakthrough in the science of dam engineering, or represents a rare example of its type, which Anderson Dam does not.

Several general observations regarding earth filled dams merit discussion by way of introduction. The first observation is an obvious but important point: there are many earth fill dams in California. Of the dams in California under the jurisdiction of the Division of Safety of Dams 72% are earth fill. Collectively, all of these dams serve important functions, and the dams of the SCVWCD obviously benefited the region's urban areas and agriculture. Individually, however, any one dam is part of a larger system and one of a vast number of similar properties.

Second, it is important to understand dams in general as part of a class of infrastructure improvements that deliver benefits to broad constituencies. Certain types of improvements fit this definition of infrastructure. Most public works projects fall into this category, including state and local road systems, municipal water systems, sewer systems, hospitals, schools, airports, and the like. Major utility features also fall into this category, including electric power generating plants, natural gas pipelines, railroads, and telephone service. These elements of the infrastructure are obviously important to the communities they serve. In time, members of the community come to rely upon these elements for their basic needs, the roads they drive, water they drink, electricity they use, and so forth. Thus, in many communities, dams are essential elements of the infrastructure.

This point is useful in appreciating how significance might be assessed for such properties. In a sense, every element of the infrastructure is important. Unless judgment is exercised, however, every dam, road, bridge, telephone line and sewer system might be seen as eligible for the National Register for its contribution to the local community and its development. To avoid that overbroad conclusion, such infrastructure elements must be assessed within the context of similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating dams.

Another consideration in evaluating significance of dams is the period of significance. The area of significance defines the period of significance. If a dam is significant for its design, the period of significance should be restricted to the era in which the dam was built. However, if it is important for its contribution to the initial settlement of a region, the period of significance should be restricted to the settlement period.

Finally, integrity is assessed for the resource's period of significance. The property must retain integrity to its potential period of significance if it is to meet the criteria for listing in the National Register of Historic Places or as an important resource under California law and regulations.

The following discussion presents an evaluation of Anderson Dam under National Register and California Register criteria and its integrity.

Criterion A or 1: Anderson Dam is an integral unit of the SCVWCD's system, which played a role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. However, as noted above, major infrastructural elements are inherently important to their communities. For example, while the SCVWCD system may have been important in the economic development of the Santa Clara Valley, the same might be said of completion of railroads through the area in the nineteenth century, or construction of modern roads and highway systems in the twentieth century. Moreover, the area receives water from other systems, including (in more recent years) the State Water Project. It is unlikely that construction and operation of the SCVWCD system, as a whole, was the principal driving force behind the economic development of the area. Rather, it was one

of several factors leading to the construction of the Santa Clara Valley. Anderson Dam is one of four dams within the system constructed to augment and add to the water conservation system of dams already in operation since the 1930s.

Criterion B or 2: Anderson Dam does not have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore does not appear eligible under this criterion. While Anderson Dam is associated with the G.W. Hunt and Guy F. Atkinson company, it is inappropriate to use its association with them under Criterion B or 2 to evaluate the dam, as it would better be considered under Criterion C or 3, as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: does Anderson Dam exhibit particular significant design or engineering characteristics, and is it the work of a master engineer. Each of these considerations will be addressed in turn.

First, Anderson Dam is a structure of common design that represented no particular engineering achievement at the time it was constructed. Earth fill dams were common in the 1950s. Of the 811 earth fill dams under the jurisdiction of the state, 197 dams have dates of construction prior to 1936, some dating as early as 1850 and 1851. Nothing in the accounts of Anderson Dam's construction (or construction of other dams in the system) suggests that they were designed and built through anything other than a standard process.

Furthermore, was Anderson Dam an innovation? As discussed above, Anderson Dam was constructed to add to the District's water conservation system that was in operation since the 1930s. The original dams constructed by the District in the 1930s were constructed to operate as a system. Anderson Dam was not part of the original system plan, but rather was added during the post-World War II period when more water conservation was needed. Anderson Dam was constructed using the same engineering methods, and augmented a system that had been in existence and therefore was not an innovation.

Second, was this dam the work of a master, in this case G.W. Hunt or Guy F. Atkinson, and if so, was it an important example of their work? Research did not reveal further information on G.W. Hunt. The Atkinson Company was an influential builder of hydroelectric structures, road, bridge, tunnel, and industrial projects in California and was responsible for many important projects. However, nothing in the historic record suggests that Anderson Dam was of particular importance or a challenging example of his company's work as a builder. Rather, it was one of many dams and large construction projects he designed. Consideration of these factors indicates that Anderson Dam and its outlet features do not appear to meet the criteria for listing in the National Register of Historic Places under Criterion C.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important. In rare instances, structures, such as dams and buildings, can serve as sources of important information about historic construction materials or technologies; however, this property is otherwise documented and does not appear to be a principal source of important information in this regard.

Integrity
As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. Anderson Dam has retained a very good level of integrity in all seven measures. It remains, obviously, in its original location, the setting of which is unchanged from its original construction beyond the growth of trees in the surrounding area. It has not been substantially altered (the only changes being to its intake structure beneath the water surface, and minor changes around the outlet structures) so it retains integrity of design, workmanship, and materials. It remains a part of the SCVWD's system, so its association also has been retained. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while

at or while viewing the site. Anderson Dam has a strong sense of time and place. While the dam retains overall integrity from its period of construction, it does not appear that the dam or its appurtenances meet the required significance criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

P5b. Photographs (cont.):

Photograph 2. Leroy Anderson Dam Spillway, camera facing northwest. April 17, 2006.

Photograph 3. Public Restroom, camera facing north. April 17, 2006.

***Resource Name or #** (Assigned by recorder) Anderson Dam

***Recorded by** Rand Herbert *Date April 17, 2006 ☒ Continuation ☐ Update

Photograph 4. Outlet Valve Building, camera facing northwest. April 17, 2006.

Photograph 5. Instrument buildings, camera facing east. April 17, 2006.

*Recorded by Rand Herbert *Date April 17, 2006 ☒ Continuation ☐ Update

Photograph 6. Anderson Dam during construction, 1950.

Photograph 7. Anderson Dam shortly after construction, c. 1950.

Photograph 8. Anderson Dam Spillway during construction, 1950.

Photograph 9. Leroy Anderson Dam plaque, camera facing west. April 17, 2006.

SUPPLEMENTAL

HISTORIC RESOURCES INVENTORY AND EVALUATION REPORT

for the

Anderson Dam Seismic Retrofit Project
(Project No. 91864005)
Santa Clara County, California

Prepared For:

Valley Water
5750 Almaden Expressway
San Jose, CA 95118

Prepared By:

Christopher McMorris, Principal
Steven J. "Mel" Melvin, Historian/Architectural Historian
JRP Historical Consulting, LLC
2850 Spafford Street
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October 2019

SUMMARY OF FINDINGS

The Santa Clara Valley Water District (District) (also known as Valley Water) is proposing a seismic retrofit of the Anderson Dam. The dam is a rockfill embankment structure built in 1950 in Santa Clara County near the eastern boundary of the city of Morgan Hill. The major components of the project are dam embankment remediation, dam crest raise, spillway volume increase, intake and outlet works construction, borrow area mining, and spoils disposal. See **Appendix A**, **Figure 1** and **Figure 2** for vicinity and project location maps, and **Figure 3** for the Area of Potential Effects (APE) map.

JRP Historical Consulting, LLC (JRP) prepared the initial Historic Resources Inventory and Evaluation Report (HRIER) for this project in 2014 and changes to the project since that time have increased the size of the APE, thus necessitating preparation of this Supplemental Historic Resources Inventory and Evaluation Report.[1] This supplemental report inventories and evaluates resources in the expanded APE. This report is being prepared under contract with Far Western Anthropological Research Group, Inc. (Far Western) as part of the environmental compliance for this project. The purpose of this document is to assist with project compliance under National Historic Preservation Act (NHPA) Section 106 and the implementing regulations of the Advisory Council on Historic Preservation (Title 36 Code of Federal Regulations Part 800) as these pertain to federally funded undertakings and their effects on historic properties, i.e., properties listed in or eligible for listing in the National Register of Historic Places (NRHP). This document also is prepared for project compliance with the California Environmental Quality Act (CEQA) as it pertains to historical resources (CEQA Guidelines Section 15064.5). The Federal Energy Regulatory Commission (FERC) is the lead agency for the federal undertaking under the NHPA and for project compliance with the National Environmental Policy Act (NEPA) and District is the lead agency for project compliance under CEQA.

The present study identified twelve historic-era built environment resources on six Assessor's parcels in the expanded APE that required evaluation for NRHP / California Register of Historical Resources (CRHR) eligibility. These resources are on Assessor Parcel Numbers (APNs) 728-34-019, 728-34-020, 728-35-037, 729-49-005, 729-49-004, and 729-50-002. These resources have been recorded and evaluated on the attached Department of Parks and Recreation (DPR) 523 forms and include a residence and garage, two poultry barns, two orchards, several water pumps and water conveyance pipes, and Coyote Canal. This report concludes that none of these resources meet the criteria for listing in NRHP or the CRHR. JRP also identified in the APE on a small portion of APN 729-49-005, the 15-acre Malaguerra Winery, a property listed on the NRHP in 1980.[2] The Malaguerra Winery is also listed on the Santa Clara County Heritage Resource

[1] JRP Historical Consulting, LLC, "Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," prepared for the Santa Clara Valley Water District, 2014.
[2] Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, November 4, 1977, NRHP Reference No. 80000858, listed October 23, 1980. This resource has a California Historical Resources Status

Inventory, and on June 9, 2009, the Santa Clara County Board of Supervisors designated the Malaguerra Winery a County Landmark (No. CL09-004).[3] This property, therefore is considered a historic property for purposes of NHPA Section 106 and is a historical resource under CEQA. Because of its status as a historic property, JRP did not record the Malaguerra Winery on a DPR 523 form for the present study. The winery is discussed below in the effects analysis section of the report. Additionally, JRP prepared an Update DPR 523 form for the Anderson Dam, previously recorded and evaluated in 2006 by JRP and found to be not eligible for listing in the NRHP or CRHR.[4] The DPR 523 forms prepared for this project are in **Appendix B**. The Malaguerra Winery National Register nomination form and photographs, and the JRP 2006 report regarding the Santa Clara Valley Water District's dams that included historic evaluation of Anderson Dam are provided in **Appendix C**.

Code of 1S. State of California, Office of Historic Preservation, "Technical Assistance Bulletin #8: User's Guide to the California Historical Resource Status Codes & Historic Resources Inventory Directory," November 2004, 4, 5.

[3] Santa Clara County, Board of Supervisors, Minutes of June 9, 2009; Santa Clara County, Historic Resources Inventory, 2005.

[4] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," prepared for Santa Clara Valley Water District, July 2006.

TABLE OF CONTENTS

APPENDICES

1 PROJECT DESCRIPTION[5]

The project objective is to remedy seismic, flood capacity, and reservoir drawdown deficiencies at Anderson Dam. This includes meeting FERC and California Department of Water Resources, Division of Safety of Dams safety requirements. The three key project components are: (1) retrofitting the dam embankment and raising the dam crest; (2) construction of new low-level and high-level outlet works, and; (3) replacing the spillway to increase flow capacity. Other necessary construction activities in support of these key components include: site preparation, access roads and bridges, creek channel and bank modifications, staging and stockpile areas, borrow sites, spoils disposal sites, construction of a water diversion system and water management, and landslide remediation areas, and; site restoration when project construction is completed. Project construction is planned over five years, with site restoration completed in the sixth year. As of the drafting of this report, many details of these construction activities are yet to be determined.

[5] Project Description provided by the District and based on the most recent project information as of the drafting of this report.

2 RESEARCH AND FIELD METHODS

JRP conducted research and prepared a historic context statement addressing themes relevant to the historic-era resource within the APE. Research was conducted at the San Jose Public Library, Dr. Martin Luther King, Jr. Branch; Santa Clara County Parks, Anderson Lake Park Ranger Office; Santa Clara County Recorder; and Santa Clara County Building Department. JRP obtained additional materials digitally from the Santa Clara Valley Water District, conducted online research, and made use of its extensive in-office library. Far Western conducted a records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University on August 1, 2017 and July 22, 2019, and shared the results relevant to built environment historic resources with JRP. The NRHP-listed Malaguerra Winery was only resource in the APE identified in the records search. A thorough discussion of the Malaguerra Winery is in Section 6. In addition, JRP reviewed the National Park Service's National Register Information System online database; California Office of Historic Preservation, Directory of Properties in the Historic Property Data File for Santa Clara County; California Office of Historic Preservation, *California Inventory of Historic Resources* which includes resources on the California Register, State Historical Landmarks, and Points of Historical Interest; and the Santa Clara County Historical Resources list.[6]

JRP conducted an intensive level survey in the expanded APE on August 16 and 17, 2017; January 4, 2018; and September 3, 2019. Identification of built-environment resources in the APE consisted of pre-fieldwork examination of aerial imagery, coordination and communication with Far Western staff who conducted an intensive level pedestrian survey of the APE prior to JRP fieldwork, and a JRP reconnaissance survey of the APE to identify all and any historic-era built environment resources in the APE not identified before fieldwork. Field survey consisted of photographing identified historic-era built environment resources in the APE on APNs 728-34-019, 728-34-020, 728-35-037, 729-49-005, and 729-50-002, noting their condition and characteristics, and observing the setting. Survey of the Coyote Canal in the APE entailed walking the length of the canal from the headworks on Coyote Creek to the west end of the APE. JRP also surveyed the canal outside of the APE on Malech Road, west of the APE as comparison points to enable an informed assessment of the overall condition and integrity of the canal. JRP has recorded the resources in the APE on DPR 523 forms provided in **Appendix B**.

The District has conducted all public outreach efforts for this project. The 2014 HRIER discussed these efforts including scoping meetings and communications with Joe and Sheila Giancola, who are the owners of property at 2290 Cochrane Road, the former Rhoades Ranch, which is listed in the NRHP. No specific letter to interested parties was sent by JRP during preparation of this report.

[6] National Park Service, National Register Research Database, Available at https://www.nps.gov/nr/research/, Accessed August 2017; California Office of Historic Preservation, *Listed California Historical Resources*, Available at http://ohp.parks.ca.gov/ListedResources/, Accessed August 2017; Northwest Information Center, Sonoma State University conducted by Far Western, Information Center File Number 17-0218, August 1, 2017. and File Number 19-0141, July 22, 2019.

3 HISTORICAL OVERVIEW

The APE for this project is in southern Santa Clara County immediately east of Morgan Hill. The built environment resources in the APE requiring evaluation are a portion of the Coyote Canal, built in 1936-1937, located in the APE on APNs 729-49-005, 729-49-004, and 729-50-002; a residence, garage, two poultry barns, built between 1960 and 1964, two orchards ca. 1920, and an irrigation pump and pumphouse ca. 1915, all on APN 72949-005; two irrigation pumps on APN 729-50-002 built ca. 1922 and ca. 1940, respectively; an irrigation pump on APN 728-34-019 built ca. 1900; a segment of irrigation pipe on APN 728-34-020 built ca. 1910; and an irrigation pump and pipe segments on APN 728-35-037 built ca. 1905. APNs 728-34-020, 728-35-037, 729-49-005, and 729-50-002 are currently owned by the County of Santa Clara and are part of Anderson Lake County Park. APNs 729-49-004 and 728-34-019 are currently owned by the Santa Clara Valley Water District. The Coyote Canal was built as a component of a wide-ranging and elaborate water conservation system built by the Santa Clara Valley Water Conservation District (later Santa Clara Valley Water District and now also referred to as Valley Water) in the 1930s. The canal is still owned by the District, which has title to a right-of-way for the canal through APNs 729-49-005 and 729-50-002 in the APE. The other evaluated resources in the APE are associated with agricultural development in the Santa Clara Valley and Morgan Hill region. The below historic overview provides a context focused on themes relevant to the recorded resources to aid in the assessment of their historic significance, specifically themes of agriculture, horticulture, poultry ranching, and the development of Santa Clara Valley Water Conservation District system. Additionally, a land use history for the area now occupied by Anderson Dam and Anderson Lake is also provided herein, intended to assist Far Western with assessment of potential historic archaeological resources.

3.1 Euro-American Settlement and Agricultural Development in the Southern Santa Clara Valley

The Santa Clara Valley is among the longest settled areas in California. The Pueblo of San Jose in the northern part of the valley, was one of the small number of *pueblos* established by the Spanish (the others include Los Angeles, San Francisco, and San Diego) in the eighteenth century. Outside of the pueblo boundaries, the valley was largely divided into rancho land grants conveyed to individuals by the Mexican government. Many of the land grants made by the Spanish and Mexican governments in the Santa Clara Valley survived into the American period and some of the property lines are still evident on the landscape.

The first Euro-American settlement in the vicinity of the APE for this project occurred in 1834 when the Mexican government granted 20,052 acres to Juan Alvires known as Rancho Refugio de la Laguna Seca and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The APE is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants Alvires and Hernandez operated cattle ranches on their land. This pastoral way of life continued into the early 1850s as non-Latino settlers began to arrive in the area, such as Martin Murphy, Sr., William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction. Fisher died in 1850 and the land, which includes the current APE, passed to his wife, Liberta C. Fisher.[7]

Large landowners in the early period of American settlement such as Fisher and Murphy initially continued the practice of cattle grazing. Other agricultural endeavors included sheep ranching, dairying, and general farming. Sheep ranches and dairy farming were particularly prevalent in southern Santa Clara County. Stock raising continued to be the primary economic activity in Santa Clara County until the drought of 1864, which decimated the herds and caused financial ruin to many ranchers.[8]

The 1864 drought also contributed to a rise in wheat cultivation in the Santa Clara Valley. Wheat had been grown in this area since the 1850s and its acreage grew with each year. The easy cultivation and high fertility of the soil of the valley facilitated wheat production with little capital investment. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop. During the 1860s, this popular crop surpassed cattle ranching as the principal agricultural activity in the valley and by 1870, wheat and barley occupied most of the rural acreage of the county. While wheat supplanted cattle ranching in the valley, some large stock ranches continued to operate in the outlying areas such as in the eastern foothills near the APE, and southwest of Gilroy. The largest of these ranches in the region were owned by the C. M. Weber estate, Henry W. and Charles Coe, Horace Willson, J. P. Sargent, and Henry Miller.[9]

Wheat's primacy in the county began to wane in the 1870s, however, as farmers experienced poor yields, lower prices, and competition from wheat grown in the Central Valley. Santa Clara County farmers responded by adopting a diversified farming approach, raising dairy cows, sheep, poultry, swine, hay, grapes, and fruit trees.[10] By turning away from wheat, Santa Clara County farmers opened the door for what would be the mainstay of Santa Clara Valley agriculture for decades to come: horticulture. Orchards had been planted during the Mexican and early American periods in the valley, but these were very small scale and for personal or limited commercial use. In 1856, the first experimental orchards were set out in the Willow Glen area, just southwest of present-day downtown San Jose. These were generally successful and led to farmers planting more orchards in the 1860s.[11]

[7] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[8] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 37-38.
[9] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 12, 13.
[10] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60.
[11] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 14.

In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. This particular variety of plum had a low moisture content making it ideal for drying and, thence, ideal for shipping as refrigerated rail cars had not yet been invented. In addition to prunes, Santa Clara Valley and farmers also planted other stone fruit orchards such as apricots, peaches, and cherries. The completion of the Santa Clara & Pajaro Valley Railroad (which would become part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 further boosted horticulture as it opened the large eastern US market to Santa Clara Valley fruit via the newly completed transcontinental railroad. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm could generate enough income to support a family. With the technological development of ice-cooled refrigerated rail cars in the 1880s, shipment of fresh fruit also became possible and furthered the popularity of orchard crops. By 1890, the transition to horticultural had spread to every part of the valley where irrigation water from streams or wells was available (**Plate 1**).[12]

Plate 1. Prune orchards near Morgan Hill ca. 1910. (Photo courtesy of San Jose Public Library.)

In addition to orchards, many farmers in the Santa Clara Valley planted another fruit crop: grapes. In the 1860s, José Maria Malaguerra planted one of the earliest vineyards in the county on a 200-acre tract purchased from Liberta C. Fisher where Malaguerra grew grapes and established the Malaguerra Winery, a property in the expanded APE for this project. Other early wineries in the Morgan Hill area include that of Joel W. Ransom who owned a 400-acre farm

[12] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15.

and by the 1880s had planted in French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes, and built a small winery on his property. Another vineyardists in the Morgan Hill area was Emilio Guglielmo who established a vineyard and commercial winery in the early twentieth century that continues to produce wine up to the present. South of Morgan Hill, the San Martin and Uvas Valley areas developed into viticulture locales with multiple farms raising wine grapes and building small wineries and brandy distilleries by the 1880s. While occupying considerably less acreage than orchard crops, viticulture remained a common practice, particularly in the southern part of the county, where such renowned wineries as the San Martin Winery were developed and continued to thrive through the twentieth century. The county experienced a general upward trend in viticulture with vineyards occupying over 1,000 acres in 1922 and 4,858 in 1955, most of this acreage lying between Morgan Hill and Gilroy.[13]

Advancements in irrigation technology facilitated the development of intensive horticulture in the Santa Clara Valley. The first type of irrigation pump used on farms was the centrifugal type pump. This type of pump was invented in the early 1800s by developers in the United States and England and by the late 1800s had come into common use on farms to draw irrigation water from streams. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance, and therefore, this type of pump was best applied to pumping surface water, such as out of a creek or canal to irrigate a field, rather than from wells. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute.[14]

The other common type of pump in the Santa Clara Valley was the vertical turbine pump. Pump manufacturing companies first developed this type of pump in the early twentieth century, particularly for pumping groundwater for irrigation from deep wells. Vertical turbine pumps had the advantage over centrifugal pumps in that they had greater lift potential, that is, they could pump water from greater depths. Vertical turbine pumps came into popular usage on farms beginning around 1915, by which time the technology had advanced to achieve a lift of 350 vertical feet and deliver between 600 and 3,000 gallons of water, making vertical turbine pumps the preferred deep well pump among farmers. Vertical turbine pumps also had a simple, low-maintenance design, and did not require as large of a bore-hole diameter, compared to other well pump systems of the day. Both centrifugal and vertical turbine pumps were powered by electric

[13] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2.
[14] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3. "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.

motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive.[15]

A common method to deliver water from either a centrifugal or vertical turbine pump was by steel pipe. The most common type of pipe design used on farms by the late 1800s was riveted steel pipe. This design consisted of sheet of rolled steel joined together at the longitudinal seam and ends with rivets. By 1905, the lock-bar type design was invented and came into common usage because of its greater tensile strength and less leakage. Lock-bar type pipe was fabricated by joining sheets of rolled steel at the longitudinal seam with an H-shaped bar applied to each edge of the steel sheet and compressed to form a tight seal. By the 1930s, welded steel pipe gradually replaced riveted steel and lock-bar as the preferred pipe design. The above discussed pumps and pipes types are resources in the expanded APE on APNs 728-34-019, 728-34-020, 728-35-037, 729-49-005, 729-49-004, and 729-50-002.[16]

Orchard fruit production continued to grow into the twentieth century and orchard farming remained the dominant agricultural activity in the Santa Clara Valley. At this time prunes remained the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District, as discussed below, which ensured sufficient water for irrigation. After World War II, the vast orchards that had come to characterize the Santa Clara Valley gradually gave way to suburban residential and industrial development. This trend started in the northern part of the county around San Jose and slowly spread out from this nucleus in all directions. The southern part of the valley was the last area to be affected by suburbanization, and remained largely rural-agricultural until the 1970s.[17]

3.2 Anderson Dam and Reservoir Area Land Use History

Anderson Dam is built in a narrow gap of a long north/south ridge of the Diablo Range, on the eastern edge of the southern Santa Clara Valley. Coyote Creek once flowed freely through this defile into the Santa Clara Valley and north to San Francisco Bay. The creek originates southeast of the dam and flows northwesterly through a narrow valley toward the dam. The southern portion of Anderson Reservoir is the flooded valley of Coyote Creek. The northern portion of the reservoir floods the valley Las Animas Creek, which prior to construction of Anderson Dam, flowed into Coyote Creek at a point just upstream from the dam site. The gap in the mountains

[15] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3.

[16] American Water Works Association, "AWWA Manual: History, Uses, and Physical Characteristics of Steel Pipe," 2004, 1-2; B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 156-157.

[17] Stephen Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.

through which Coyote Creek formerly flowed into the Santa Clara Valley also provided an easy route into the valleys of Coyote Creek and Las Animas Creek, and the backcountry of the Diablo Range. The division of Anderson Reservoir into northern and southern sections defined by the natural waterways, Coyote Creek and Las Animas Creek, also coincidentally holds true for historic land ownership patterns and the discussion below is divided as such.

The farming/ranching/livestock grazing land use established by the earliest Euro-American settlers in what became the Anderson Dam reservoir area continued to be the predominant land use until 1950 and the flooding of the area following completion of Anderson Dam. In contrast to the flat terrain of the adjacent Santa Clara Valley, the steep valleys and ridges of the Diablo Range made the intensive irrigated agriculture practiced in the valley impossible, and for the most part limited land use to livestock grazing. The topography also made travel and access to this area difficult, resulting in very few people living in the area, and only a very few unimproved roads built (**Plate 2** and **Plate 3**).

Plate 2. Portion of the 1917 USGS *Morgan Hill Quadrangle* showing the northern reservoir and dam portion of the project study area outlined in blue. Note the steep terrain, buildings, and roads.

Plate 3. Portion of the 1917 USGS *Morgan Hill Quadrangle* showing the southern reservoir and dam portion of the project study area outlined in blue. Note the steep terrain, buildings, and roads.

The northern part of the reservoir is entirely within the boundaries of the former Rancho Cañada de San Felipe y Las Animas, a Mexican land grant conveyed to Thomas Bowen in 1839 by Mexican Governor Manuel Jimeno. Bowen sold land to Charles Maria Weber circa 1842. Weber, a German immigrant, arrived in California in 1841 with the Bartleson-Bidwell party and settled in San Jose in 1842, purchasing Rancho Cañada de San Felipe y Las Animas shortly thereafter (**Plate 4**). Weber started grazing cattle on the rancho, and while in the southern Santa Clara Valley met and married Helen Murphy, the daughter of Martin Murphy, also a large cattle rancher. The US Board of Land Commissioners confirmed the rancho grant, consisting of 8,787.80 acres, to Weber in 1866. In 1845, Weber purchased another large rancho grant, the Rancho Campo de los Franceses in San Joaquin County, and by 1876, had also acquired 2,302 acres of Rancho Laguna Seca adjacent to the west Rancho Cañada de San Felipe y Las Animas. After the Mexican-American War (1846-1848), Weber settled in San Joaquin County and founded the city of Stockton, while maintaining possession of Rancho Cañada de San Felipe y Las Animas and using the land for livestock grazing. Weber lived in Stockton until his death in 1881.[18]

[18] H.I. Wiley, *Report of the Surveyor General of the State of California, August 1, 1884-August 1, 1886* (Sacramento: State Printing Office, 1886), 13; Ogden Hoffman, *Reports of Land Cases Determined in the United States District Court for the Northern District of California* (San Francisco: Numa Hubert, 1862), Appendix, 46; UC Berkeley, Bancroft Library, Collection Summary, Biography, Weber Family Papers, Collection Number BANC MSS C-B

Plate 4. Portion of an 1876 map showing the portion of Charles M. Weber's Rancho Cañada de San Felipe y Las Animas property (shaded red) in the project study area.[19]

Charles and Helen Weber had three children: Charles Martin Weber, Julia Helen Weber, and Thomas Jefferson Weber. The Weber children inherited Rancho Cañada de San Felipe y Las Animas and continued the ongoing livestock grazing land use. The Weber heirs began selling off the family's vast real estate holdings in the early twentieth century including that portion of Las Animas Cañada de San Felipe y Las Animas in the project study area sold to the Bay Cities Water Company (Bay Cities) about 1905. Bay Cities bought the land to acquire its water rights with the objective of developing the water resources in this part of the county for sale to San Francisco. The project never got beyond the planning stage as the San Francisco Board of Supervisors rejected the Bay Cities proposal. Bay Cities, however, held on to the property and

829; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 26; Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876).

[19] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876).

developed some magnesite mining sites, the exact location of these is unknown. Following the collapse of the magnesite market after World War I, the company sold the land in 1919 to the San Jose-based firm the O'Connell Brothers (**Plate 5**).[20]

Plate 5. This image shows the northern portion of the dam and reservoir portion of the project study area superimposed on a 1939 aerial photograph. At the bottom of the image is the confluence of Coyote Creek and Las Animas Creek.[21]

[20] J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 10, 15, 18; Santa Clara County Recorder, Bay Cities Water Company to Charles O'Connell, et al, Deed, Deeds:486:400, June 6, 1919; McMillan & McMillan, *Official Map of Santa Clara County, California* (San Jose: McMillan & McMillan, 1929).
[21] Fairchild Aerial Surveys and US Department of Agriculture, Aerial Photographs, Flight C-5750, Photo No. CIV-294-97, October 20, 1939.

The O'Connell Brothers formed in 1906 in San Jose started by Charles T., Franklin J., George D., Albert F., and Elmer S. O'Connell. The five brothers established a grocery store and butcher shop in San Jose and shortly thereafter began leasing the former Weber lands, finally purchasing the property in 1919. O'Connell Brothers grazed cattle on the property and to enhance grazing on the tract, the company built a dam across Las Animas Creek to irrigate pasture lands along the creek. It appears cattle grazing continued as the predominant land use in the northern portion of the reservoir study area until construction of the dam in l950.[22]

In the southern portion of the reservoir study area, the majority of land was originally part of the Pueblo of San José land grant established in 1778. The grant covered a vast amount of land generally from San Francisco Bay on the north, south almost to Gilroy, and between the Guadalupe River on the west, and the Diablo Range on the east. In the years after 1778, particularly during the Mexican period, 1821-1848, many rancho tracts within the San Jose pueblo lands were granted to private individuals. After California became part of the United States in 1848, the pueblo lands and rancho tract titles and boundaries conveyed under Spanish/Mexican rule required confirmation by the US Board of Land Commissioners, established in 1851. The Commission confirmed the Pueblo Lands of San José grant in 1856, and after a long court process, the grant was patented in 1884. The final grant consisted of five discontiguous tracts totaling 54,155.35 acres. Most of the land encompassing the south portion of the Anderson Reservoir was Pueblo Tract No. 4 containing 1,524 acres (**Plate 6**).[23]

[22] Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 936; USGS, *Morgan Hill Quadrangle,* 62,500, 15-minute (Washington: USGS 1917); USGS, *Morgan Hill Quadrangle,* 62,500, 15-minute (Washington: USGS 1939; Fairchild Aerial Surveys and US Department of Agriculture, Aerial Photographs, Flight C-5750, Photo Nos. CIV-294-97, -98, -99, October 20, 1939.

[23] George H. Thompson, "Map of the Pueblo Lands of San José Finally Confirmed to the Mayor & Common Council of the City of San José," July 1866; Ogden Hoffman, *Reports of Land Cases Determined in the United States District Court for the Northern District of California* (San Francisco: Numa Hubert, 1862), Appendix, 40; Bureau of Land Management, General Land Office Records, Patent Search, T9S/R3E, MDM, accessed August 2019 at https://glorecords.blm.gov/search/default.aspx.

Plate 6. Portion of a map surveyed in 1866 of the Pueblo Lands of San José showing Tract No. IV outlined in purple. The map also shows Coyote Creek flowing north and Las Animas Creek flowing south into Coyote Creek. Where the two streams meet is just upstream from Anderson Dam. Note the adjacent Rancho Ojo de Agua de la Coche and Rancho Cañada de San Felipe y Las Animas .[24]

In the years between filing of the claim for the Pueblo Lands of San Jose to the US Board of Land Commissioners and the patent issuance in 1884, the City of San Jose sold Tract No. 4 to a private party. Research did not determine the date or grantee of the initial sale, but by the early 1860s, R.H. McElroy owned most or all of Tract No. 4 and operated a farm/ranch on the property. where he lived along with his family and several hired hands. McElroy sold his ranch to John Cochrane and his wife Aphelia F. Cochrane in 1869, at the time 1,273.50 acres (**Plate 7**). The Cochranes initially moved into an adobe built in 1832 by Juan Maria Hernandez, who was the grantee of the adjacent rancho grant Ojo de Agua de la Coche, but soon built a new residence. The Cochrane family retained ownership of this land until construction of Anderson Dam in 1950. During this long tenure, the family engaged in farming and ranching, keeping dairy and beef cattle, and a prune orchard (**Plate 8**). John Cochrane died in 1899, but Aphelia Cochrane and her daughter Aphelia May Jackson, and her husband Alfred Jackson continued to live on the

[24] George H. Thompson, "Map of the Pueblo Lands of San José Finally Confirmed to the Mayor & Common Council of the City of San José," July 1866.

property and farm and ranch. The dairying part of the operation stopped after the 1906 earthquake destroyed the dairy barn. The earthquake also prompted the construction of a new house in 1914. The Cochrane/Jackson family continued to raise beef cattle and prunes on their property up to construction of Anderson Dam. Prior to filling of the reservoir, the Cochrane/Jackson house was moved to a location near the southern end of the lake and upon creation of the Anderson Lake County Park, was deeded to Santa Clara County branch of the California Pioneers who leased it to Santa Clara County, and it is now part of the park and is on the Santa Clara County Heritage Resource list. The house is not in the APE for this project.[25]

Plate 7. Portion of a map 1876 map showing the Cochrane property.[26]

[25] US Census, Population Schedule, 1860, Santa Clara County, Burnett Township, Page 34; "History of Anderson," binder located at the Anderson Lake County Park office; Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); Santa Clara County, Department of Planning and Development, Historic Preservation Office, Heritage Resource List, South County.

[26] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876). Note that the name Cochrane is misspelled on the map.

Plate 8. This image shows the southern portion of the dam and reservoir portion of the project study area superimposed on a 1939 aerial photograph. At the top of the image is the confluence of Coyote Creek and Las Animas Creek.[27]

The remaining part of the Pueblo Lands of San Jose, Tract No. 4, less the 1273.50 acres sold to John and Aphelia Cochrane, was a 246.63-acre tract owned in 1876 by Elizabeth Willis (**Plate 9**). Research did not determine the exact date Willis purchased the property. The 1880 census identified Willis as a widowed, retired physician, 67 years old, and living with a ten-year-old boy identified as a boarder. The land is at the confluence of Las Animas and Coyote creeks and in 1876 there were two buildings and some type of crop growing. This property is just upstream from Anderson Dam.[28]

[27] Fairchild Aerial Surveys and US Department of Agriculture, Aerial Photograph, Flight C-5750, Photo No. CIV-294-97, October 20, 1939.

[28] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); US Census, Population Schedule, 1880, Santa Clara County, Burnett Township, Enumeration District 256, Page 12.

Plate 9. Portion of a map 1876 map showing the Willis property.[29]

Willis sold the land to another physician, Dr. J.H. Josselyn and his wife, Mamie. The Josselyns moved from San Francisco to this property in 1887 and developed it as a summer vacation retreat and health spa know variously as Glen Willis, Glen Wildwood, and Glen Willows (**Plate 10**). The retreat included three guest cottages, a large residence/hotel, and public house. The Josselyn's landscaped their property with orchards, walnut trees, chestnut trees, and vineyards. In addition to creating an idyllic and tranquil resort setting, they also promoted the resort as a mineral springs health spa. The Josselyn's tapped Packwood Creek, bringing the water by means of a tunnel to their property and building bathing pools for their guests to enjoy. The water was purported to be of "great medicinal value."[30]

[29] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876).
[30] "Dr. J.H. Josselyn," *Santa Clara County Historical and Genealogical Society Quarterly* 15, no. 3 (January 1979), 73; Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); Herrmann Brothers, *Official Map of Santa Clara County, California* (San Francisco: Britton & Rey, 1890); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 66; H.S. Foote, ed., *Pen Pictures from the Garden of the World or Santa Clara County, California* (Chicago: Lewis Publishing Co., 1888), 401.

Plate 10. Illustrations of the Glen Wildwood Resort. Clockwise from top left is the residence and stable, "refreshment cottage," cottages, and a general view.[31]

The Josselyn's resort did not last long. By 1903, the Weber family owned this 246.63-acre tract and in 1929 it was owned by the O'Connell Brothers. Both the Webers and O'Connell Brothers had large cattle operations and owned thousands of acres adjacent to the north where they grazed their herds. There is no indication in the historic record that either party continued to operate a resort on this property. Rather, they likely incorporated it into their grazing land. See the below section for more information on the Webers and O'Connell Brothers.[32]

Adjacent to the 246.63-acre tract discussed above, was a 188-acre parcel on which a portion of the Anderson Dam exists. This property was originally part of Rancho Refugio de la Laguna Seca, a 20,052-acre Mexican land grant. Liberta Cesena Fisher received patent to the land 1865 and then began selling off portions of the property. By 1870, Daniel Phegley had acquired the 188-acre parcel of the former rancho along the bank of Coyote Creek and established a cattle

[31] H.S. Foote, ed., *Pen Pictures from the Garden of the World or Santa Clara County, California* (Chicago: Lewis Publishing Co., 1888), 401.
[32] J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); McMillan & McMillan, *Official Map of Santa Clara County, California* (San Jose: McMillan & McMillan, 1929).

ranch (**Plate 11**). Phegley continued the ranching operation until the late 1890s he sold the property and retired.[33]

This change of ownership coincided with a subdivision of the Phegley property with the portion containing Anderson Dam becoming a separate parcel of about 75 acres. The land was initially owned by Diana Murphy Hill, the wife of H. Morgan Hill, the namesake of the city of Morgan Hill, and inheritor of 4,927 acres of Rancho Ojo de Agua de la Coche from her father, Daniel Murphy. The rancho lands owned by Hill were adjacent to this 75-acre tract along Coyote Creek. The Hills operated a cattle ranch on their land until 1892 when they began subdividing it into small parcels. Subsequent owners in the early twentieth century include George Stephens and the O'Connell Brothers, both farmers/ranchers who also owned adjacent land.[34]

Plate 11. Portion of a map 1876 map showing the Phegley property.[35]

[33] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, 13; Urban Programmers, "Historical and Architectural Evaluation for the Parcel Located at 2280 Cochrane Road, Morgan Hill, California," April 10, 2012, 12.
[34] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 27-28; Herrmann Brothers, *Official Map of Santa Clara County, California* (San Francisco: Britton & Rey, 1890); J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); McMillan & McMillan, *Official Map of Santa Clara County, California* (San Jose: McMillan & McMillan, 1929); US Census, Population Schedule, 1910, Santa Clara County, Machado Precinct, Enumeration District 65, Page 10A; Santa Clara County, Great Register of Voters, Burnett Precinct, 1896.
[35] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876). Note that Phegley is misspelled on the map.

In the upstream area of Anderson Reservoir, south of the Cochrane property, the reservoir and project study area are very narrow and cover a less land. Consistent with land general land uses in the reservoir portion of the project study area, this land from the late nineteenth century into the early twentieth century was owned by local farmers and ranchers who also had land elsewhere in the county and appear to have utilized these properties for grazing livestock and did not live on the property. Examples of these include John S. Fitzgerald who in 1890 owned over 800 acres adjacent to Coyote Creek in the southern end of the study area and had his home ranch near Gilroy. In 1929, brothers Harry Dexter and Albert, Jr. owned this same tract of land. The Dexter family began ranching sheep and cattle based out of their home ranch on Pacheco Pass Road east of Gilroy in the 1860s. Their operation continued until Harry died in 1951.[36]

3.3 Poultry Industry in Santa Clara County

While orchard crops dominated agriculture in the Santa Clara Valley for decades, a modest number of farmers raised poultry. During the early settlement period, most general farms kept a few or a coop of chickens to generate eggs for personal use and perhaps sold surplus locally. Later, some farmers established small poultry ranches, primarily to produce eggs for urban markets. As eggs are highly perishable, at least a few poultry ranches to exist near urban areas to supply eggs to city-dwellers. In the greater San Francisco Bay region, the Santa Clara Valley produced eggs to meet the local demand, but was not a regional leader in this enterprise, such as southern Sonoma County/Petaluma area, which by 1898, was the largest poultry-producing county in California, accounting for half the eggs produced in the entire state.[37]

The predominance of Sonoma County in the Bay Area egg-producing field, and the relatively modest status of Santa Clara County continued into the twentieth century. Santa Clara County egg production did increase in the immediate post World War II era, but the poultry industry remained a lower tier agricultural activity in terms of overall agricultural production and horticulture remained a clear leader. Other factors after the war such as technological advances in egg collection equipment, breeding, temperature-controlled chicken houses, and improved transportation and shipping, allowed other regions such as Southern California and the San Joaquin Valley to compete in the Bay Area egg market. This period also ushered in the era of corporate farms entering the egg and poultry business. Their access to vast amounts of capital

[36] "From Whales to Livestock," *San Jose News*, June 1, 1973, 31; US Census, Population Schedule, 1900, Santa Clara County, Las Animas Precinct, Enumeration District 50, Page 1; Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); Herrmann Brothers, *Official Map of Santa Clara County, California* (San Francisco: Britton & Rey, 1890); J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); McMillan & McMillan, *Official Map of Santa Clara County, California* (San Jose: McMillan & McMillan, 1929).

[37] Thea Snyder Lowry, *Empty Shells: The Story of Petaluma, America's Chicken City* (Novato, Calif: Manifold Press, 2000), 1-4, 24-26, 68; California State Board of Agriculture, *Statistical Report of the California State Board of Agriculture,* (Sacramento: California State Printing Office, 1921), 110-113.

enabled the construction of massive poultry operations, which pushed smaller ranches out of business.[38]

In the midst of these larger economic and technological changes in the poultry business, the industry experienced change within Santa Clara County as well. The same post-war suburbanization that was replacing orchards also affected the poultry ranches, pushing them further out into rural areas. As noted above, southern Santa Clara County, inclusive of the study area, remained rural longer than other parts of the county and, therefore, poultry ranching continued in this part of the county, and the open land made it attractive to poultry ranchers forced to relocate from the northern part of the county, as illustrated in the two poultry barns built in 1960s in the expanded APE on APN 729-49-005.[39]

3.4 Development of Morgan Hill

The urban settlement in the Morgan Hill area began as a stage stop along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill, and the APE, was Madrone, located about two miles southwest of the APE. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. The early farmers located in the APE and general vicinity were identified as living in Madrone.[40]

Settlement of Morgan Hill began following the establishment of a railroad station there in 1893 and the subdivision of the large ranches in the Morgan Hill area (**Plate 12**). The rise of horticulture had caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. Surveyor C.H. Phillips worked with local landowners to subdivide nearly all of the ranchland between Madrone and Gilroy, including Morgan Hill. Phillips was well connected with the Southern Pacific Railroad and worked with the railroad to attract settlers. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from one-half acre town lots in Morgan Hill to small farm tracts of five to 100 or more acres. Lots along Monterey Road (the main street in Morgan Hill) sold off fairly quickly, while tracts further away were slower to sell. This subdivision of the large ranches in the Morgan Hill area further facilitated the spread of horticulture in this part of the Santa Clara Valley.[41]

Following the founding of Morgan Hill, the importance of Madrone as the regional shipping

[38] Lowry, *Empty Shell*, 232; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1940; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1940; Santa Clara County, Department of Agriculture, "Annual Report," 1960; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1965.
[39] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51, 54, 70.
[40] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 32, 33.
[41] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 16.

center declined and Morgan Hill took over as the main rail depot. Fruit dehydrators, canning factories, and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was generally slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[42]

Plate 12. Morgan Hill ca. 1905 with train passing and orchards beyond (looking east). (Photo courtesy of San Jose Public Library.)

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area, being distant from the San Jose region, did not experience the same growth pressures and was able to retain its rural, agricultural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and the State built US Highway 101 as a freeway bypassing the downtown area, which facilitated development of this area as a bedroom community to San Jose and triggered construction of large residential subdivisions east and north of Morgan Hill, and their annexation into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill into the vicinity of Anderson Dam, further altering the once rural and agricultural character of the area.[43]

[42] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

[43] USGS, *Morgan Hill Quadrangle,* 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

3.5 Creation and Development of the Santa Clara Valley Water Conservation District

Irrigation water for the crops grown in the Santa Clara Valley came in large part from groundwater augmented by diversions from the many small creeks flowing from the adjacent mountains. In the early era of irrigation, the valley had abundant groundwater, so much that in places it flowed freely out of the ground under artesian pressure. In the late-nineteenth century, and early twentieth century, however, as horticulture flourished and the demands increased, farmers pumped more and more groundwater out of the natural aquifers. Pump technology steadily improved, allowing deeper wells and greater volumes of water to be drawn. By the 1920s, this once abundant resource had become endangered; groundwater was being depleted faster than it could be replenished and groundwater levels steadily dropped. At the same time, the growth of towns and cities in the region increased municipal demands for the same underground water. Measurements taken in 1929 noted a 50-foot drop in the groundwater level since 1925. Not only was this recognized as an unsustainable trend, drop in water table caused the ground to subside in many areas and increased the pumping costs of farmers.[44]

These factors led valley leaders and local engineers to seek a means reverse this trend and replenish the underground aquifers. Among the leaders of this effort was the Santa Clara Valley Water Conservation Committee formed by a group of prominent Santa Clara Valley citizens. The committee hired prominent northern California hydraulic engineers Fred H. Tibbetts and his partner, Stephen Kieffer, to undertake a study of the valley's water problems and develop a plan. Tibbetts was an established and influential hydraulic engineer of northern California and designed many important flood-control, reclamation, and irrigation works in the Sacramento Valley, including projects for the Nevada Irrigation District. Tibbetts also served as an advisor to the State of California during development of the State Water Plan in the 1920s. It was Tibbetts and Keiffer who developed the original concept of the Santa Clara Valley Water Conservation District (SCVWCD) system, and it was Tibbetts who designed six of the seven dams of the system's original phase of construction between 1932 and 1936.[45] After several years of study, Tibbetts and Kieffer proposed a system of reservoirs, percolation areas, canals, and flood control structures to capture and retain the water of the streams flowing into the valley for the purpose of groundwater recharge. They regarded any water from a creek or stream that made it to San Francisco Bay as "wasted," and the project at this time was called the "Waste Water Salvage Project." To carry out the project, Tibbetts & Kieffer recommended the establishment of a water conservation district to build, own, and manage the system, and which would be supported by taxes levied on the water users in the would-be district. The Santa Clara Valley Water Conservation Committee, and other groups such as the Santa Clara County Citizens' Committee

[44] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934; American Society of Civil Engineers, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.

[45] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, 49; American Society of Civil Engineers, *Transactions, Volume 105* (New York: American Society of Civil Engineers, 1940), 1924-1928.

and the Farmers' Committee, enthusiastically supported the plan and in the late 1920s proceeded to lobby for creation of such a district among landowners who would need to vote to approve establishment of a district. Supporters of the plan employed rhetoric to generate support spelling out the dire conditions and the bleak future if nothing was done. Voters defeated establishment of a water conservation district in 1927 and again in 1928, but as water levels in local wells continued to fall, finally approved the measure in 1929 and the Santa Clara Valley Water Conservation District (District) formed on November 12, 1929 "for the primary purpose of salvaging the waste waters of the various streams in the Valley."[46]

With approval of the District and a system plan in place, the District and Tibbets & Kieffer proceeded with construction. The system sought to store and distribute water to the best percolation areas in the Santa Clara Valley where it would soak back into the soil and replenish the groundwater. Tibbets & Kieffer final plan consisted of six major dams, along with canals and percolation facilities. The original upstream storage dams in the foothills of the Santa Cruz Mountains and Diablo Range flanking the Santa Clara Valley were Almaden, Calero, Guadalupe, Vasona, Stevens Creek, and Coyote built in 1935 and 1936. Coyote Reservoir was the largest in the system (**Plate 13**). Downstream, the District built the Coyote Percolation Dam in 1932 on Coyote Creek near Metcalf Road to create an in-stream percolation reservoir. In addition to the Coyote Percolation Reservoir, the District undertook other smaller in-stream improvements to enhance percolation such as constructing low dams in areas naturally conducive to percolation. Three canals rounded out the other original main elements of the system: the Amaden-Calero Canal (1935), and Vasona Canal (1936), and Coyote Canal (1936-37). The Amaden-Calero Canal carried excess water four miles from the smaller Almaden Reservoir to the larger Calero Reservoir. The Vasona Canal carried water from Vasona Reservoir on Los Gatos Creek to San Tomas Aquinas Creek where it flowed to in-stream percolation areas. On the opposite side of the valley, the Coyote Canal diverted water from Coyote Creek at a point in present-day Anderson Lake County Park, and conveyed it nine miles to the Coyote Percolation Reservoir. The water carried by the Coyote Canal was stored water released from Coyote Reservoir upstream in the Diablo Range.[47]

[46] Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," January 31, 1936, 6-10, On file at Water Resources Collections & Archives; Fred H. Tibbetts, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I, Project Report 17," May 8, 1934; J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.

[47] Santa Clara Valley Water Conservation District, "To the Voters of the District," 1936, On file at Water Resources Collections & Archives; Fred H. Tibbetts, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I, Project Report 17," May 8, 1934, 7; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," January 31, 1936, 17-20, On file at Water Resources Collections & Archives; State of California, State Water Resources Board, "Santa Clara Valley Investigation," Bulletin No. 7, June 1955, 49-51; J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.

Plate 13. Map from 1936 showing the main elements of the Santa Clara Valley Water Conservation District system. The dashed line shows the District service area boundaries at the time. The blue line has been added to highlight the Coyote Canal alignment. The bold dark lines are roads and highways leading to the reservoirs.

Money for the project came in 1934 from a $2 million bond issue passed by the members of the District, which provided funding for the majority of dam construction and the Vasona Canal and a section of the Coyote Canal. A supplemental bond passed in 1936 and federal Public Works Administration funds enabled completion of these early works. The District awarded contracts for the dams to several firms including F.O. Bohnett, D. McDonald Company, Macco Construction, A. Teichert & Son, and Carl N. Swenson Company. Research did not determine the contractor for the Coyote Canal, but Macco Construction built the Coyote Dam and the Coyote Percolation Dam, both of which are also on Coyote Creek, so perhaps also built the Coyote Canal. When District system was completed, it boasted of being the first water conservation system of its type in the state.[48]

The efforts of the District proved successful and groundwater levels began to rise. Between 1936 and 1943, the water table rose 76 feet on average.[49] While meeting with success, ever increasing water usage associated with increased urbanization, industrial use, and more year-round irrigation led to an improvement and expansion era of the District's system during the 1940s and 1950s. The large elements of this were construction of Anderson Dam, completed in 1950, and Lexington Dam finished in 1952 to increase storage capacity. Other parts of this program were construction of the Coyote-Alamitos Canal and the Alamitos Percolation Pond built (1953), Coyote Canal Extension (1942-1954), Saratoga-Calabazas Pipeline (1953), Evergreen Canal (1954), and the Upper and Lower Page Canals (1954). The District also altered how the Coyote Canal functioned. Originally supplying water to the Coyote Creek Percolation Reservoir, in the 1950s, it became chiefly a feeder canal for the Coyote-Alamitos Canal, Coyote Canal Extension, and the Evergreen Canal, and only rarely suppled water to the Coyote Creek Percolation Reservoir. This area also saw the inclusion of about 4,000 acres in the Evergreen area east of San Jose included in the District, and the merger with the Central Santa Clara Valley Water Conservation District encompassing land from Coyote south to the southern city limits of Morgan Hill. [50]

After the 1950s, the District did not undertake any major construction project, such as large dams, but it conducted maintenance and minor improvements to its existing system while continuing to fulfill its mission of providing water to the Santa Clara Valley. Over time, the District incorporated most of the smaller local water conservation districts, and also, in 1968 merged with the Santa Clara County Flood Control District, forming one agency to manage the water supply and flood programs for most of the county. In the 1970s, the District dropped "Conservation" from its name and officially became the Santa Clara Valley Flood Control District and eventually changed its name to the Santa Clara Valley Water District. Mergers

[48] Santa Clara Valley Water Conservation District, "This is Your Santa Clara Valley Water Conservation District," ca. 1957, 2-11.
[49] J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.
[50] J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.

continued in the 1980s with the acquisition by the District of the 34,900-acre South Santa Clara Valley Water Conservation District in 1987, which included two large dams/reservoirs, the Chesbro Dam and Uvas Dam.[51]

[51] Santa Clara Valley Water District, "History of the Santa Clara Valley Water District," Accessed August 2017 at http://www.valleywater.org/About/History.aspx.

4 DESCRIPTION OF EVALUATED RESOURCES

This section provides a brief written description and photographs of the resources in the expanded APE evaluated for NRHP/CRHR eligibility for the present study. Beside the Malaguerra Winery, Anderson Dam and its appurtenant structures, and Coyote Canal, the remaining built environment elements are presented herein by the APN on which they are located. See the DPR 523 forms in **Appendix B** for full descriptions of these resources and additional photographs.

Malaguerra Winery

The 15-acre, NRHP-listed Malaguerra Winery property includes a building consisting of the original rubblestone winery built in 1869, an attached rubblestone barn built in 1904, and two modern additions (**Photograph 1**). South of this building is a large chicken barn that is also within the 15-acre boundary. The character-defining features of the property are not explicitly stated in the NRHP Nomination Form, but the contributors are the 1869 rubblestone winery and the attached 1904 rubblestone barn. Thus, the character-defining features of the winery part of the property are the basalt rubblestone construction, roof, wooden door, interior wood posts, one-over-one wood sash windows, and star-shaped opening in gable peak. The character-defining features of the 1904 rubblestone barn are the basalt rubblestone construction, ship-lap wood siding, roof including wood roof trusses, wood post and beam framing, and large wood double door. Two modern additions have been constructed, and these are not contributors to the historic property. (See also the NRHP Nomination Form in **Appendix C**.)

Photograph 1. Malaguerra Winery, camera facing northeast, August 16, 2017.

Anderson Dam

Anderson Dam is a rolled earth and rock fill dam, with a crest length of 1,385 feet, and height from Coyote Creek's streambed to the spillway crest of 625 feet (**Photograph 2**). The dam has a freeboard of 19.5 feet, and is 40 feet wide at the top and 1,100 feet wide at the base. Its outlet provides for release of a maximum of 550 cubic-feet-per-second (cfs) through a 1,160-foot long, 49-inch diameter steel pipe that spills back into Coyote Creek. An ogee chute style spillway is located on the west side of the dam and has a capacity of 57,400 cfs. The spillway weir is 223 long. On the dam crest and near the south end of the dam are two small concrete block buildings with flat roofs. Three other similar small concrete equipment buildings are below the dam near the outlet chute.

Photograph 2. Upstream face of Anderson Dam, spillway head at right. Camera facing southwest, September 4, 2019.

Coyote Canal

Coyote Canal is an approximately nine-mile-long canal beginning on Coyote Creek, about 1.3 miles downstream of Anderson Dam, then running generally northwest to approximately Coyote Ranch Road in San Jose where it turns back into Coyote Creek. The District built and owns the canal, which is no longer in use. Generally, the canal is variously unlined, concrete lined, or lined with stone riprap, is U-shaped or trapezoidal, and is between 15-36 feet wide and 6-10 feet deep (**Photograph 3**). In places it has berms on one or both sides, and some stretches have a gravel maintenance road alongside. In the APE, several small concrete bridges cross the canal, built to give farmers access to their properties.

Photograph 3. Typical view of Coyote Canal in APE, camera facing northwest, August 16, 2017.

APN 729-49-005

On this parcel are a residence, garage, two poultry barns, and two orchards. The residence is a single-story, multi-unit, Minimal Traditional style building with a medium-pitched front-gable roof and stucco clad walls (**Photograph 4**). On the side of the building are three entrances, one for each unit, each with a plain wood door and a single concrete step. Windows consist of aluminum, horizontal sliding sash. Next to the house is a two-bay garage of the same style and features as the house.

Directly east of the residence is the southern of the two poultry barn (**Photograph 5**). It has a long, rectangular plan and a medium-pitched, raised seam metal roof with a monitor vent along the ridge. The building is wood framed with wood trusses and wood posts anchored to a poured concrete foundation. The barn has open sides except for one end which had plywood siding and plywood top-hung sliding doors. To the north is a similar poultry barn with a long, rectangular footprint. Topping this building is a medium-pitched corrugated metal roof with a monitor vent along the ridge. It is wood framed with wood trusses and wood posts anchored to a poured concrete foundation and open sides. Corrugated metal siding covers the ends, which also have a large doorway in the center once covered by a top-hung sliding door.

Near the residence are the remnants of two long-neglected orchards, one fruit trees and one walnut trees. The fruit tree orchard is just north of the residence and only about 30 trees remain, making the original rows largely indistinguishable. South of the nearby poultry barn is the walnut orchard of about 100 trees. This orchard is more intact and its rows clearly evident. The County has installed a few picnic tables in this orchard (**Photograph 6**). On the opposite side of the creek from the residence is a small, corrugated metal pumphouse with a centrifugal pump inside (**Photograph 7**).

Photograph 4. Residence and garage, camera facing west, August 16, 2017.

Photograph 5: South poultry barn, camera facing southeast, August 16, 2017.

Photograph 6: Walnut tree orchard, camera facing southeast, August 16, 2017.

Photograph 7: Pumphouse, camera facing west, September 4, 2019.

APN 729-50-002

On this parcel are two water pumps, which for the purposes of this report called Pump 1 and Pump 2. Pump 1 is the remnants of a vertical turbine pump used to pump groundwater from a deep well for irrigation (**Photograph 8**). It is made of steel, cylindrical is shape, and has a pressure gauge on one side. Many elements of this pump are no longer extant, nor is the electric motor that drove the pump. At Pump 2 is a pump, electric motor, and remnants of equipment and a pump house (**Photograph 9**). The pump is also a vertical turbine pump made of steel and generally cylindrical with grooves at the top for the drive belts that formerly connected to the nearby motor. The pump is mounted on the concrete slab that caps the well below. About seven feet away from the pump head is a Westinghouse brand electric motor bolted to a raised, board-form concrete platform. Scattered on the ground around the pump and motor are sections of pipe, charred lumber, sheets of corrugated metal of the former pumphouse, and other related debris.

Photograph 8: Pump 1, camera facing east, January 4, 2018.

Photograph 9: Pump 2 showing electric motor at right, top of the vertical turbine puma at left, and other pump and pumphouse remnants, camera facing southeast, January 4, 2018.

APN 728-35-037

On this parcel is an irrigation pump and segments of water distribution pipe. The pump is a steel, centrifugal style water pump next to an electric motor mounted on steel beams attached to a concrete platform (**Photograph 10**). The platform is on the sloping bank of Coyote Creek, about 15 feet above and away from the water at the time of survey. The centrifugal pump is located immediately next to the motor on the same concrete platform. From bottom of the pump, a long, steel intake pipe about eight inches in diameter reaches down into the creek. The segments of distribution pipe segments run on the flat ground just above the steep creek bank parallel to Coyote Creek and Malaguerra Avenue, and downstream from the pump (**Photograph 11**). The two pipe segments appear to be segments of the same pipe. The pipe is a riveted steel pipe about ten inches in diameter. The pipe runs on the surface, or just below the surface, but some parts of the pipe have become covered over with earth.

Photograph 10: Pump, motor, and pipe, camera facing northwest, January 4, 2018.

Photograph 11: Distribution pipe along Malaguerra Avenue, facing northeast, January 4, 2018.

APN 728-34-020

On this parcel is a section of water distribution pipe (**Photograph 12**). This is an approximately 10 foot long, 12 inch diameter segment of steel, lock-bar type water pipe. The pipe is broken into two segments on an eroded bank of Coyote Creek and continues north underground. No other pipe segments, pumps or other features clearly associated with this pipe were located nearby.

Photograph 12: Pipe segment, camera facing northwest, January 4, 2018.

APN 728-34-019

On this parcel is a steel, centrifugal style water pump mounted on a concrete slab. The pump, made by the Krogh Manufacturing Company of San Francisco, is generally cylindrical and has a roughly 12-inch steel intake pipe that reaches down the sloping bank into Coyote Creek. Next to the pump is the electric motor which has toppled off its concrete base (**Photograph 13**). The shaft of the pump extends out horizontally on one side and has a grooved wheel attached designed to carry the belts that connected with the motor and drove the pump. Extending up the bank from the pump is another steel pipe that joins with a vertical, concrete standpipe with a steel cover and vertical vent pipe.

Photograph 13: Pump, motor, pipe, and standpipe in foreground, camera facing northwest, August 16, 2017.

5 EVALUATION

JRP prepared this HRIER to assist the District with its compliance under NHPA Section 106, as amended, and the implementing regulations of the Advisory Council on Historic Preservation [Title 36 Code of Federal Regulations Part 800 (36 CFR 800)] as these pertain to federally funded undertakings and their impacts on historic properties and with CEQA as it pertains to historical resources.

5.1 NRHP Criteria

Section 106 defines historic property as a historic district, site, building, structure or object included in or determined eligible for inclusion in the NRHP. JRP used the NRHP criteria to evaluate the historic significance of resources in the APE. The eligibility criteria for listing properties in the NRHP are codified in 36 CFR Part 60 and explained in guidelines published by the Keeper of the National Register.

Eligibility for listing in the NRHP rests on twin factors of significance and integrity. A property must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm any historical significance a property may possess and render it ineligible. Likewise, a property can have complete integrity, but if it lacks significance, it is also ineligible.

Historic significance is judged by applying the NRHP criteria identified as Criteria A through D. The NRHP guidelines explain that a historic resource's "quality of significance in American history, architecture, archeology, engineering, and culture" is determined by meeting at least one of the four main criteria at the local, state, or national level:

- Criterion A: association with events or trends significant in the broad patterns of our history;
- Criterion B: association with the lives of significant individuals;
- Criterion C: a property that embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or that possesses high artistic values;
- Criterion D: has yielded, or is likely to yield information important to history or prehistory.

Criterion D is generally used to evaluate historic sites and archaeological resources. Although buildings and structures can occasionally be recognized for the important information they might yield regarding historic construction or technologies, for example, the resource types within the current APE are well documented and, thus, not a source of important information in this regard.

Integrity is determined under NRHP guidelines by applying seven factors to a historic resource: location, design, setting, workmanship, materials, feeling, and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria, pertaining to the overall ability of the property to convey a sense of the historical time and place in which it was constructed.

5.2 CRHR Criteria of Significance

The State of California references cultural resources in CEQA, and archaeological and historical resources are specifically treated under Sections 21083.2 and 21084.1, respectively. California Public Resources Code (PRC) Sections 5020.1 through 5024.6 create the CRHR and set forth requirements for protection of historic cultural resources. The criteria for listing properties in the CRHR are set forth in the CEQA Guidelines and are as follows:[52]

- Criterion 1: Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;
- Criterion 2: Associated with the lives of persons important to local, California or national history;
- Criterion 3: Embodies the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values;
- Criterion 4: Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation;

Under CEQA Guidelines, Section 15064.5 (a), a "historical resource" is defined as:

- A resource listed in or eligible for the CRHR;
- A resource listed in a local register of historical resources, as defined in section 5020.1(k) of the PRC or identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the PRC;
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines historically significant, provided the determination is supported by substantial evidence in light of the whole record;
- A resource so determined by a lead agency as defined in PRC sections 5020.1(j) or 5024.1.
- Historical resources listed in, or determined eligible for, the NRHP are automatically listed in the CRHR, Section 5024 (d)(1)(2) of the PRC.

5.3 Previous Studies

Previous studies are relevant to three built environment resources in the expanded APE: the Malaguerra Winery, Coyote Canal, and Anderson Dam.

[52] CEQA—Public Resources Code [PRC] Division 13, Sections 21000-21178; CEQA Guidelines, Section 15064.5(a)(2)-(4) provide the criteria from Section 5024.1 of the California Public Resources Code, and the CRHR is defined in the California Code of Regulations Title 14, Chapter 11.5.

The Malaguerra Winery is located on a 15-acre portion of APN 729-49-005. The winery was listed as a California Point of Historical Interest in 1976, and in 1977 it was documented by a Historic American Building Survey team and a NRHP Nomination Form was prepared. The resource was listed in the Santa Clara County Heritage Resource Inventory in 1979, it was listed in the NRHP in 1980. In 2003, the Malaguerra Winery was recorded on a DPR 523 form as part of the Santa Clara County Heritage Resource Inventory update, and on June 9, 2009, the Santa Clara County Board of Supervisors designated the Malaguerra Winery a County Landmark (No. CL09-004). This property, therefore is considered a historic property for purposes of NHPA Section 106, i.e. a resource listed in or determined eligible for listing in the NRHP, and is listed in the CRHR because of its listing in the NRHP and is thus a historical resource under CEQA. The winery has a California Historical Resources Status Code of 1S. The boundaries of the property as defined in the NRHP Nomination Form encompass 15 acres of the 92.51-acre APN 729-49-005. Contributors to the historic property are the winery building built in 1869, and the attached barn, built in 1904. Another later addition to the main building constructed 1930 to 1950 is not a contributor to the property. The poultry barn recorded and evaluated herein is also within the 15-acre boundary, but is not a contributor to the NRHP-listed property.[53]

The historical significance of the District's dams has been previously evaluated in 2006, but the Coyote Canal has not. Evaluation of the dams is relevant to the Coyote Canal because its possible significance is based on an analysis of the importance of the dams within the District's overall system. The study, conducted by JRP in 2006, recorded and evaluated all of the District's dams as individual resources, and as a historic district. JRP concluded that the seven original District dams built in the 1930 were eligible for the NRHP/CRHR as a discontiguous historic district under NRHP Criterion A/CRHR Criterion 1 for their association with the development of a modern water supply system for the Santa Clara Valley, and NRHP Criterion C/CRHR Criterion 3 as the work of master engineer Fred H. Tibbetts. The seven dams identified as contributors to the historic district were Almaden, Vasona, Stevens Creek, Guadalupe, Coyote, Calero, and Coyote Percolation. The four dams built in the 1950s – Anderson, Chesbro, Lenihan, and Uvas – were found to not be contributors to the historic district. JRP did not find any of the eleven dams studied in 2006 – including Anderson Dam –individually eligible for listing in the NRHP/CRHR. A review of the most recent California Office of Historic Preservation Directory of Properties in the Historic Property Data File dated April 5, 2012, does not include the historic

[53] Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, November 4, 1977, NRHP Reference No. 80000858, Listed October 23, 1980. This resource has a California Historical Resources Status Code of 1S. State of California, Office of Historic Preservation, "Technical Assistance Bulletin #8: User's Guide to the California Historical Resource Status Codes & Historic Resources Inventory Directory," November 2004, 4, 5; Santa Clara County, Board of Supervisors, Minutes of June 9, 2009; Santa Clara County, Historic Resources Inventory, 2005; Santa Clara County, Historical Heritage Commission, Agenda, April 16, 2009; Santa Clara County, Historic Resources Inventory, 2005; Historic American Building Survey, "Malaguerra Winery," HABS No. CA-2004, July 1977; State of California, Office of Historic Preservation, "Technical Assistance Bulletin #8: User's Guide to the California Historical Resource Status Codes & Historic Resources Inventory Directory," November 2004, 4, 5.

district in its property list, suggesting that the 2006 documentation was not sent to the State Historic Preservation Officer (SHPO), and its findings did not receive SHPO concurrence.[54]

JRP's specific 2006 significance justifications under Criterion NRHP Criterion A/CRHR Criterion 1 for the historic district were as follows:

> The SCVWD 1930s dams are the original and integral units of the SCVWCD's system, which played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. The SCVWCD system was important in the economic development of the Santa Clara Valley, because it provided a steady, reliable, and consistent supply of water for municipal, industrial, and agricultural uses. While any dam might be considered important this way, the construction of the seven dams as a unified system provided for continued development on a scale that was larger and provided a supply more certain than that that might have been provided by any single such structure. The fact that later dams provided additional supplies, or that the area receives water from other systems, including (in more recent years) the State Water Project and the San Felipe Division of the USBR Central Valley Project, does not diminish the importance of the original seven. While it is unlikely that construction and operation of the SCVWCD system, as a whole, was the sole driving force behind the economic development of the area, it did play a significant and lasting role in this context.[55]

Under NRHP Criterion C/CRHR Criterion 3, JRP's 2006 evaluation discussed the historic district as significant as the work of master engineer Frederick Horace Tibbetts as follows:

> Tibbetts was an influential hydraulic engineer of northern California, and with his partner Stephen Keiffer was responsible for many important projects. Tibbetts also served as an advisor to the State of California during development of the State Water Plan in the 1920s. It was Tibbetts and Keiffer who developed the original concept of the SCVWCD system, and it was Tibbetts who designed six of the seven dams of the system's original phase of construction between 1934 and 1936.[56]

JRP concluded that the seven dams also retained sufficient historic integrity to convey their significance. The historic district's period of significance was established as 1932 to 1950. These findings are relevant to the present study and evaluation of the Coyote Canal, which was also built in 1936-1937 as part of the original District system.

With respect to Anderson Dam, and the three other District dams built in the 1950s being eligible as contributors to the historic district:

[54] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006.
[55] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, 47-48.
[56] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, 49.

> Four dams – Anderson, Lexington (now Lenihan), Uvas, and Chesbro – were either built by the SCVWD or other districts that have since been subsumed into the SCVWD. They are additive to the original plan, and provide additional water supplies. They were built after a sufficient period of time, and in two cases by a different agency, so that they should be considered as separate resources and not as part of the discontiguous district or as a district of their own. They do not have the connection to the original plan, or to Tibbetts, and thus do not appear to meet the criteria for listing in the National Register or California Register.[57]

The 2006 JRP report also evaluated Anderson Dam as an individual resource, and concluded that it was not eligible for the NRHP/CRHR. The evaluation found that Anderson Dam did not meet any of the NRHP/CRHR Criteria as an individual resource, just as a contributor to the historic district.[58]

5.4 **Evaluation of Resources**

In addition to Anderson Dam and its appurtenant structure, the present study identified twelve historic-era built environment resources on six Assessor's parcels in the expanded APE that required evaluation for NRHP/CRHR eligibility. The APNs are 728-34-019, 728-34-020, 728-35-037, 729-49-005, 729-49-004, and 729-50-002. See also the DPR 523 forms in Appendix B for eligibility evaluations and analysis of historic integrity.

Anderson Dam

For this current study, JRP re-visited the 2006 evaluation of Anderson Dam and its appurtenant structures. The 2006 evaluation and conclusion, quoted in Section 5.3, remain valid. Therefore, Anderson Dam, inclusive of its appurtenant structures and buildings, does not meet the criteria for listing in the NRHP or the CRHR as an individual resource, or as part of a historic district.

Coyote Canal

The Coyote Canal is a resource constructed in 1936-1937 as part of the original District system. By the same reasoning as presented by JRP's previous evaluation in 2006 and presented in Section 5.3, the Coyote Canal has the potential to be eligible for listing in the NRHP / CRHR under NRHP Criterion A / CRHR Criterion 1 as a contributor to the Santa Clara Valley Water District Dams Historic District as the Coyote Canal was an original and integral component of the Santa Clara Valley Water Conservation District's system and played a significant role in providing water to the Santa Clara Valley and contributing to the economic development of the region. The Coyote Canal, however, is not eligible for listing in the NRHP / CRHR because it does not retain sufficient historic integrity to the 1932-1950 period of significance of the historic district. The numerous and substantial alterations resulting in loss of integrity are the concrete

[57] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, 51.
[58] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, Anderson Dam DPR 523 Form, August 2006.

lining of long sections of this originally earthen canal, demolition or removal of the headworks dam and other original headworks structures, realignment of segments, tunneling/piping under US 101 and other roadways, alterations at other locations, change in function of the canal, discontinued use of the canal, breaches in the canal at several locations, vegetation growth in the canal, and urban development. All of these combined have resulted in a loss of integrity of design, materials, workmanship, setting, location, feeling, and association such that the canal is no longer able to convey its importance to the 1932-1950 period of significance of the historic district.

Similarly, the Coyote Canal, has the potential to be eligible for listing in the NRHP / CRHR under NRHP Criterion C / CRHR Criterion 3, as part of a system designed by master engineer Frederick Horace Tibbetts, but its lack of historic integrity disqualifies it being eligible as a contributor to the SCVWD Dams Historic District under this criterion.

The Coyote Canal is not significant for an association with the lives of persons important to history (NRHP Criterion B/CRHR Criterion 2). Research did not reveal that any individual associated with this property has made demonstrably important contributions to history at the local, state, or national level. This property is also not a significant or likely source of important information about historic construction materials or technologies as this type of structure is well documented in the historic record (NRHP Criterion D / CRHR Criterion 4).

In addition, the Coyote Canal also does not meet NRHP / CRHR Criteria as an individual resource because its potential significance is derived from it being a component of a larger system.

APN 729-49-005

The residence, garage, two poultry barns, two orchards, pumphouse and irrigation pump on APN 729-49-005 do not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). The residence, garage, and two poultry barns are associated with the poultry/egg industry in the 1950s and 1960s that were part of the poultry farm operated by John H. Klinke. While the poultry industry had a long presence in the Santa Clara Valley dating back to the late nineteenth century, it never ranked among the leading agricultural endeavors of the region, being far overshadowed by horticulture. The development of the poultry/egg industry in this area, therefore, is not a historically significant event, and none of the buildings recorded on this parcel meet this criterion. The orchards are associated with horticulture in the Santa Clara Valley, but orchards were ubiquitous throughout the Santa Clara Valley by the time these orchards were planted, therefore, these orchards are not important within this context. Similarly, the pumphouse and pump are associated with crop irrigation, and by the time this pump was installed, irrigated agriculture was common in the Santa Clara Valley and such equipment was ubiquitous. The orchards, pumphouse, and pump, therefore, do not have important associations with agriculture in the Morgan Hill area, or the greater Santa Clara Valley, and do not meet this criterion.

These resources are not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). These resources on this parcel are associated with individuals engaged in various types of agriculture. John H. Klinke, who built the buildings on the parcel as part of his poultry farm, achieved a measure of success in his career, but his achievements do not merit elevating him to the status of a person important to history. Similarly, research did not reveal that the other owners of this land who may be associated with the orchards recorded on this form and the pumphouse are also not persons important to history. Research did not reveal any other individual associated with these resources that has made demonstrably important contributions to history at the local, state, or national level.

Under NRHP Criterion C or CRHR Criterion 3, these buildings are not eligible because they do not possess distinctive characteristics of a type, period, or method of construction, nor are they important works of a master architect. The residence is a Minimal Traditional style building, a style widely popular throughout California in the post World War II era. The style emerged in the late 1930s, as a simpler, less ornate, and more economical house style. Considered a "compromise style," the Minimal Traditional house reflected the form and shape of earlier small house styles, but without the decorative detailing. Generally, these residences were built with low to medium roof pitches with close rather than overhanging eaves. They were modestly sized, of wood frame construction, and were built with exterior walls clad in wood siding, stucco, brick, stone, or a mixture of materials. Minimal Traditional style homes were built in great numbers in California and continued to be popular into the 1960s. The residence recorded on this parcel is a late, and very modest example of the style and lacks architectural distinction in all regards. The other resources—the garage, two poultry barns, and pumphouse—are all utilitarian and are typical in their designs and materials for their periods of construction, and, therefore, also do not meet this criterion. The pump itself also does not meet this criterion. Centrifugal type pumps were in common use on farms throughout the Santa Clara Valley and other agricultural regions of California, particularly to draw water from streams and canals for irrigation purposes by the time this pump was installed. This pump, along with the associated steel pipes and concrete standpipe, are typical in its design, technology, and materials for its periods of construction. Additionally, the orchards exhibit common design in their linear rows and spacing and do not meet this criterion.[59]

Under NRHP Criterion D / CRHR Criterion 4, none of these resources are a significant or likely source of important information about historic construction materials or technologies that otherwise would not be available through documentary evidence.

These resources do not have any association with, and do not contribute to the significance of the NRHP-listed Malaguerra Winery, also on this parcel, and are therefore not contributors to the NRHP-listed property.

[59] Virginia Savage McAlester, *A Field Guide to American Houses* (New York: Alfred A. Knopf, 2013), 586-595.

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, a small addition on the house, missing garage door, dilapidated condition of the barn, missing trees from the orchards, abandonment of these resources, and missing elements of the pumphouse and pump have diminished their integrity of materials, workmanship, design, setting, and association.

APNs 729-50-002, 728-35-037, 728-34-019, and 728-34-020

The resources on these four parcels are all isolated irrigation pumps and pipe segments that share the same historic context, thus, their evaluations are grouped together in this section. For evaluations of the individual resources, see the attached DPR 523 forms in Appendix B. Under NRHP Criterion A / CRHR Criterion 1, these irrigation pumps and pipe segments do not have important associations with significant historic events, patterns, or trends of development. These resources provided water for irrigation on small farms in the Santa Clara Valley. By the time this equipment was installed, irrigated agriculture was common in the Santa Clara Valley and such pumps and pipes were ubiquitous. Furthermore, the farms they irrigated were typical in their size and types of crops raised for this time period. These pumps and pipes, therefore, do not have important associations with agriculture in the Morgan Hill area, or the greater Santa Clara Valley, and to not meet this criterion.

These resources are not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). These pump and pipes are associated with farmers who owned and worked the land they irrigated. These individuals owned small farms and worked as farmers, and research did not reveal that they attained the status of persons important to history related to farming, or any other activity at the local, state, or national level.

Under NRHP Criterion C or CRHR Criterion 3, these pumps and pipes do not possess distinctive characteristics of a type, period, or method of construction, nor are they important works of a master architect. The pumps evaluated are of two types: centrifugal and vertical turbine. Centrifugal type pumps were in common use on farms throughout the Santa Clara Valley and other agricultural regions of California by the late 1800s, particularly to draw water from streams and canals for irrigation purposes. Vertical turbine pumps are used to pump water from deep wells and came into common usage on farms around 1915. Both of these pump types were in common use on farms throughout the Santa Clara Valley and other agricultural regions of California to pump groundwater for irrigation purposes by the time the pumps in the study area were installed. The pumps documented in this report are all typical in their design, technology, and materials for their periods of construction and, therefore, does not meet this criterion. Likewise, the types of pipes documented in this report, riveted steel, and lock-bar type pipes, were in common usage for irrigation on farms by the time these were installed, and are of typical design, technology, and materials for their periods of construction.

Under NRHP Criterion D / CRHR Criterion 4, none of these pumps and pipes hold the potential to be significant or likely sources of important information about historic construction materials or technologies that otherwise would not be available through documentary evidence.

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, the pumps and pipes documented in this report all have diminished historic integrity. Generally speaking, these resources are all dilapidated to varying degrees, have been abandoned and are no longer in use, and land use has changed from intensive irrigated agriculture to open park land and residential subdivisions. These alterations have greatly diminished the resource's integrity of materials, workmanship, design, setting, feeling, and association.

6 EFFECTS ANALYSIS OF MALAGUERRA WINERY

The analysis in this section is based on project information provided to JRP to date.

The Malaguerra Winery, as a NRHP-listed property, is the only resource in the expanded APE that is a historic property under Section 106 of the NHPA and a historical resource for the purposes of CEQA. The Malaguerra Winery is on 15 acres of the 93.83-acre APN 729-49-005. See the NRHP Nomination Form attached in **Appendix C**. An analysis of the potential effects of this project under Section 106 and CEQA is presented below.[60]

6.1 NHPA Section 106 Effects Analysis

NHPA Section 106 regulations state that if there are historic properties in the APE which may be affected by a federal undertaking, the agency official shall assess adverse effects, if any, in accordance with the Criteria of Adverse Effect defined in 36 CFR 800.5. These regulations state an "adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Application of the criteria of adverse effect assesses how an undertaking will affect those features of a historic property that contribute to its eligibility for listing in the NRHP, specifically examining an undertaking's impacts on a historic property's historic integrity.

The following are examples of adverse effects as listed in 36 CFR 800.5(a)(2)(a-g):

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (36 CFR part 68) and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

[60] Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, November 4, 1977, NRHP Reference No. 80000858, Listed October 23, 1980. This resource has a California Historical Resources Status Code of 1S. State of California, Office of Historic Preservation, "Technical Assistance Bulletin #8: User's Guide to the California Historical Resource Status Codes & Historic Resources Inventory Directory," November 2004, 4, 5.

- Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

The Anderson Dam Seismic Retrofit Project does not propose any physical destruction, damage, relocation, or alteration to the Malaguerra Winery. Please refer to Section 4 above for a description of the Malaguerra Winery property, its character-defining features, and contributing features. The project is proposing to potentially use a 65-acre area south and west of the 15-acre NRHP-listed Malaguerra Winery property as a staging area known as Staging Area A, one of several staging areas. Generally, staging areas will be used for office and equipment trailers, equipment and materials storage, equipment maintenance facilities, fuel pumps and fuel storage tanks, concrete batching, construction vehicle parking, and laydown areas. To prepare the construction staging areas, the construction contractor would remove vegetative groundcover and debris, grade the sites to create a flat surface for the movement of construction vehicles and equipment, and place gravel or a separation fabric over the ground surface depending on usage. A portion of Staging Area A overlaps a portion of the Malaguerra Winery historic property, but there are no contributors to the historic property on this overlapping area. Any effects, therefore, would be a potential visual effect or vibration effects. With regard to potential visual effects, the use of this area would be temporary, and therefore, the visual effects would be as well. As the project calls for Staging Area A to be restored to its former state and appearance, there would be no lasting visual effect. There also does not appear to be the potential for an adverse effect because of vibration. Large trucks will likely use Staging Area A, an activity that poses the greatest potential harm from vibration. Any truck activity, however, will be several hundred feet south of the winery property’s contributing buildings, and therefore, the vibrations of the trucks will not cause an adverse effect.[61]

In applying the NRHP Criteria of Adverse Effect, therefore, the conclusion of this analysis is that the proposed Anderson Dam Seismic Retrofit Project would result in no adverse effect on the Malaguerra Winery, thus, the Malaguerra Winery would remain a historic property under Section 106 of the NHPA and maintain its current status as a NRHP-listed property.

6.2 CEQA Effects Analysis

Similar to effects analysis under Section 106, the analysis of project impacts under CEQA is related to the effect of a proposed project on the integrity of a historical resource and its ability to convey its significance. CEQA guidelines Section 15064.5(b) state that “a project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.” This section of the CEQA guidelines further details the standards for impacts to historical resources as follows (Section 15064.5 (b)(1-2a-c):

[61] Analysis based on April 2019 project description provided Santa Clara Valley Water District.

- Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.
- The significance of an historical resource is materially impaired when a project:
    - Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or
    - Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
    - Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

The Anderson Dam Seismic Retrofit Project does not propose any physical destruction, damage, relocation, or alteration to the Malaguerra Winery. Please refer to Section 4 above for a description of the Malaguerra Winery property, its character-defining features, and contributing features. The project is proposing to potentially use a 65-acre area south and west of the 15-acre NRHP-listed Malaguerra Winery property as a staging area known as Staging Area A, one of several staging areas. Generally, staging areas will be used for office and equipment trailers, equipment and materials storage, equipment maintenance facilities, fuel pumps and fuel storage tanks, concrete batching, construction vehicle parking, and laydown areas. To prepare the construction staging areas, the construction contractor would remove vegetative groundcover and debris, grade the sites to create a flat surface for the movement of construction vehicles and equipment, and place gravel or a separation fabric over the ground surface depending on usage. A portion of Staging Area A overlaps a portion of the Malaguerra Winery historic property, but there are no contributors to the historic property on this overlapping area. Any effects, therefore, would be a potential visual effect or vibration effects. With regard to potential visual effects, the use of this area would be temporary, and therefore, the visual effects would be as well. As the project calls for Staging Area A to be restored to its former state and appearance, there would be no lasting adverse visual effect. There also does not appear to be the potential for an adverse effect because of vibration. Large trucks will likely use Staging Area A, an activity that poses the greatest potential harm from vibration. Any truck activity, however, will be several hundred feet south of the winery property's contributing buildings, and therefore, the vibrations of the trucks will not cause an adverse effect.[62]

In applying the CEQA guidelines for determining substantial adverse change, therefore, the conclusion of this analysis is that the proposed Anderson Dam Seismic Retrofit Project would not result in a substantial adverse change to the Malaguerra Winery and thus, the Malaguerra Winery would retain its historic integrity and remain a historical resource for the purposes of CEQA.

[62] Analysis based on April 2019 project description provided Santa Clara Valley Water District.

7 PREPARERS' QUALIFICATIONS

This HRER was conducted under the general direction of Christopher D. McMorris (M.S., Historic Preservation, Columbia University, New York), a Principal at JRP with more than 21 years of experience conducting these types of studies. Mr. McMorris provided overall project direction and guidance, and reviewed and edited this report (and the attached DPR 523 form). Based on his level of experience and education, Mr. McMorris meets and exceeds the Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

JRP Staff Architectural Historian Steven J. "Mel" Melvin (M.A., Public History, California State University, Sacramento) was the lead historian for this project. Mr. Melvin has over 14 years of experience as a historian/architectural historian conducting historic architectural inventories and evaluations. He was the primary author of the report and DPR 523 forms, and also led fieldwork and conducted research. Mr. Melvin also meets and exceeds the Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

Research Assistant Jason Sarmiento (M.A., Public History, California State University, Sacramento) assisted in fieldwork, research, and preparation of the report and DPR 523 forms.

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APPENDIX A

Figures

Figure 1. Project Vicinity Map

Figure 2. Project Location Map

Figure 3. Project APE Map

APPENDIX B

DPR 523 Forms

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ____
Review Code ____ Reviewer ____ Date ____

***Resource Name or #** (Assigned by recorder): APN: 728-34-019

P1. Other Identifier: Irrigation Pump and Associated Features

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara

***b. USGS 7.5' Quad**: Morgan Hill **Date**: 1955 (photorevised 1980) **T**: ; **R**: ; **Sec**: ; Mount Diablo Meridian

c. Address: City: Zip:

d. UTM: (give more than one for large and/or linear resources) Zone 10, 621208mE, 4114038mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcel Number (APN): 728-34-019; Adjacent to Cochrane Road

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records and evaluates an irrigation pump and associated features on APN 728-34-019, a parcel currently owned by the Santa Clara Valley Water District (**Photograph 1**; **Sketch Map**). The pump element of this resource consists of a steel, centrifugal style water pump mounted on a concrete slab. Made by the Krogh Manufacturing Company of San Francisco, the pump is generally cylindrical and has a roughly 12-inch steel intake pipe that reaches down the sloping bank into Coyote Creek. Next to the pump is the electric motor which has toppled off its concrete base (**Photograph 2** & **3**). The shaft of the pump extends out horizontally on one side and has a grooved wheel attached designed to carry the belts that connected with the motor and drove the pump. Extending up the bank from the pump is another steel pipe that joins with a vertical, concrete standpipe with a steel cover and vertical vent pipe (**Photograph 4**). Another steel pipe continues underground from the standpipe under Cochrane Road.

***P3b. Resource Attributes:** (List attributes and codes) HP39—Water Pump and associated features

***P4. Resources Present:** ☐ Building ☒ Structure ☒ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Pump, motor, pipe, and standpipe in foreground, camera facing northwest, August 16, 2017.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
Ca. 1900 (estimate based on land use/ownership change; see Historic Context)

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

***P8. Recorded by:**
Steven J. Melvin & Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: August 16, 2017 & January 4, 2018

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Supplemental Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," Prepared for the Santa Clara Valley Water District, 2019.

***Attachments:** ☐ None ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

***NRHP Status Code**: 6Z

***Resource Name or #** (Assigned by recorder): APN: 728-34-019

B1. Historic Name: None

B2. Common Name: None

B3. Original Use: Irrigation pump; water distribution B4. Present Use: Not in use

***B5. Architectural Style**: Utilitarian

***B6. Construction History**: (Construction date, alteration, and date of alterations) Built in ca. 1900; the concrete standpipe does not appear original, date of construction unknown.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**

***B8. Related Features:** _________

B9. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme**: Agriculture **Area**: Santa Clara Valley/Morgan Hill

Period of Significance: n/a **Property Type**: Irrigation Structure **Applicable Criteria**: n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The water pump and associated features recorded and evaluated on this form do not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). They are not an historic property under Section 106 of the National Historic Preservation Act, nor an historical resource for the purposes of the California Environmental Quality Act (CEQA). These resources have been evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. (See Section B10 on Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: Thompson & West, *Santa Clara County Atlas*, 1876; Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, 2012; J.G. McMillan, *Official Map of the County of Santa Clara, California*, 1903; A.T. Herrmann, "Map of the Survey of the former Phegley Home Ranch in the Rancho Laguna Seca," January 1904; USGS, Aerial Photographs, Various Years; See also footnotes.

B13. Remarks:

***B14. Evaluator**: Steven J. Melvin

***Date of Evaluation**: January 2018

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See Sketch Map on last page.

B10. Significance (continued):

Historic Context

Euro-American Settlement and Agricultural Development of Southern Santa Clara County

The Santa Clara Valley is among the longest settled areas in California. The Pueblo of San Jose in the northern part of the valley, was one of the small number of *pueblos* established by the Spanish (the others include Los Angeles, San Francisco, and San Diego) in the eighteenth century. Outside of the pueblo boundaries, the valley was largely divided into rancho land grants conveyed to individuals by the Mexican government. Many of the land grants made by the Spanish and Mexican governments in the Santa Clara Valley survived into the American period and some of the property lines are still evident on the landscape.

The first Euro-American settlement in the vicinity of the APE of the project cited in P11 occurred in 1834 when the Mexican government granted 20,052 acres to Juan Alvires known as Rancho Refugio de la Laguna Seca and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The APE is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants Alvires and Hernandez operated cattle ranches on their land. This pastoral way of life continued into the early 1850s as non-Latino settlers began to arrive in the area, such as Martin Murphy, Sr., William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction. Fisher died in 1850 and the land, which includes the current APE, passed to his wife, Liberta C. Fisher.[1]

Large landowners in the early period of American settlement such as Fisher and Murphy initially continued the practice of cattle grazing. Other agricultural endeavors included sheep ranching, dairying, and general farming. Sheep ranches and dairy farming were particularly prevalent in southern Santa Clara County. Stock raising continued to be the primary economic activity in Santa Clara County until the drought of 1864, which decimated the herds and caused financial ruin to many ranchers.[2]

The 1864 drought also contributed to a rise in wheat cultivation in the Santa Clara Valley. Wheat had been grown in this area since the 1850s and its acreage grew with each year. The easy cultivation and high fertility of the soil of the valley facilitated wheat production with little capital investment. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop. During the 1860s, this popular crop surpassed cattle ranching as the principal agricultural activity in the valley and by 1870, wheat and barley occupied most of the rural acreage of the county. While wheat supplanted cattle ranching in the valley, some large stock ranches continued to operate in the outlying areas such as in the eastern foothills near the APE for the project cited in P11, and southwest of Gilroy. The largest of these ranches in the region were owned by the C. M. Weber estate, Henry W. and Charles Coe, Horace Willson, J. P. Sargent, and Henry Miller.[3]

Wheat's primacy in the county began to wane in the 1870s, however, as farmers experienced poor yields, lower prices, and competition from wheat grown in the Central Valley. Santa Clara County farmers responded by adopting a diversified farming approach, raising dairy cows, sheep, poultry, swine, hay, grapes, and fruit trees.[4] By turning away from wheat, Santa Clara County farmers opened the door for what would be the mainstay of Santa Clara Valley agriculture for decades to come: horticulture. Orchards had been planted during the Mexican and early American periods in the valley, but these were very small scale and for personal or limited commercial use. In 1856, the first experimental orchards were set out in the Willow

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[2] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 37-38.
[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 12, 13.
[4] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60.

Glen area, just southwest of present-day downtown San Jose. These were generally successful and led to farmers planting more orchards in the 1860s.[5]

In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. This particular variety of plum had a low moisture content making it ideal for drying and, thence, ideal for shipping as refrigerated rail cars had not yet been invented. In addition to prunes, Santa Clara Valley and farmers also planted other stone fruit orchards such as apricots, peaches, and cherries. The completion of the Santa Clara & Pajaro Valley Railroad (which would become part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 further boosted horticulture as it opened the large eastern US market to Santa Clara Valley fruit via the newly completed transcontinental railroad. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm could generate enough income to support a family. With the technological development of ice-cooled refrigerated rail cars in the 1880s, shipment of fresh fruit also became possible and furthered the popularity of orchard crops. By 1890, the transition to horticultural had spread to every part of the valley where irrigation water from streams or wells was available (**Plate 1**).[6]

Plate 1. Prune orchards near Morgan Hill ca. 1910. (Photo courtesy of San Jose Public Library.)

In addition to orchards, many farmers in the Santa Clara Valley planted another fruit crop: grapes. In the 1860s, José Maria Malaguerra planted one of the earliest vineyards in the county on a 200-acre tract purchased from Liberta C. Fisher where Malaguerra grew grapes and established the Malaguerra Winery, a nearby property located to the west. Other early wineries in the Morgan Hill area include that of Joel W. Ransom who owned a 400-acre farm and by the 1880s had planted in French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes, and built a small winery on his property. Another vineyardists in the Morgan Hill area was Emilio Guglielmo who established a vineyard and commercial winery in the early twentieth

[5] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 14.
[6] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15.

century that continues to produce wine up to the present. South of Morgan Hill, the San Martin and Uvas Valley areas developed into a viticulture locales with multiple farms raising wine grapes and building small wineries and brandy distilleries by the 1880s. While occupying considerably less acreage than orchard crops, viticulture remained a common practice, particularly in the southern part of the county, where such renowned wineries as the San Martin Winery were developed and continued to thrive through the twentieth century. The county experienced a general upward trend in viticulture with vineyards occupying over 1,000 acres in 1922 and 4,858 in 1955, most of this acreage lying between Morgan Hill and Gilroy.[7]

Advancements in irrigation technology facilitated the development of intensive horticulture in the Santa Clara Valley. The first type of irrigation pump used on farms was the centrifugal type pump. This type of pump was invented in the early 1800s by developers in the United States and England and by the late 1800s had come into common use on farms to draw irrigation water from streams. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance, and therefore, this type of pump was best applied to pumping surface water, such as out of a creek or canal to irrigate a field, rather than from wells. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute.[8]

The other common type of pump in the Santa Clara Valley was the vertical turbine pump. Pump manufacturing companies first developed this type of pump in the early twentieth century, particularly for pumping groundwater for irrigation from deep wells. Vertical turbine pumps had the advantage over centrifugal pumps in that they had greater lift potential, that is, they could pump water from greater depths. Vertical turbine pumps came into popular usage on farms beginning around 1915, by which time the technology had advanced to achieve a lift of 350 vertical feet and deliver between 600 and 3,000 gallons of water, making vertical turbine pumps the preferred deep well pump among farmers. Vertical turbine pumps also had a simple, low-maintenance design, and did not require as large of a bore-hole diameter, compared to other well pump systems of the day. Both centrifugal and vertical turbine pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive.[9]

A common method to deliver water from either a centrifugal or vertical turbine pump was by steel pipe. The most common type of pipe design used on farms by the late 1800s was riveted steel pipe. This design consisted of sheet of rolled steel joined together at the longitudinal seam and ends with rivets. By 1905, the lock-bar type design was invented and came into common usage because of its greater tensile strength and less leakage. Lock-bar type pipe was fabricated by joining sheets of rolled steel at the longitudinal seam with an H-shaped bar applied to each edge of the steel sheet and compressed to form a tight seal. By the 1930s, welded steel pipe gradually replaced riveted steel and lock-bar as the preferred pipe design.[10]

Orchard fruit production continued to grow into the twentieth century and orchard farming remained the dominant agricultural activity in the Santa Clara Valley. At this time prunes remained the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District, as discussed below, which ensured sufficient water for irrigation. After World War II, the vast orchards that had come to characterize the Santa Clara Valley gradually gave way to suburban residential and industrial development. This trend started in the northern part of the county around San Jose and

[7] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2.
[8] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3. "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian,* September 1895, 461.
[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3.
[10] American Water Works Association, "AWWA Manual: History, Uses, and Physical Characteristics of Steel Pipe," 2004, 1-2; B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 156-157.

slowly spread out from this nucleus in all directions. The southern part of the valley was the last area to be affected by suburbanization, and remained largely rural-agricultural until the 1970s.[11]

Development of Morgan Hill

The urban settlement in the Morgan Hill area began as a stage stop along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill, and the location of the structures recorded herein, was Madrone, located about two miles southwest. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. The early farmers located in the general vicinity were identified as living in Madrone.[12]

Settlement of Morgan Hill began following the establishment of a railroad station there in 1893 and the subdivision of the large ranches in the Morgan Hill area (**Plate 2**). The rise of horticulture had caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. Surveyor C.H. Phillips worked with local landowners to subdivide nearly all of the ranchland between Madrone and Gilroy, including Morgan Hill. Phillips was well connected with the Southern Pacific Railroad and worked with the railroad to attract settlers. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from one-half acre town lots in Morgan Hill to small farm tracts of five to 100 or more acres. Lots along Monterey Road (the main street in Morgan Hill) sold off fairly quickly, while tracts further away were slower to sell. This subdivision of the large ranches in the Morgan Hill area further facilitated the spread of horticulture in this part of the Santa Clara Valley.[13]

Following the founding of Morgan Hill, the importance of Madrone as the regional shipping center declined and Morgan Hill took over as the main rail depot. Fruit dehydrators, canning factories, and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was generally slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[14]

Plate 2. Morgan Hill ca. 1905 with orchards in the distance (looking east). (Courtesy of San Jose Public Library.)

[11] Stephen Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.
[12] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 32, 33.
[13] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 16.
[14] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area, being distant from the San Jose region, did not experience the same growth pressures and was able to retain its rural, agricultural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and the State built US Highway 101 as a freeway bypassing the downtown area, which facilitated development of this area as a bedroom community to San Jose and triggered construction of large residential subdivisions east and north of Morgan Hill, and their annexation into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill into the vicinity of Anderson Dam, further altering the once rural and agricultural character of the area.[15]

Property History: APN 728-34-019

This 4.61-acre parcel, APN 728-34-019, containing the water pump and associated features recorded on this form was once part of Rancho Laguna Seca, a 20,052-acre Mexican land grant patented to Liberta C. Fisher in 1865. Fisher gradually sold off tracts of the rancho and by 1870, Daniel Phegley had acquired a 188-acre parcel of the former rancho along the bank of Coyote Creek, inclusive of APN 728-34-019. Phegley had only recently settled in Santa Clara County along with his son James Phegley, who owned an adjacent parcel. The Phegley's established a cattle ranch on their properties and continued the ranching operation until the late 1890s when Daniel Phegley sold the land and retired from ranching.[16] At this time, the ownership of the land passed through a number of short-term owners including W. Osterman, who owned the land in 1903, and John Bender, who had acquired the property by 1904. In 1911, long-term owners and father and son, Ira and William Rhoades, bought the land. It appears that the water pump and associated features were installed during the period between Phegley's ownership, when it was un-irrigated cattle range, and Rhoades' ownership, possibly by Osterman or Bender. John Bender is listed as a Morgan Hill orchardist and vineyardists around this time, both crops that would have required irrigation. Upon taking ownership, Bender had land resurveyed, which was 156.92 acres of the original 188-acre Phegley ranch. Bender's January 1904 survey map shows an irrigation pump at the location of the pump recording on this form (**Plate 3**). Following Bender's tenure, Ira and William Rhoades continued horticulture on the property, raising prunes, apricots and walnuts (**Plate 4**). Ira Rhoades transferred ownership of the land to his son, William, in 1920 and following William's death in 1935, the land his widow, Katherine Garnett Rhoades, inherited the land. Katherine Rhoades divided the parcel in 1945, selling 14.31 acres that contained the house and buildings to Harold E. Thomas, and the remaining 142.61 acres, inclusive of APN 728-34-019, to Sebastian and Luigia Borello, who continued to raise orchard crops on the land. The Borello family remained owners of the agricultural parcel into the 1980s and grew such crops as prunes, apricots, and cherries. It appears the Santa Clara Valley Water District acquired the current 4.61 acre parcel in 1973.[17]

[15] USGS, *Morgan Hill Quadrangle,* 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

[16] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, 13.

[17] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, 13; Urban Programmers, "Historical and Architectural Evaluation for the Parcel Located at 2280 Cochrane Road, Morgan Hill, California," April 10, 2012, 12-14; J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); A.T. Herrmann, "Map of the Survey of the former Phegley Home Ranch in the Rancho Laguna Seca," January 1904, Recorded in Maps, Book F2, Page 28, Santa Clara County Recorder; F.M. Husted, *San Jose City Directory Including Santa Clara County* (San Jose: F.M. Husted, 1900), 513; USGS, Aerial Photograph, Photo No. 2310-3-114, May 6, 1968. Santa Clara County Assessor, Property Information for APN 728-34-019.

Plate 3. Map of John Bender's 1904 survey of the former Phegley ranch, a 156.92-acre parcel outline in blue. The red arrow points to the "pumping plant" on Coyote Creek.[18]

[18] A.T. Herrmann, "Map of the Survey of the former Phegley Home Ranch in the Rancho Laguna Seca," January 1904, Recorded in Maps, Book F2, Page 28, Santa Clara County Recorder.

Plate 4. Aerial image from 1940 showing the same property as Plate 3, owned at this time by Katherine Rhoades and planted in orchards. Coyote Creek runs east to west across the top of the image.[19]

The pump recorded on this form is a centrifugal type water pump, a pump design innovated in the early 1800s by developers in the United States and England. It first came into use for municipal water purposes after 1850, and by the late 1800s had become common on farms to draw irrigation water from streams and canals. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance. Centrifugal pumps of the early twentieth century of the type commonly used on small farms had a maximum lift of about 75 feet. This type of pump was best applied to pumping surface water, such as out of a creek or canal to an adjacent field. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute. Like other pumps, centrifugal pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive. Once drawn from the source, irrigation water was commonly conveyed by canal, clay pipe, or steel pipe. The Krogh Manufacturing Company fabricated

[19] USGS, Aerial Photograph, Photo No. CIV-342-44, June 9, 1940.

this particular pump on APN 728-34-019 in their factory in San Francisco (**Plate 5**). By 1895, the company was one of largest pump manufacturers in California, making pumps for irrigation, reclamation, and mining.[20]

Plate 5. Advertisement from an 1898 issue of the *Pacific Rural Press*.[21]

Evaluation

The water pump and associated features recorded on this form do not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). This resource delivered water for irrigation on a farm in the Santa Clara Valley. By the time these features were installed, irrigated agriculture was common in the Santa Clara Valley and such equipment was ubiquitous. Furthermore, the farm irrigated by this pump was typical in its size and the types of crops raised for this time period. This resource, therefore, does not have important associations with agriculture in the Morgan Hill area, or the greater Santa Clara Valley, and does not meet this criterion.

This resource is also associated with the Rhoades Ranch, a 12.27-acre property at 2290 Cochrane Road (APN 728-34-010), which is listed on the NRHP as a historic district and is a Santa Clara County Designated Landmark. The historic property was determined significant under NRHP Criterion A, for its association with agricultural development of the region; NRHP Criterion B, for its association with Harold E. Thomas (a pioneer in strawberry research and development of commercial strawberry production, and was director of the Strawberry Institute of California that was later located on the Rhoades Ranch); and NRHP Criterion C, for distinctive architecture. Its period of significance is ca. 1863-1966. This water pump falls within the period of significance under the agricultural development context. The NRHP documentation did not discuss this water pump, and did not identify it as a contributing element of the historic property. The pump is located outside of historic district boundaries, being across Cochrane Road and west of the NRHP-listed property. Given its discontiguous location and the fact that it is a relatively minor feature of the farming operation of the Rhoades Ranch property, it should not be considered a contributor to the historic district.[22]

Another historic property evaluation was conducted in 2012 for the "Borello Farms," the same land sold by Katherine Rhoades to Sebastian and Luigia Borello in 1945 that included the water pump. This 2012 report evaluated the Borello Farms property

[20] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3. "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.
[21] "Krogh Manufacturing Co." *Pacific Rural Press* 55, No. 19 (May 7, 1898), 295.
[22] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, listed April 17, 2013, NRIS Reference No. 13000158; Santa Clara County Board of Supervisors, Rhoades Ranch Historic Landmark Designation Resolution (CL11-001), February 8, 2011.

and found that it was not eligible for listing in either the NRHP or CRHR. All of the buildings and structures documented in the 2012 report on this property have been demolished and new homes were being constructed in 2018.[23]

The resources recorded herein are not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). The water pump and pipe segments are associated with such people as John Bender, Ira Rhoades, William Rhoades, and Katherine Rhoades. These individuals engaged in horticulture and viticulture in the Santa Clara Valley, a common and prevalent enterprise in the region at this time, and none of these individuals attained the status of persons important to history in relationship to their farming activities, or any other endeavors. Additionally, research did not identify any other individuals associated with this resource, such as later owners or occupants, that made demonstrably important contributions to history at the local, state, or national level. The historical record also provided no indication that this resourced under evaluation are associated with Harold E. Thomas either.

Under NRHP Criterion C or CRHR Criterion 3, this pump does not meet this criterion because it does not possess distinctive characteristics of a type, period, or method of construction. Centrifugal type pumps were in common use on farms throughout the Santa Clara Valley and other agricultural regions of California, particularly to draw water from streams and canals for irrigation purposes by the time these on the study parcel were installed. This pump is typical in its design, technology, and materials for its periods of construction and, therefore, does not meet this criterion. Likewise, the other elements of this structure, the pipes and standpipe, are also of common types and do not meet this criterion.

Under NRHP Criterion D / CRHR Criterion 4, this resource is not significant or likely sources of important information about historic construction materials or technologies that otherwise would not be available through documentary evidence.

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, the deteriorated condition of this resource, discontinuance of use, and the change in land use of the historic orchards it irrigated to residential subdivisions has greatly diminished its historic integrity of materials, workmanship, design, setting, feeling, and association.

[23] Urban Programmers, "Historical and Architectural Evaluation for the Parcel Located at 2280 Cochrane Road, Morgan Hill, California," April 10, 2012, 29-34.

Photographs (continued):

Photograph 2: Electric motor on left and pump on right, camera facing northwest, January 4, 2018.

Photograph 3: Pump showing intake pipe to Coyote Creek on left, electric motor on right, camera facing east, January 4, 2018.

Photograph 4: Showing standpipe, camera facing west, January 4, 2018.

***Resource Name or #** (Assigned by recorder): APN: 728-34-019

***Recorded by**: S.J. Melvin & J. Sarmiento ***Date**: August 16, 2017 & January 4, 2018 ☒ Continuation ☐ Update

Sketch Map:

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ______________
Review Code ______ Reviewer ______________ Date ______

***Resource Name or #** (Assigned by recorder): APN: 728-34-020

P1. Other Identifier: Water Distribution Pipe

***P2. Location:** ☐ Not for Publication ☒ Unrestricted ***a. County**: Santa Clara

***b. USGS 7.5' Quad**: Morgan Hill **Date**: 1955 (photorevised 1980) **T**: ; **R**: ; **Sec**: ; Mount Diablo Meridian

c. Address: City: Zip:

d. UTM: (give more than one for large and/or linear resources): Zone 10, 620880mE, 4114141mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Assessor Parcel Number (APN): 728-34-020; In the Live Oak Picnic Area of Anderson Lake County Park

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records and evaluates a section of water distribution pipe on APN 728-34-020, located on a 5.36-acre parcel in the Live Oak Picnic Area of Anderson lake County Park (**Photograph 1** and **2**; **Sketch Map**). This is an approximately 10-foot long, 12-inch diameter segment of steel, lock-bar type water pipe. The pipe is broken into two segments on an eroded bank of Coyote Creek and continues north underground. No other pipe segments, pumps or other features clearly associated with this pipe were located nearby.

***P3b. Resource Attributes:** (List attributes and codes) HP39—Water Pipe

***P4. Resources Present:** ☐ Building ☐ Structure ☒ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Pipe segment, camera facing northwest, January 4, 2018.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both

Ca. 1910 (estimate based on land use/ownership change and pipe design; see Historic Context)

***P7. Owner and Address:**

Santa Clara County
70 West Hedding Street
San Jose, 95110

***P8. Recorded by:**

Steven J. Melvin & Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: January 4, 2018

***P10. Survey Type:** (Describe)

Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Supplemental Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," Prepared for the Santa Clara Valley Water District, 2019.

***Attachments:** ☐ None ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): APN: 728-34-020

B1. Historic Name: None
B2. Common Name: None
B3. Original Use: Irrigation water distribution pipe B4. Present Use: Not in use
***B5. Architectural Style**: Utilitarian
***B6. Construction History**: (Construction date, alteration, and date of alterations) Built in ca. 1910.
***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**
***B8. Related Features:** _________
B9. Architect: Unknown b. Builder: Unknown
***B10. Significance: Theme**: Agriculture **Area**: Santa Clara Valley/Morgan Hill
Period of Significance: n/a **Property Type**: Irrigation Structure **Applicable Criteria**: n/a
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The water pipe recorded and evaluated on this form does not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). This resource is not an historic property under Section 106 of the National Historic Preservation Act, nor an historical resource for the purposes of the California Environmental Quality Act (CEQA). This resource has been evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. (See Section B10 on Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: Thompson & West, *Santa Clara County Atlas*, 1876; Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, 2012; J.G. McMillan, *Official Map of the County of Santa Clara, California*, 1903; A.T. Herrmann, "Map of the Survey of the former Phegley Home Ranch in the Rancho Laguna Seca," January 1904; US Census, Population Schedule, 1900, 1910; USGS, Aerial Photographs, Various Years; See also footnotes.

B13. Remarks:

***B14. Evaluator**: Steven J. Melvin
***Date of Evaluation**: January 2018

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See Sketch Map on last page.

B10. Significance (continued):

Historic Context

Euro-American Settlement and Agricultural Development of Southern Santa Clara County

The Santa Clara Valley is among the longest settled areas in California. The Pueblo of San Jose in the northern part of the valley, was one of the small number of *pueblos* established by the Spanish (the others include Los Angeles, San Francisco, and San Diego) in the eighteenth century. Outside of the pueblo boundaries, the valley was largely divided into rancho land grants conveyed to individuals by the Mexican government. Many of the land grants made by the Spanish and Mexican governments in the Santa Clara Valley survived into the American period and some of the property lines are still evident on the landscape.

The first Euro-American settlement in the vicinity of the APE for the project cited in P11 occurred in 1834 when the Mexican government granted 20,052 acres to Juan Alvires known as Rancho Refugio de la Laguna Seca and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The APE is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants Alvires and Hernandez operated cattle ranches on their land. This pastoral way of life continued into the early 1850s as non-Latino settlers began to arrive in the area, such as Martin Murphy, Sr., William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction. Fisher died in 1850 and the land, which includes the current APE, passed to his wife, Liberta C. Fisher.[1]

Large landowners in the early period of American settlement such as Fisher and Murphy initially continued the practice of cattle grazing. Other agricultural endeavors included sheep ranching, dairying, and general farming. Sheep ranches and dairy farming were particularly prevalent in southern Santa Clara County. Stock raising continued to be the primary economic activity in Santa Clara County until the drought of 1864, which decimated the herds and caused financial ruin to many ranchers.[2]

The 1864 drought also contributed to a rise in wheat cultivation in the Santa Clara Valley. Wheat had been grown in this area since the 1850s and its acreage grew with each year. The easy cultivation and high fertility of the soil of the valley facilitated wheat production with little capital investment. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop. During the 1860s, this popular crop surpassed cattle ranching as the principal agricultural activity in the valley and by 1870, wheat and barley occupied most of the rural acreage of the county. While wheat supplanted cattle ranching in the valley, some large stock ranches continued to operate in the outlying areas such as in the eastern foothills near the APE, and southwest of Gilroy. The largest of these ranches in the region were owned by the C. M. Weber estate, Henry W. and Charles Coe, Horace Willson, J. P. Sargent, and Henry Miller.[3]

Wheat's primacy in the county began to wane in the 1870s, however, as farmers experienced poor yields, lower prices, and competition from wheat grown in the Central Valley. Santa Clara County farmers responded by adopting a diversified farming approach, raising dairy cows, sheep, poultry, swine, hay, grapes, and fruit trees.[4] By turning away from wheat, Santa Clara County farmers opened the door for what would be the mainstay of Santa Clara Valley agriculture for decades to come: horticulture. Orchards had been planted during the Mexican and early American periods in the valley, but these were very small scale and for personal or limited commercial use. In 1856, the first experimental orchards were set out in the Willow

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[2] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 37-38.
[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 12, 13.
[4] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60.

Glen area, just southwest of present-day downtown San Jose. These were generally successful and led to farmers planting more orchards in the 1860s.[5]

In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. This particular variety of plum had a low moisture content making it ideal for drying and, thence, ideal for shipping as refrigerated rail cars had not yet been invented. In addition to prunes, Santa Clara Valley and farmers also planted other stone fruit orchards such as apricots, peaches, and cherries. The completion of the Santa Clara & Pajaro Valley Railroad (which would become part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 further boosted horticulture as it opened the large eastern US market to Santa Clara Valley fruit via the newly completed transcontinental railroad. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm could generate enough income to support a family. With the technological development of ice-cooled refrigerated rail cars in the 1880s, shipment of fresh fruit also became possible and furthered the popularity of orchard crops. By 1890, the transition to horticultural had spread to every part of the valley where irrigation water from streams or wells was available (**Plate 1**).[6]

Plate 1. Prune orchards near Morgan Hill ca. 1910. (Photo courtesy of San Jose Public Library.)

In addition to orchards, many farmers in the Santa Clara Valley planted another fruit crop: grapes. In the 1860s, José Maria Malaguerra planted one of the earliest vineyards in the county on a 200-acre tract purchased from Liberta C. Fisher where Malaguerra grew grapes and established the Malaguerra Winery, located on a nearby property to the west. Other early wineries in the Morgan Hill area include that of Joel W. Ransom who owned a 400-acre farm and by the 1880s had planted in French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes, and built a small winery on his property. Another vineyardists in the Morgan Hill area was Emilio Guglielmo who established a vineyard and commercial winery in the early twentieth

[5] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 14.
[6] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15.

century that continues to produce wine up to the present. South of Morgan Hill, the San Martin and Uvas Valley areas developed into viticulture locales with multiple farms raising wine grapes and building small wineries and brandy distilleries by the 1880s. While occupying considerably less acreage than orchard crops, viticulture remained a common practice, particularly in the southern part of the county, where such renowned wineries as the San Martin Winery were developed and continued to thrive through the twentieth century. The county experienced a general upward trend in viticulture with vineyards occupying over 1,000 acres in 1922 and 4,858 in 1955, most of this acreage lying between Morgan Hill and Gilroy.[7]

Advancements in irrigation technology facilitated the development of intensive horticulture in the Santa Clara Valley, including the use of centrifugal and vertical turbine pumps. Centrifugal pumps, which had been inventoried in the early 1800s, gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance, and therefore, this type of pump was best applied to pumping surface water, such as out of a creek or canal to irrigate a field, rather than from wells. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute.[8] Pump manufacturing companies first developed vertical turbine pumps in the early twentieth century, particularly for pumping groundwater for irrigation from deep wells. Vertical turbine pumps had the advantage over centrifugal pumps in that they had greater lift potential, that is, they could pump water from greater depths. Vertical turbine pumps came into popular usage on farms beginning around 1915, by which time the technology had advanced to achieve a lift of 350 vertical feet and deliver between 600 and 3,000 gallons of water, making vertical turbine pumps the preferred deep well pump among farmers. Vertical turbine pumps also had a simple, low-maintenance design, and did not require as large of a bore-hole diameter, compared to other well pump systems of the day. Both centrifugal and vertical turbine pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive.[9]

A common method to deliver water from either a centrifugal or vertical turbine pump was by steel pipe. The most common type of pipe design used on farms by the late 1800s was riveted steel pipe. This design consisted of sheet of rolled steel joined together at the longitudinal seam and ends with rivets. By 1905, the lock-bar type design was invented and came into common usage because of its greater tensile strength and less leakage. Lock-bar type pipe was fabricated by joining sheets of rolled steel at the longitudinal seam with an H-shaped bar applied to each edge of the steel sheet and compressed to form a tight seal. By the 1930s, welded steel pipe gradually replaced riveted steel and lock-bar as the preferred pipe design.[10]

Orchard fruit production continued to grow into the twentieth century and orchard farming remained the dominant agricultural activity in the Santa Clara Valley. At this time prunes remained the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District which ensured sufficient water for irrigation. After World War II, the vast orchards that had come to characterize the Santa Clara Valley gradually gave way to suburban residential and industrial development. This trend started in the northern part of the county around San Jose and slowly spread out from this

[7] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2.

[8] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3. "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian,* September 1895, 461.

[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3.

[10] American Water Works Association, "AWWA Manual: History, Uses, and Physical Characteristics of Steel Pipe," 2004, 1-2; B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 156-157.

nucleus in all directions. The southern part of the valley was the last area to be affected by suburbanization, and remained largely rural-agricultural until the 1970s.[11]

Development Morgan Hill

The urban settlement in the Morgan Hill area began as a stage stop along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill, and property on which the pipe recorded herein was located, was Madrone, situated about two miles southwest. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. The early farmers located in the general vicinity were identified as living in Madrone.[12]

Settlement of Morgan Hill began following the establishment of a railroad station there in 1893 and the subdivision of the large ranches in the Morgan Hill area (**Plate 2**). The rise of horticulture had caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. Surveyor C.H. Phillips worked with local landowners to subdivide nearly all of the ranchland between Madrone and Gilroy, including Morgan Hill. Phillips was well connected with the Southern Pacific Railroad and worked with the railroad to attract settlers. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from one-half acre town lots in Morgan Hill to small farm tracts of five to 100 or more acres. Lots along Monterey Road (the main street in Morgan Hill) sold off fairly quickly, while tracts further away were slower to sell. This subdivision of the large ranches in the Morgan Hill area further facilitated the spread of horticulture in this part of the Santa Clara Valley.[13]

Following the founding of Morgan Hill, the importance of Madrone as the regional shipping center declined and Morgan Hill took over as the main rail depot. Fruit dehydrators, canning factories, and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was generally slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[14]

Plate 2. Morgan Hill ca. 1905 with train passing and orchards beyond (looking east). (Photo courtesy of San Jose Public Library.)

[11] Stephen Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.
[12] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 32, 33.
[13] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 16.
[14] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area, being distant from the San Jose region, did not experience the same growth pressures and was able to retain its rural, agricultural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and the State built US Highway 101 as a freeway bypassing the downtown area, which facilitated development of this area as a bedroom community to San Jose and triggered construction of large residential subdivisions east and north of Morgan Hill, and their annexation into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill into the vicinity of Anderson Dam, further altering the once rural and agricultural character of the area.[15]

Property History: APN 728-34-020

This 5.36-acre containing the segment of water pipe recorded on this form was once part of Rancho Laguna Seca, a 20,052-acre Mexican land grant patented to Liberta C. Fisher in 1865. Fisher gradually sold off tracts of the rancho and by 1876, a 112-acre tract of the former rancho had been sold to A. Haalm (first name unknown). The 112 acres is inclusive of APN 728-34-020 and the water pipe segment recorded on this form. Research did not locate any further information regarding Haalm, but by 1880, Martin Hobin had purchased the 112-acre tract (**Plate 3**). Hobin arrived in Santa Clara County in 1862 from Illinois and first settled on a farm near San Jose. By 1880, Martin had relocated to the 112-acre tract on Cochrane Road and established a general farm on the property with his wife, Mary, and son, William. As a general farm, the Hobins would have raised a variety of crops and livestock. With frontage on Coyote Creek, Martin Hobin recorded a water rights claim for use of water from the creek with the Santa Clara County Recorder in 1903. This would have required some type of pump and piping system to make use of the water for irrigation. The Hobins continued to live on this farm until after 1910, at which time it appears the land was sold to Ira and William Rhoades, who had purchased an adjacent 156-acre farm in 1911. The Rhoades' were raised prunes, grapes, apricots and walnuts. The transfer of ownership to the Rhoades' appears to have initiated a change of land use from a general farm to orchard crops and grapes (**Plate 4**). By 1935, Katherine Garnett Rhoades, the widow of William Rhoades, had inherited the property and continued raising orchard crops and grapes. Katherine Rhoades divested of her ranch properties in the 1940s, selling the 112-acre former Hobin tract in 1944 to Peter and Laura Orlando. Land use during the Orlando's tenure remained generally unchanged, being orchards and vineyards, until the 1960s and the creation of Anderson Lake County Park. Established in 1960, Anderson Lake County Park acquired a portion of the Orlando farm along Coyote Creek in 1966 for the Live Oak Picnic Area.[16]

[15] USGS, *Morgan Hill Quadrangle*, 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

[16] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, 13; J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); A.T. Herrmann, "Map of the Survey of the former Phegley Home Ranch in the Rancho Laguna Seca," January 1904, Recorded in Maps, Book F2, Page 2; Alley, Bowen & Company, *A History of Santa Clara County, California* (San Francisco: Alley, Bowen & Co., 1881), 572-573; Santa Clara County Recorder, Martin Hobin, Water Claim, Book 1:229, April 17, 1903; US Census, Population Schedule, 1910, Santa Clara County, Burnett Township, Enumeration District 66, Sheet 5B; US Census, Population Schedule, 1900, Santa Clara County, Burnett Township, Enumeration District 47, Sheet 8; Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, 13; Santa Clara County Recorder, Katherine Garnett Rhoades to Peter Orlando and Laura Orlando, Deed, OR:1191:362, March 24, 1944; USGS, Aerial Photograph, Photo No. CIV-342-44, June 6, 1940; USGS, Aerial Photograph, Photo No. CIV-11R-120, July 7, 1956; USGS, Aerial Photograph, Photo No. SCL-23-240, May 27, 1965; William M. Hunt, "Record of Survey of Part of the Lands of Peter and Laura Orlando," April 1955, Recorded in Maps, Book 56, Page 33, Santa Clara County Recorder; Brian Christensen, Senior Park Ranger, Anderson Lake County Park, Email communications with Steven J. Melvin, JRP Historical Consulting, LLC, August 14 and August 16, 2017; Santa Clara County, Great Register of Voters, 1880, 46.

Plate 3. A map from 1903 showing the 112-acre property of M. Hobin outlined in blue.[17]

Plate 4. Aerial image from 1940 showing the former Hobin tract, at this time owned by Katherine Rhoades, planted in orchards and vineyards. Coyote Creek runs east to west across the top of the image.[18]

[17] J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903).
[18] USGS, Aerial Photograph, Photo No. CIV-342-44, June 9, 1940.

The pipe segment recorded on this form is a steel, lock-bar or lock-seam type pipe. This type of pipe was innovated around 1905 as an improvement over riveted steel pipe and thereafter came into common usage as it had higher tensile strength and less leakage. Lock-bar type pipe is fabricated by joining sheets of rolled steel at the longitudinal seam with an H-shaped bar that is applied to each edge of the steel sheet and compressed to form a tight seal. By the 1930s, welded steel pipe gradually replaced riveted steel and lock-bar as the preferred pipe design. Given this chronology, it appears that this pipe segment recorded on this form dates to circa 1910, possible coinciding with the acquisition of the property by the Rhoades family who were heavily invested in horticulture.[19]

Evaluation

The water pipe segment recorded on this form does not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). This pipe delivered water for irrigation on a small farm in the Santa Clara Valley. By the time this pipe was installed, irrigated agriculture was common in the Santa Clara Valley and such pipes were ubiquitous. Furthermore, the farm irrigated by this pump and pipe was typical in its size and the types of crops raised for this time period. This resource, therefore, does not have important associations with agriculture in the Morgan Hill area, or the greater Santa Clara Valley, and does not meet this criterion.

This resource is also associated with the Rhoades Ranch, a 12.27-acre property at 2290 Cochrane Road (APN 728-34-010) that is listed on the NRHP as a historic district and is a Santa Clara County Designated Landmark. The historic property was determined significant under NRHP Criterion A, for its association with agricultural development of the region; NRHP Criterion B, for its association with Harold E. Thomas (a pioneer in strawberry research and development of commercial strawberry production, and was director of the Strawberry Institute of California that was later located on the Rhoades Ranch); and NRHP Criterion C, for distinctive architecture. Its period of significance is ca. 1863-1966. This pipe segment falls within the period of significance under the agricultural development context. The NRHP documentation did not discuss this pipe segment, and did not identify it as a contributing element of the historic property. The pump is located outside of historic district boundaries, being across Cochrane Road and west of the NRHP-listed property. Given its discontiguous location and the fact that it is a relatively minor feature of the Rhoades Ranch farming operation, it should not be considered a contributor to the historic district.[20]

This resource is not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). The pipe segment is associated with the Hobin and Rhoades families. These individuals engaged in general farming, horticulture, and viticulture in the Santa Clara Valley, a common and prevalent enterprise in the region during their respective periods of ownership, and none of these individuals attained the status of persons important to history in relationship to their farming activities, or any other endeavors. Additionally, research did not identify any other individuals associated with this resource, such as later owners or occupants, that made demonstrably important contributions to history at the local, state, or national level. The historical record provided no indication that this pipe is associated with Harold E. Thomas either.

Under NRHP Criterion C or CRHR Criterion 3, this pipe does not meet this criterion because it does not possess distinctive characteristics of a type, period, or method of construction. Steel, lock-bar type pipe, like the one recorded on this form, was innovated around 1905 and came into common usage on farms for irrigation throughout the Santa Clara Valley and other agricultural regions of California and became ubiquitous. This pipe segment is typical in its design, technology, and materials for its periods of construction and, therefore, does not meet this criterion.

Under NRHP Criterion D / CRHR Criterion 4, this resource is not significant or likely sources of important information about historic construction materials or technologies that otherwise would not be available through documentary evidence.

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, the deteriorated condition of this resource, lack of associated features such as a pump, discontinuance of its use,

[19] American Water Works Association, "AWWA Manual: History, Uses, and Physical Characteristics of Steel Pipe," 2004, 1-2.
[20] Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, listed April 17, 2013, NRIS Reference No. 13000158; Santa Clara County Board of Supervisors, Rhoades Ranch Historic Landmark Designation Resolution (CL11-001), February 8, 2011.

and the change in land use of the farm land it irrigated to a county park and residential subdivisions has greatly diminished the historic integrity of materials, workmanship, design, setting, feeling, and association.

Photographs (continued):

Photograph 2: Pipe segment showing the lock-bar seam across the top, camera facing northwest, January 4, 2018.

Sketch Map:

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ______
Review Code ______ Reviewer ______ Date ______

 ***Resource Name or #** (Assigned by recorder): APN: 728-35-037

P1. Other Identifier: Irrigation Pump and Water Distribution Pipe Segments

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara

***b. USGS 7.5′ Quad**: Morgan Hill **Date**: 1955 (photorevised 1980) **T**: ; **R**: ; **Sec**: ; Mount Diablo Meridian

c. Address: City: Zip:

d. UTM: Zone 10, 620051mE, 4114177mN (pump); 619961mE, 414268mN (pipe seg.); 619993mE, 414222mN (pipe seg.)

e. Other Locational Data: Assessor Parcel Number (APN): 728-35-037; Adjacent to Malaguerra Road near the Anderson Lake County Park Visitor Center

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records and evaluates an irrigation pump and water distribution pipe segments on APN 728-35-037, currently owned by the County of Santa Clara and part of Anderson Lake County Park (**Sketch Map**). This Pacific Pump Company built pump is a steel, centrifugal style water pump mounted on steel beams attached to a concrete platform next to an electric motor. The shaft of the motor extends out horizontally on one side and has a grooved wheel attached, designed to carry the belts to drive the pump. The centrifugal pump is located immediately next to the motor on the same concrete platform, it also has a belt drive wheel on one side. The concrete platform is built on the sloping bank of Coyote Creek, about 15 feet above and away from the water at the time of survey. Extending down from bottom of the pump is a long, steel intake pipe about eight inches in diameter that reaches down into the creek. Another steel pipe of the same dimensions, the delivery pipe, comes out the top of the pump and runs horizontally away from the creek (**Photograph 1** & **2**). (See Section P3a on Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP39—Water Pump and Pipes

***P4. Resources Present:** ☐ Building ☒ Structure ☒ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Pump, motor, and pipe, camera facing northwest, January 4, 2018.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
Ca. 1905 (estimate based on land use/ownership change; see Historic Context)

***P7. Owner and Address:**
Santa Clara County
70 West Hedding Street
San Jose, 95110

***P8. Recorded by:** (Name, affiliation, address)
Steven J. Melvin & Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: August 16, 2017 & January 4, 2018

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Supplemental Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," Prepared for the Santa Clara Valley Water District, 2019.

***Attachments:** ☐ None ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

***NRHP Status Code**: 6Z

***Resource Name or #** (Assigned by recorder): APN: 728-35-037

B1. Historic Name: None

B2. Common Name: None

B3. Original Use: Irrigation pump and distribution pipe B4. Present Use: Not in use

***B5. Architectural Style**: Utilitarian

***B6. Construction History**: (Construction date, alteration, and date of alterations) Installed ca. 1905; steel beams added to platform, date unknown; electric motor replaced, date unknown

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**

***B8. Related Features:** ___________

B9. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme**: Agriculture **Area**: Santa Clara Valley/Morgan Hill

Period of Significance: n/a **Property Type**: Irrigation Structure **Applicable Criteria**: n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The water pump and pipe segments recorded and evaluated on this form do not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). They are not an historic property under Section 106 of the National Historic Preservation Act, nor an historical resource for the purposes of the California Environmental Quality Act (CEQA). These two resources have been evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. (See Section B10 on Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: US Census, Population Schedule, 1920, 1930 and 1940; USGS, Aerial Photographs, Various Years; Shackelford & Fisher, "Map of J.M. McElhany's Subdivision of S.A. McPherson's Ranch," July 17, 1895, Recorded in Maps, Book H, Page 129, Santa Clara County Recorder; Santa Clara County, "Record of Survey, Lot 12 and Part of Lot 13 of J.M. McElhany's Subdivision." December 1944, Recorded in Maps, Book 6, Page 45, Santa Clara County Recorder; See also footnotes.

B13. Remarks:

***B14. Evaluator**: Steven J. Melvin

***Date of Evaluation**: January 2018

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See Sketch Map on last page.

P3a. Description (continued):

The distribution pipe segments run on the flat ground just above the pump and the steep creek bank. The pipe runs parallel to Coyote Creek and Malaguerra Avenue, and downstream from the pump (**Photograph 3** & **4**). The pipe is a riveted steel pipe about ten inches in diameter and the two pipe segments appear to be segments of the same pipe. The pipe segments run on the surface, or just below the surface.

B10. Significance (continued):

Historic Context

Euro-American Settlement and Agricultural Development of Southern Santa Clara County

The Santa Clara Valley is among the longest settled areas in California. The Pueblo of San Jose in the northern part of the valley, was one of the small number of *pueblos* established by the Spanish (the others include Los Angeles, San Francisco, and San Diego) in the eighteenth century. Outside of the pueblo boundaries, the valley was largely divided into rancho land grants conveyed to individuals by the Mexican government. Many of the land grants made by the Spanish and Mexican governments in the Santa Clara Valley survived into the American period and some of the property lines are still evident on the landscape.

The first Euro-American settlement in the general vicinity of the APE of the project cited in Section P11 occurred in 1834 when the Mexican government granted 20,052 acres to Juan Alvires known as Rancho Refugio de la Laguna Seca and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The APE is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants Alvires and Hernandez operated cattle ranches on their land. This pastoral way of life continued into the early 1850s as non-Latino settlers began to arrive in the area, such as Martin Murphy, Sr., William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction. Fisher died in 1850 and the land, which includes the current APE, passed to his wife, Liberta C. Fisher.[1]

Large landowners in the early period of American settlement such as Fisher and Murphy initially continued the practice of cattle grazing. Other agricultural endeavors included sheep ranching, dairying, and general farming. Sheep ranches and dairy farming were particularly prevalent in southern Santa Clara County. Stock raising continued to be the primary economic activity in Santa Clara County until the drought of 1864, which decimated the herds and caused financial ruin to many ranchers.[2]

The 1864 drought also contributed to a rise in wheat cultivation in the Santa Clara Valley. Wheat had been grown in this area since the 1850s and its acreage grew with each year. The easy cultivation and high fertility of the soil of the valley facilitated wheat production with little capital investment. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop. During the 1860s, this popular crop surpassed cattle ranching as the principal agricultural activity in the valley and by 1870, wheat and barley occupied most of the rural acreage of the county. While wheat supplanted cattle ranching in the valley, some large stock ranches continued to operate in the outlying areas such as in the eastern foothills near the APE for the project cited in P11, and southwest of Gilroy. The largest of these ranches in the region were owned by the C. M. Weber estate, Henry W. and Charles Coe, Horace Willson, J. P. Sargent, and Henry Miller.[3]

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[2] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 37-38.
[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 12, 13.

Wheat's primacy in the county began to wane in the 1870s, however, as farmers experienced poor yields, lower prices, and competition from wheat grown in the Central Valley. Santa Clara County farmers responded by adopting a diversified farming approach, raising dairy cows, sheep, poultry, swine, hay, grapes, and fruit trees.[4] By turning away from wheat, Santa Clara County farmers opened the door for what would be the mainstay of Santa Clara Valley agriculture for decades to come: horticulture. Orchards had been planted during the Mexican and early American periods in the valley, but these were very small scale and for personal or limited commercial use. In 1856, the first experimental orchards were set out in the Willow Glen area, just southwest of present-day downtown San Jose. These were generally successful and led to farmers planting more orchards in the 1860s.[5]

In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. This particular variety of plum had a low moisture content making it ideal for drying and, thence, ideal for shipping as refrigerated rail cars had not yet been invented. In addition to prunes, Santa Clara Valley and farmers also planted other stone fruit orchards such as apricots, peaches, and cherries. The completion of the Santa Clara & Pajaro Valley Railroad (which would become part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 further boosted horticulture as it opened the large eastern US market to Santa Clara Valley fruit via the newly completed transcontinental railroad. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm could generate enough income to support a family. With the technological development of ice-cooled refrigerated rail cars in the 1880s, shipment of fresh fruit also became possible and furthered the popularity of orchard crops. By 1890, the transition to horticultural had spread to every part of the valley where irrigation water from streams or wells was available (**Plate 1**).[6]

Plate 1. Prune orchards near Morgan Hill ca. 1910. (Photo courtesy of San Jose Public Library.)

[4] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60.
[5] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 14.
[6] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15.

In addition to orchards, many farmers in the Santa Clara Valley planted another fruit crop: grapes. In the 1860s, José Maria Malaguerra planted one of the earliest vineyards in the county on a 200-acre tract purchased from Liberta C. Fisher where Malaguerra grew grapes and established the Malaguerra Winery, which is located on a nearby property. Other early wineries in the Morgan Hill area included that of Joel W. Ransom who owned a 400-acre farm and by the 1880s had planted in French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes, and built a small winery on his property. Another vineyardists in the Morgan Hill area was Emilio Guglielmo who established a vineyard and commercial winery in the early twentieth century that continues to produce wine up to the present. South of Morgan Hill, the San Martin and Uvas Valley areas developed into a viticulture locales with multiple farms raising wine grapes and building small wineries and brandy distilleries by the 1880s. While occupying considerably less acreage than orchard crops, viticulture remained a common practice, particularly in the southern part of the county, where such renowned wineries as the San Martin Winery were developed and continued to thrive through the twentieth century. The county experienced a general upward trend in viticulture with vineyards occupying over 1,000 acres in 1922 and 4,858 in 1955, most of this acreage lying between Morgan Hill and Gilroy.[7]

Advancements in irrigation technology facilitated the development of intensive horticulture in the Santa Clara Valley. The first type of irrigation pump used on farms was the centrifugal type pump. This type of pump was invented in the early 1800s by developers in the United States and England and by the late 1800s had come into common use on farms to draw irrigation water from streams. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance, and therefore, this type of pump was best applied to pumping surface water, such as out of a creek or canal to irrigate a field, rather than from wells. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute.[8]

The other common type of pump in the Santa Clara Valley was the vertical turbine pump. Pump manufacturing companies first developed this type of pump in the early twentieth century, particularly for pumping groundwater for irrigation from deep wells. Vertical turbine pumps had the advantage over centrifugal pumps in that they had greater lift potential, that is, they could pump water from greater depths. Vertical turbine pumps came into popular usage on farms beginning around 1915, by which time the technology had advanced to achieve a lift of 350 vertical feet and deliver between 600 and 3,000 gallons of water, making vertical turbine pumps the preferred deep well pump among farmers. Vertical turbine pumps also had a simple, low-maintenance design, and did not require as large of a bore-hole diameter, compared to other well pump systems of the day. Both centrifugal and vertical turbine pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive.[9]

A common method to deliver water from either a centrifugal or vertical turbine pump was by steel pipe. The most common type of pipe design used on farms by the late 1800s was riveted steel pipe. This design consisted of sheet of rolled steel joined together at the longitudinal seam and ends with rivets. By 1905, the lock-bar type design was invented and came into common usage because of its greater tensile strength and less leakage. Lock-bar type pipe was fabricated by joining sheets of rolled steel at the longitudinal seam with an H-shaped bar applied to each edge of the steel sheet and compressed to form a tight seal. By the 1930s, welded steel pipe gradually replaced riveted steel and lock-bar as the preferred pipe design.[10]

[7] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2.

[8] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3. "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian,* September 1895, 461.

[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3.

[10] American Water Works Association, "AWWA Manual: History, Uses, and Physical Characteristics of Steel Pipe," 2004, 1-2; B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 156-157.

Orchard fruit production continued to grow into the twentieth century and orchard farming remained the dominant agricultural activity in the Santa Clara Valley. At this time prunes remained the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District, as discussed below, which ensured sufficient water for irrigation. After World War II, the vast orchards that had come to characterize the Santa Clara Valley gradually gave way to suburban residential and industrial development. This trend started in the northern part of the county around San Jose and slowly spread out from this nucleus in all directions. The southern part of the valley was the last area to be affected by suburbanization, and remained largely rural-agricultural until the 1970s.[11]

Development Morgan Hill

The urban settlement in the Morgan Hill area began as a stage stop along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill, and the location of the structures recorded herein, was Madrone, located about two miles southwest. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. The early farmers located in the general vicinity were identified as living in Madrone.[12]

Settlement of Morgan Hill began following the establishment of a railroad station there in 1893 and the subdivision of the large ranches in the Morgan Hill area (**Plate 2**). The rise of horticulture had caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. Surveyor C.H. Phillips worked with local landowners to subdivide nearly all of the ranchland between Madrone and Gilroy, including Morgan Hill. Phillips was well connected with the Southern Pacific Railroad and worked with the railroad to attract settlers. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from one-half acre town lots in Morgan Hill to small farm tracts of five to 100 or more acres. Lots along Monterey Road (the main street in Morgan Hill) sold off fairly quickly, while tracts further away were slower to sell. This subdivision of the large ranches in the Morgan Hill area further facilitated the spread of horticulture in this part of the Santa Clara Valley.[13]

Following the founding of Morgan Hill, the importance of Madrone as the regional shipping center declined and Morgan Hill took over as the main rail depot. Fruit dehydrators, canning factories, and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was generally slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[14]

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area, being distant from the San Jose region, did not experience the same growth pressures and was able to retain its rural, agricultural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and the State built US Highway 101 as a freeway bypassing the downtown area, which facilitated development of this area as a bedroom community to San Jose and triggered construction of large residential subdivisions east and north of Morgan Hill, and their annexation into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill into the vicinity of Anderson Dam, further altering the once rural and agricultural character of the area.[15]

[11] Stephen Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa: Historic Property Development, “Historic Context Statement for the City of Morgan Hill,” 51-54, 70; Archives and Architecture, LLC, “County of Santa Clara Historic Context Statement,” 40-41.
[12] Circa: Historic Property Development, “Historic Context Statement for the City of Morgan Hill,” 32, 33.
[13] Circa: Historic Property Development, “Historic Context Statement for the City of Morgan Hill,” 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 16.
[14] Circa: Historic Property Development, “Historic Context Statement for the City of Morgan Hill,” 36-38.
[15] USGS, *Morgan Hill Quadrangle*, 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan*

Plate 2. Morgan Hill ca. 1905 with train passing and orchards beyond (looking east). (Photo courtesy of San Jose Public Library.)

Property History: APN 729-35-037

APN 728-35-037, a 2.13-acre parcel containing the water pump and pipe segments recorded on this form, was once part of Rancho Laguna Seca, a 20,052-acre Mexican land grant patented to Liberta C. Fisher in 1865. Fisher gradually sold off tracts of the rancho and by 1870, James Phegley had acquired a 244-acre parcel of the former rancho along the bank of Coyote Creek, inclusive of APN 728-35-037. Phegley had only recently settled in Santa Clara County along with his parents Daniel and Nancy Phegley, who owned an adjacent 188-acre parcel. Daniel and James Phegley established a cattle ranching operation on their properties, but by 1877, James and his wife Mary had moved to Gilroy where they opened a grocery store, leaving the ranching operations to Daniel Phegley. The Phegley cattle ranch remained in operation into the 1890s.[16]

By 1894, S.A. McPherson, also a cattle rancher, had purchased a 142.83-acre tract being a portion of the 244-acre James Phegley property and inclusive of APN 728-35-037. In 1895, McPherson had sold the land to J.M. McElhany who subdivided it into 16 small farm lots (**Plate 3**). The pump and pipe segments recorded on this form are on Lots 10 and 11 of this subdivision, which together encompassed 20.55 acres. Following the survey of McElhany's Subdivision, research did not determine who initially bought Lots 10 and 11. What is known is that Palmeira Alves owned the land in 1919, the year of her death and the transfer of the land to her son Manuel Alves. By 1930, Manuel Alves, a widower, was living on the property and farming it with his son, Charles. Manuel Alves emigrated from Portugal in 1906, while his son, 15 years old in 1930, was born in California. In 1920, Manuel Alves had been living nearby in the Morgan Hill area on another farmstead raising orchard crops. The land Alves inherited from her mother, also was entirely planted in orchards by 1940 (**Plate 4**).

Hill Quadrangle, 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

16 Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); Franklin Maggi and Sarah Winder, Archives and Architecture, LLC, National Register of Historic Places Registration Form, Rhoades Ranch, July 24, 2012, 13; J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903).

Plate 3. Map of J.M. McElhany's Subdivision recorded in 1895. The pump and pipe segments recorded on this form are located along Coyote Creek on Lots 10 and 11, outlined in blue.[17]

Plate 4. Aerial image dated 1940 showing the Alves property, Lots 10 and 11 of McElhany's Subdivision, planted in orchards and under irrigation.[18]

[17] Shackelford & Fisher, "Map of J.M. McElhany's Subdivision of S.A. McPherson's Ranch," July 17, 1895, Recorded in Maps, Book H, Page 129, Santa Clara County Recorder.
[18] USGS, Aerial Photograph, Photo No. CIV-342-110, June 9, 1940.

Manuel Alves still owned the land as late as 1944. Research did not determine the owners subsequent to Alves, but the land continued to be primarily orchards at least into the 1960s. Research also did not determine the exact installation date of this pump, but it is estimated ca. 1905 based on the land being unirrigated cattle range until its subdivision by J.M. McElhany in 1895 into small farm lots. In 1980, a 2.13-acre strip of land—APN 728-35-037—along Coyote Creek, including the pump and pipe segments recorded on this form, was transferred to the County of Santa Clara for inclusion in Anderson Lake County Park.[19]

The pump recorded on this form is a centrifugal type water pump, and as noted above, it was of a design innovated in the early 1800s by developers in the United States and England. It first came into use for municipal water purposes after 1850, and by the late 1800s had become common on farms to draw irrigation water from streams and canals. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance. Centrifugal pumps of the early twentieth century of the type commonly used on small farms had a maximum lift of about 75 feet. This type of pump was best applied to pumping surface water, such as out of a creek or canal to an adjacent field. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute. Like other pumps, centrifugal pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive. The pipe segments recorded on this form are riveted steel pipes. This type of pipe was inexpensive, readily available, and came into common use on farms by the late 1800s.[20]

Evaluation

The water pump and pipe segments recorded on this form do not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). These resources delivered water for irrigation on a small farm in the Santa Clara Valley. By the time these pumps were installed, irrigated agriculture was common in the Santa Clara Valley and such pumps and pipes were ubiquitous. Furthermore, the farm irrigated by this pump and pipe was typical in its size and the types of crops raised for this time period. These resources, therefore, do not have important associations with agriculture in the Morgan Hill area, or the greater Santa Clara Valley, and do not meet this criterion.

These resources are not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). The water pump and pipe segments are associated with the Alves family, who farmed the property for many years. These individuals owned a small farm and worked as farmers, and they did not attain the status of persons important to history in relationship to their farming, or any other activities. Additionally, research did not identify any other individuals associated with these resources, such as later owners or occupants, that made demonstrably important contributions to history at the local, state, or national level.

[19] A.T. Herrmann, "Map of the Property of J.M. Malaguerra," September 17, 1894, Recorded in Maps, Book F, Page 29, Santa Clara County Recorder; Shackelford & Fisher, "Map of J.M. McElhany's Subdivision of S.A. McPherson's Ranch," July 17, 1895, Recorded in Maps, Book H, Page 129, Santa Clara County Recorder; Santa Clara County Recorder, Palmeira Alves to Manuel Alves, Deed, Deeds:486:371, June 2, 1919; US Census, Population Schedule, 1920, Santa Clara County, Burnett Township, Enumeration District 121, Sheet 4B; US Census, Population Schedule, 1930, Santa Clara County, Burnett Township, Enumeration District 43-3, Sheet 5A; US Census, Population Schedule, 1940, Santa Clara County, Burnett Township, Enumeration District 43-2, Sheet 7A; Santa Clara County, "Record of Survey, Lot 12 and Part of Lot 13 of J.M. McElhany's Subdivision." December 1944, Recorded in Maps, Book 6, Page 45, Santa Clara County Recorder; Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); R.L. Polk & Company, *San Jose City Directory* (San Francisco: R.L. Polk & Co., 1931; USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939; USGS, Aerial Photograph, Photo No. 2310-3-114, May 6, 1968; Santa Clara County Assessor, Property Information for APN 728-35-037.

[20] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 156-157, 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3.

Under NRHP Criterion C or CRHR Criterion 3, this pump and pipe segments do not meet this criterion because they do not possess distinctive characteristics of a type, period, or method of construction, nor are they important works of a master architect. Centrifugal type pumps were in common use on farms throughout the Santa Clara Valley and other agricultural regions of California, particularly to draw water from streams and canals for irrigation purposes by the time these on the study parcel were installed. This pump is typical in its design, technology, and materials for its periods of construction and, therefore, does not meet this criterion. Likewise, riveted steel pipe was in common usage by this time and these pipe segments are also typical for their period and do not meet this criterion.

Under NRHP Criterion D / CRHR Criterion 4, these resources are not significant or likely sources of important information about historic construction materials or technologies that otherwise would not be available through documentary evidence.

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, the deteriorated condition of the pump and pipe segments, apparent removal of much of the pipeline, abandonment of these resources, and the change in land use of the historic farm from intensive irrigated agriculture to park land and residential subdivisions has greatly diminished the historic integrity of materials, workmanship, design, setting, feeling, and association of these resources.

Photographs (continued):

Photograph 2: Pump showing the intake pipe extending down the bank into Coyote Creek, camera facing east, January 4, 2018.

Photograph 3: Partially buried distribution pipe along Malaguerra Avenue, facing southwest, January 4, 2018.

Photograph 4: Distribution pipe along Malaguerra Avenue, facing northeast, January 4, 2018.

***Resource Name or #** (Assigned by recorder): APN: 728-35-037

***Recorded by**: S.J. Melvin & J. Sarmiento *__Date__: August 16, 2017 & January 4, 2018 ☒ Continuation ☐ Update

Sketch Map:

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ____
Review Code ____ Reviewer ____ Date ____

***Resource Name or #** (Assigned by recorder): APN: 729-49-005

P1. Other Identifier: Anderson Lake County Park, Burnett Area; Klinke Ranch

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5′ Quad**: Morgan Hill **Date**: 1955 (photorevised 1980) **T**: ; **R**: ; **Sec**: ; Mount Diablo Meridian

c. Address: City: Zip:

d. UTM: (give more than one for large and/or linear resources) Zone: _____; ____mE/ ____mN

e. Other Locational Data: Assessor Parcel Number: 729-49-005

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records and evaluates built environment resources on APN 729-49-005 currently owned by the County of Santa Clara and located in the Burnett Area of Anderson Lake County Park. The resources are a residence, garage, two poultry barns, two orchards, and a water pump and pumphouse (see **Sketch Map**). Another resource on the parcel, the Malaguerra Winery, is listed on the National Register of Historic Places (NRHP Reference No. 80000858, listed October 23, 1980), and is therefore not recorded and evaluated on this form. The NRHP documentation is attached to the report cited in field P11. The residence recorded on this form is a single-story Minimal Traditional style, multi-unit building with a rectangular plan on a concrete foundation and a medium-pitched front-gable roof (**Photograph 1**). The roof is clad in composition shingles and has overhanging eaves with exposed rafter tails. Stucco covers the exterior walls. (See Section P3a on Continuation Sheet.)

***P3b. Resource Attributes:** HP2—Multiple Family Property; HP30—Trees; HP33—Farm Buildings; HP39—Water Pump

***P4. Resources Present:** ☒ Building ☐ Structure ☒ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Residence and garage, camera facing west, August 16, 2017.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
Ca. 1910, ca. 1920, 1960, 1964 (Santa Clara County Building Permits; Aerial Photographs; see also Historic Context)

***P7. Owner and Address:**
Santa Clara County
70 West Hedding Street
San Jose, 95110

***P8. Recorded by:** (Name, affiliation, address)
Steven J. Melvin & Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: August 16, 2017; September 4, 2019

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Supplemental Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," Prepared for the Santa Clara Valley Water District, 2019.

***Attachments:** ☐ None ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

Primary # ___ _____
HRI # ___ _____

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z

***Resource Name or #** (Assigned by recorder): APN: 729-49-005

B1. Historic Name: Malaguerra Winery; Malaguerra Farm; Klinke Ranch

B2. Common Name: Anderson Lake County Park, Burnett Area

B3. Original Use: Farm B4. Present Use: Anderson Lake County Park

***B5. Architectural Style**: Minimal Traditional; utilitarian

***B6. Construction History**: (Construction date, alteration, and date of alterations) Residence and garage: 1964; two poultry barns: ca. 1960; orchards: ca. 1920; carport added after 1980; Pump and pumphouse: ca. 1910 (estimate based on pump design and historic mapping).

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**

***B8. Related Features:** _________

B9. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme**: Agriculture **Area**: Santa Clara Valley/Morgan Hill

Period of Significance: n/a **Property Type**: Ranch/Farm **Applicable Criteria**: n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The built environment resources recorded and evaluated on this form do not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). The resources are not historic properties under Section 106 of the National Historic Preservation Act, nor are they historical resource for the purposes of the California Environmental Quality Act (CEQA). These resources have been evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. (See Section B10 on Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: USGS, Aerial Photographs, various years; Santa Clara County, Recorded Maps, various; *San Jose News*; Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, 1977; Historic American Building Survey, "Malaguerra Winery," HABS No. CA-2004, July 1977; US Census, various years; See also footnotes.

B13. Remarks:

***B14. Evaluator**: Steven J. Melvin

***Date of Evaluation**: January 2018/September 2019

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See Sketch Map on last page.

P3a. Description (continued):

The gable roof has two parts, the front section being wider and higher than the rear section. On the side of the building are three entrances, one for each unit, each with a plain wood door and a single concrete step. Next to each door are aluminum sash, horizontal sliding windows. Similar windows are on the other building elevations. Next to the house is a two-bay garage of the same style and features as the house. It has a front gable roof with composition shingles, overhanging eaves, stucco siding, aluminum sash sliding windows and tilt-up wood garage door. The other bay lacks a door and is partially boarded up with plywood. Near the garage is an open-sided shelter consisting of square wood posts supporting a wood framed roof covered in corrugated metal sheets (**Photograph 2**).

Directly east of the residence is a poultry barn (**Photograph 3**). It has a long, rectangular plan and a medium-pitched, raised seam metal roof with a monitor vent along the ridge. The building is wood framed with wood trusses and wood posts anchored to a poured concrete foundation; the concrete does not appear original. The barn has open sides except for one end which had plywood siding and plywood top-hung sliding doors. Some of the siding and a door has been removed and these are lying on the ground. Etched in the concrete at this end are the initials “JHK” for John H. Klinke, the owner of the property when this building was built. It appears the opposite end of the barn had identical siding and doors, but these have all been removed. Some of the roofing is also gone at this end of the building. About 375 yards to the north is a similar poultry barn with a long, rectangular, although slightly larger, footprint (**Photograph 4**). Topping this building is a medium-pitched corrugated metal roof with a monitor vent along the ridge. It is wood framed with wood trusses and wood posts anchored to a poured concrete foundation and open sides. Corrugated metal siding covers the ends, which also have a large doorway in the center once covered by a top-hung sliding door.

At the south end of this parcel are the remnants of two long-neglected orchards, one fruit trees and one walnut trees. The fruit tree orchard is just north of the residence and only about 30 trees remain, making the original rows largely indistinguishable (**Photograph 5**). South of the nearby poultry barn is the walnut orchard of about 100 trees. This orchard is more intact and its rows clearly evident. The County has installed a few picnic tables in this orchard (**Photograph 6**).

On the opposite side of Coyote Creek from the above built environment resources is a small pumphouse and pump along the bank of the creek (**Photograph 7**). The pumphouse is about four feet by eight feet, wood framed with corrugated metal walls and shed roof, all on a concrete slab foundation. Inside is a steel centrifugal type water pump mounted on a steel base (**Photograph 8**). The electric motor originally mounted next to the pump is gone. A steel intake pipe from Coyote Creek attached to one side of the pump, and attached to the other side is an outflow pipe leading to a cylindrical concrete standpipe next to the pumphouse.

B10. Significance (continued):

Historic Context

Euro-American Settlement and Agricultural Development of Southern Santa Clara County

The Santa Clara Valley is among the longest settled areas in California. The Pueblo of San Jose in the northern part of the valley, was one of the small number of *pueblos* established by the Spanish (the others include Los Angeles, San Francisco, and San Diego) in the eighteenth century. Outside of the pueblo boundaries, the valley was largely divided into rancho land grants conveyed to individuals by the Mexican government. Many of the land grants made by the Spanish and Mexican governments in the Santa Clara Valley survived into the American period and some of the property lines are still evident on the landscape.

The first Euro-American settlement in the vicinity of the Area of Potential Effects (APE) for the project cited in field P11 occurred in 1834 when the Mexican government granted 20,052 acres to Juan Alvires known as Rancho Refugio de la Laguna Seca and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The APE is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants Alvires and Hernandez operated cattle ranches on their land. This pastoral way of life continued into the early 1850s as non-Latino settlers began to arrive in the area, such as Martin Murphy, Sr., William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction. Fisher died in 1850 and the land, which includes the current APE, passed to his wife, Liberta C. Fisher.[1]

Large landowners in the early period of American settlement such as Fisher and Murphy initially continued the practice of cattle grazing. Other agricultural endeavors included sheep ranching, dairying, and general farming. Sheep ranches and dairy farming were particularly prevalent in southern Santa Clara County. Stock raising continued to be the primary economic activity in Santa Clara County until the drought of 1864, which decimated the herds and caused financial ruin to many ranchers.[2]

The 1864 drought also contributed to a rise in wheat cultivation in the Santa Clara Valley. Wheat had been grown in this area since the 1850s and its acreage grew with each year. The easy cultivation and high fertility of the soil of the valley facilitated wheat production with little capital investment. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop. During the 1860s, this popular crop surpassed cattle ranching as the principal agricultural activity in the valley and by 1870, wheat and barley occupied most of the rural acreage of the county. While wheat supplanted cattle ranching in the valley, some large stock ranches continued to operate in the outlying areas such as in the eastern foothills near the APE for the project cited in P11, and southwest of Gilroy. The largest of these ranches in the region were owned by the C. M. Weber estate, Henry W. and Charles Coe, Horace Willson, J. P. Sargent, and Henry Miller.[3]

Wheat's primacy in the county began to wane in the 1870s, however, as farmers experienced poor yields, lower prices, and competition from wheat grown in the Central Valley. Santa Clara County farmers responded by adopting a diversified farming approach, raising dairy cows, sheep, poultry, swine, hay, grapes, and fruit trees.[4] By turning away from wheat, Santa Clara County farmers opened the door for what would be the mainstay of Santa Clara Valley agriculture for decades to come: horticulture. Orchards had been planted during the Mexican and early American periods in the valley, but these were very small scale and for personal or limited commercial use. In 1856, the first experimental orchards were set out in the Willow Glen area, just southwest of present-day downtown San Jose. These were generally successful and led to farmers planting more orchards in the 1860s.[5]

In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. This particular variety of plum had a low moisture content making it ideal for drying and, thence, ideal for shipping as refrigerated rail cars had not yet been invented. In addition to prunes, Santa Clara Valley and farmers also planted other stone fruit orchards such as apricots, peaches, and cherries. The completion of the Santa Clara & Pajaro Valley Railroad (which would become part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 further boosted horticulture as it opened the large eastern US market to Santa Clara Valley fruit via the newly completed transcontinental railroad. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm could generate enough income to support a family. With the technological development of ice-cooled refrigerated rail cars in the 1880s, shipment of fresh fruit also became possible and furthered the

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[2] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 37-38.
[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 12, 13.
[4] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60.
[5] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 14.

popularity of orchard crops. By 1890, the transition to horticultural had spread to every part of the valley where irrigation water from streams or wells was available (**Plate 1**).[6]

Plate 1. Prune orchards near Morgan Hill ca. 1910. (Photo courtesy of San Jose Public Library.)

In addition to orchards, many farmers in the Santa Clara Valley planted another fruit crop: grapes. In the 1860s, José Maria Malaguerra planted one of the earliest vineyards in the county, as discussed below. Other early wineries in the Morgan Hill area include that of Joel W. Ransom who owned a 400-acre farm and by the 1880s had planted in French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes, and built a small winery on his property. Another vineyardists in the Morgan Hill area was Emilio Guglielmo who established a vineyard and commercial winery in the early twentieth century that continues to produce wine up to the present. South of Morgan Hill, the San Martin and Uvas Valley areas developed into a viticulture locales with multiple farms raising wine grapes and building small wineries and brandy distilleries by the 1880s. While occupying considerably less acreage than orchard crops, viticulture remained a common practice, particularly in the southern part of the county, where such renowned wineries as the San Martin Winery were developed and continued to thrive through the twentieth century. The county experienced a general upward trend in viticulture with vineyards occupying over 1,000 acres in 1922 and 4,858 in 1955, most of this acreage lying between Morgan Hill and Gilroy.[7]

Advancements in irrigation technology facilitated the development of intensive horticulture in the Santa Clara Valley. The first type of irrigation pump used on farms was the centrifugal type pump. This type of pump was invented in the early 1800s by developers in the United States and England and by the late 1800s had come into common use on farms to draw irrigation water from streams. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance, and therefore, this type of pump was best applied to pumping

[6] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15.
[7] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2.

surface water, such as out of a creek or canal to irrigate a field, rather than from wells. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute.[8]

Orchard fruit production continued to grow into the twentieth century and orchard farming remained the dominant agricultural activity in the Santa Clara Valley. At this time prunes remained the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District, as discussed below, which ensured sufficient water for irrigation. After World War II, the vast orchards that had come to characterize the Santa Clara Valley gradually gave way to suburban residential and industrial development. This trend started in the northern part of the county around San Jose and slowly spread out from this nucleus in all directions. The southern part of the valley was the last area to be affected by suburbanization, and remained largely rural-agricultural until the 1970s.[9]

Poultry Industry in Santa Clara County

While orchard crops dominated agriculture in the Santa Clara Valley for decades, a modest number of farmers raised poultry. During the early settlement period, most general farms kept a few or a coop of chickens to generate eggs for personal use and perhaps sold surplus locally. Later, some farmers established small poultry ranches, primarily to produce eggs for urban markets. As eggs are highly perishable, at least a few poultry ranches to exist near urban areas to supply eggs to city-dwellers. In the greater San Francisco Bay region, the Santa Clara Valley produced eggs to meet the local demand, but was not a regional leader in this enterprise, such as southern Sonoma County/Petaluma area, which by 1898, was the largest poultry-producing county in California, accounting for half the eggs produced in the entire state.[10]

The predominance of Sonoma County in the Bay Area egg-producing field, and the relatively modest status of Santa Clara County continued into the twentieth century. Santa Clara County egg production did increase in the immediate post World War II era, but the poultry industry remained a lower tier agricultural activity in terms of overall agricultural production and horticulture remained a clear leader. Other factors after the war such as technological advances in egg collection equipment, breeding, temperature-controlled chicken houses, and improved transportation and shipping, allowed other regions such as Southern California and the San Joaquin Valley to compete in the Bay Area egg market. This period also ushered in the era of corporate farms entering the egg and poultry business. Their access to vast amounts of capital enabled the construction of massive poultry operations, which pushed smaller ranches out of business.[11]

In the midst of these larger economic and technological changes in the poultry business, the industry experienced change within Santa Clara County as well. The same post-war suburbanization that was replacing orchards also affected the poultry ranches, pushing them further out into rural areas. As noted above, southern Santa Clara County, inclusive of the study area, remained rural longer than other parts of the county and, therefore, poultry ranching continued in this part of the county, and the open land made it attractive to poultry ranchers forced to relocate from the northern part of the county.[12]

[8] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3. "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.
[9] Stephen Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.
[10] Thea Snyder Lowry, *Empty Shells: The Story of Petaluma, America's Chicken City* (Novato, Calif: Manifold Press, 2000), 1-4, 24-26, 68; California State Board of Agriculture, *Statistical Report of the California State Board of Agriculture*, (Sacramento: California State Printing Office, 1921), 110-113.
[11] Lowry, *Empty Shell*, 232; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1940; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1940; Santa Clara County, Department of Agriculture, "Annual Report," 1960; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1965.
[12] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51, 54, 70.

Development of Morgan Hill

The urban settlement in the Morgan Hill area began as a stage stop along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill, and the location of the resources recorded on this form, was Madrone, located about two miles southwest. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. The early farmers located in the APE and general vicinity were identified as living in Madrone.[13]

Settlement of Morgan Hill began following the establishment of a railroad station there in 1893 and the subdivision of the large ranches in the Morgan Hill area (**Plate 2**). The rise of horticulture had caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. Surveyor C.H. Phillips worked with local landowners to subdivide nearly all of the ranchland between Madrone and Gilroy, including Morgan Hill. Phillips was well connected with the Southern Pacific Railroad and worked with the railroad to attract settlers. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from one-half acre town lots in Morgan Hill to small farm tracts of five to 100 or more acres. Lots along Monterey Road (the main street in Morgan Hill) sold off fairly quickly, while tracts further away were slower to sell. This subdivision of the large ranches in the Morgan Hill area further facilitated the spread of horticulture in this part of the Santa Clara Valley.[14]

Following the founding of Morgan Hill, the importance of Madrone as the regional shipping center declined and Morgan Hill took over as the main rail depot. Fruit dehydrators, canning factories, and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was generally slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[15]

Plate 2. Morgan Hill ca. 1905 with train passing and orchards beyond (looking east). (Photo courtesy of San Jose Public Library.)

[13] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 32, 33.
[14] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 16.
[15] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area, being distant from the San Jose region, did not experience the same growth pressures and was able to retain its rural, agricultural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and the State built US Highway 101 as a freeway bypassing the downtown area, which facilitated development of this area as a bedroom community to San Jose and triggered construction of large residential subdivisions east and north of Morgan Hill, and their annexation into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill into the vicinity of Anderson Dam, further altering the once rural and agricultural character of the area.[16]

Property History: APN 729-49-005

As shown on the Sketch Map on the last page of this form, the majority of the 92.51-acre APN 729-49-005 is on the north side of Coyote Creek, and this portion contains the residence, garage, two poultry barns, and two orchards evaluated on this form, as well as the Malaguerra Winery. On the south side of the creek is a 6.44-acre portion of the parcel containing the irrigation pumphouse.

José Maria Malaguerra settled on 200 acres of the former Rancho Laguna Seca inclusive of APN 729-49-005 in 1861 after he purchased it from Liberta C. Fisher, the rancho's patentee (**Plate 3**). Malaguerra planted vineyards on the property, built a winery, and also raised hogs. By 1869 he was producing wine for sale, making the Malaguerra Winery the earliest commercial winery in the Santa Clara Valley. Malaguerra built his house and winery building nestled up against the foothills on the eastern edge of this parcel. The winery building is still extant and is listed on the NRHP. The Malaguerra family continued living on the property and producing wine until the family sold the 200-acre tract to Giovanni Raggio in 1898. Around this same time, Raggio also purchased and adjacent 294-acre plot on the north side of Burnett Avenue, and a 130-acre tract south of Burnett Avenue. Raggio, an Italian immigrant, previously lived in San Jose in 1880 where he worked as a storekeeper. Upon purchase of this land in the Morgan Hill area, Raggio became a farmer and lived on his property with his wife, Beatrice, three children, mother, brother, and cousin. Raggio likely followed the regional norm and raised orchard crops and grapes.[17]

[16] USGS, *Morgan Hill Quadrangle*, 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

[17] US Census, Population Schedule, 1880, Santa Clara County, San Jose, Enumeration District 242, Sheet 37; US Census, Population Schedule, 1900, Santa Clara County, Burnett Township, Enumeration District 47, Sheet 18; "Old Winery May Be Pressed Into Use Again," *San Jose News,* 21 February 1975, 33; "Hog in Wine Cellar Provided Family Laughs," *San Jose News,* 21 February 1975, 33; A.T. Herrmann, "Map of the Property of J.M. Malaguerra," September 17, 1894, Recorded in Maps, Book F, Page 29, Santa Clara County Recorder; A.T. Herrmann, "Map of the Original Malaguerra Tract," January 1902, Recorded in Maps, Book F2, Page 11, Santa Clara County Recorder; Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, November 4, 1977, NRHP Reference No. 80000858, Listed October 23, 1980; Historic American Building Survey, "Malaguerra Winery," HABS No. CA-2004, July 1977; Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); Herrmann Brothers, *Official Map of Santa Clara County, California* (San Francisco: Britton & Rey, 1890).

Plate 3. Portion of an 1876 map showing the 200-acre "J.M. Malaguerra" property spanning both sides of Coyote Creek.

In 1899, Raggio sold 88.92 acres of the former Malaguerra property on the north side of Coyote Creek to Dr. Augustino A. Guglieri (**Plate 4**). Dr. Guglieri, a San Francisco physician, used this pastoral property as a vacation home and apparently leased the farm land, or hired laborers to tend the crops. Around 1920, Guglieri sold the land to Gianni Traverso and his wife Amelia Traverso. By this time, the vineyards had been replaced and the land was mostly planted in fruit and nut trees, including the orchards recorded on this form. The property lost some of its acreage in the mid-1930s when the Santa Clara Valley Water Conservation District acquired 3.02 acres for the headworks of the Coyote Canal and additional land for the Coyote Canal right-of-way. The canal did not provide irrigation water to this parcel, and does not have associations with the development of the parcel aside from the right-of-way acquisition. Around 1950, Lionel J. Tilson purchased the property from the Traversos.[18]

[18] US Census, Population Schedule, San Francisco County, 1900, Enumeration District 285, Sheet 6B; Santa Clara County Recorder, Gianni Traverso to Santa Clara Valley Water Conservation District, Deed, OR:827:549, July 1, 1937; USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939; USGS, Aerial Photograph, Photo No. CIV-7R-153, June 12, 1956; R.L. Polk & Company, *San Jose City Directory* (San Francisco: R.L. Polk & Co., 1931).

Plate 4. This 1902 survey map drawn for Giovanni Raggio the 88.92-acre tract sold to Guglieri outlined in blue, and the land retained by Raggio along Coyote Creek outlined in red.[19]

After Tilson bought this property, the use of this land began to transition away from vineyards and orchards and the buildings recorded on this form were built. Lionel J. Tilson, a resident of Cupertino, owned Tilson Construction Company and became wealthy as a subdivision building contractor in the San Jose area. Tilson also owned a frozen chicken processing plant in Santa Clara. Following Tilson's purchase of the property, he built a house on the hill above the winery building overlooking the vineyards and orchards, apparently using it as a vacation property while primarily residing in Cupertino and Los Gatos. This home is no longer extant. Tilson also developed the property as a chicken farm to supply his Santa Clara chicken processing plant. He built four long, rectangular poultry barns at the southwest end of the tract between the Coyote Canal and Coyote Creek; these four buildings are also no longer extant.[20]

[19] A.T. Herrmann, "Map of the Original Malaguerra Tract," January 1902, Recorded in Maps, Book F2, Page 11, Santa Clara County Recorder.

[20] "4 Die in Plane Crash," *San Rafael Independent-Journal*, 2 April 1956, 15; Santa Clara County Recorder, Estate of Lionel J. Tilson to John H. Klinke, Deed, OR:3948:469, November 18, 1957; R.L. Polk & Company, *San Jose City Directory* (San Francisco: R.L. Polk & Co., 1950, 1954; USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939; USGS, Aerial Photograph, Photo No. CIV-7R-153, June 12, 1956.

Following Tilson's death in a plane crash in 1957, John H. Klinke, another poultry rancher, bought the property. At the time of the purchase, Klinke was a well-established in the poultry industry focusing on egg production. Klinke also had a large ranch in the Campbell area and was a leader in various trade organizations such as the California Farm Bureau Federation, Poultry Producers of Central California, and Nulaid Farmer Association. By 1956, urban development in the greater San Jose area led Klinke to move his poultry operation from Campbell to a more rural area and started a large ranch in Scotts Valley near Santa Cruz as well as purchasing this property. Klinke expanded the poultry ranch on the study parcel, adding two more long, rectangular poultry barns and a smaller barn, circa 1960. The small barn is no longer extant, the two large barns are the barns recorded on this form. Klinke also built the house and garage recorded on this form in 1964 next to the group of five poultry barns (**Plate 5**). Klinke resided in the house on the hill above the winery built by Tilson and the 1964 house, with its three separate entrances, appears to have been used to house employees who worked on the ranch.[21]

As the land of APN 729-49-005 north of Coyote Creek transitioned in the twentieth century to poultry ranching, the land south of the creek that includes the pumphouse continued to be devoted to orchards. In 1899, when Giovanni Raggio sold part of his land to Dr. Augustino Guglieri, he still retained 362 acres, including the land occupied by the pumphouse recorded on this form, and raised crops, likely orchards, on the land. Raggio died in 1904 and his land was subdivided into smaller tracts. Ownership of about 40-acres of his property, inclusive of that occupied by the pumphouse, subsequently passed to Swiss immigrants Joseph and Lena Imhoff. The Imhoffs maintained the farming patterns on the land, raising orchard crops. By the 1960s, Lena Imhoff still owned the property and it was still in orchards (**Plate 5**).[22]

The State of California bought the Klinke and Imhoff properties in 1971 along with other land for a proposed US 101 interchange construction project. Construction of the interchange did not come to pass and the State sold the study parcel to Santa Clara County in 1979 with the stipulation that it be used for "park, recreational, and historical purposes" at which time it became part of Anderson Lake County Park. The County first established Anderson Lake County Park in 1960, originally consisting of property along the Anderson Lake shoreline and thereafter gradually increased the size of the park by acquiring additional land downstream of the dam along Coyote Creek, such as APN 729-49-005. Following acquisition of this land by the County, many of the buildings were demolished, vandalized, or destroyed by fire. The County used the residence recorded on this form as a park ranger office until 1996, when the bridge crossing Coyote Creek washed out in a flood. The residence has since been vacant.[23]

[21] "Nine Bay Men Get New Posts at Convention," *Oakland Tribune*, 15 November 1956, 8; County Rates Well Up With State Egg-Producing Areas," *Santa Cruz Sentinel*, 8 April 1956, 20; "Nulaid Reports $53,177,000 in Business in 1960," *Santa Cruz Sentinel*, 12 April 1961, 6; "Area Poultry Ranches Hit by Sizzlers," *Santa Cruz Sentinel*, 16 June 1961, 1; "Nulaid Totals 1960 Business," *Hayward Daily Review*, 12 April 1961, 43; USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939; USGS, Aerial Photograph, Photo No. CIV-7R-153, June 12, 1956; USGS, Aerial Photograph, Photo No. SCL-1-99, July 18, 1963; USGS, Aerial Photograph, Photo No. SCL-23-213, May 27, 1965; Santa Clara County, Building Permit, Permit No. 1715, April 2, 1964; AKA, Inc., "Existing Conditions Report, Coyote Creek Parkway, Burnett Avenue Site Plan, Prepared for County of Santa Clara, July 1990, 9, 14; Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, November 4, 1977, NRHP Reference No. 80000858, Listed October 23, 1980; Historic American Building Survey, "Malaguerra Winery," HABS No. CA-2004, July 1977.

[22] A.T. Herrmann, "Map of the Original Malaguerra Tract," January 1902, Recorded in Maps, Book F2, Page 11, Santa Clara County Recorder; J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); US Census, Population Schedule, 1930, Santa Clara County, Burnett Township, Enumeration District 43-3, Sheet 5B; US Census, Population Schedule, 1940, Santa Clara County, Burnett Township, Enumeration District 43-2, Sheet 5A; McMillan & McMillan, *Official Map of Santa Clara County, California* (San Jose: McMillan & McMillan, 1929); USGS, *Morgan Hill Quadrangle*, 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, Aerial Photograph, Photo No. SCL-23-213, May 27, 1965; California Department of Public Health, California County Birth, Marriage, and Death Records, 1830-1980, accessed September 2019 at ancestry.com; James T. Pott, "Amended Record of Survey, A Portion of the Malaguerra Tract," August 1961, Recorded in Maps, Book 137, Page 5, Santa Clara County Recorder; USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939.

[23] AKA, Inc., "Existing Conditions Report, Coyote Creek Parkway, Burnett Avenue Site Plan, Prepared for County of Santa Clara, July 1990, 9, 14; Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, November 4, 1977, NRHP Reference No. 80000858, Listed October 23, 1980; Historic American Building Survey, "Malaguerra Winery," HABS No. CA-2004, July 1977; Brian Christensen, Senior Park Ranger, Anderson Lake County Park, interview and email communications with Steven J. Melvin, JRP Historical Consulting, LLC, August 14 and August 16, 2017.

Plate 5. Aerial photo taken in 1965 showing the built environment resources on APN 729-49-005 recorded on this form. Circled in red is the house and garage, red rectangles outline the two poultry barns, the two orchards are labeled and outlined in green, and the red arrow points to the pumphouse. The other barns and orchards depicted in the image are no longer extant.

The pump within the pumphouse recorded on this form is a centrifugal type water pump, a design innovated in the early 1800s by developers in the United States and England. It first came into use for municipal water purposes after 1850, and by the late 1800s had become common on farms to draw irrigation water from streams and canals. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance. Centrifugal pumps of the early twentieth century of the type commonly used on small farms had a maximum lift of about 75 feet. This type of pump was best applied to pumping surface water, such as out of a creek or canal to an adjacent field. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute. Like other pumps, centrifugal pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive. Once drawn from the source, irrigation water was commonly conveyed by canal, clay pipe, or steel pipe. The American Well Works Company fabricated the pump recorded on this form in their factory in Aurora, Illinois. The company formed in 1869 as manufacturers of water well equipment and pumps. The pump recorded on this form appears to be a circa 1915 model.[24]

Evaluation

The built environment resources on APN 729-49-005 recorded on this form do not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). The residence, garage, and two poultry barns are associated with the poultry/egg industry in the 1950s and 1960s, and were part of the poultry farm operated by John H. Klinke. While the poultry industry had a long presence in the Santa Clara Valley dating back to the late nineteenth century, it never ranked among the leading agricultural endeavors of the region, being far overshadowed by horticulture. The development of the poultry/egg industry in this area, therefore, is not a historically significant event, and none of the buildings recorded on this form meet this criterion. The orchards are associated with horticulture in the Santa Clara Valley, but orchards were ubiquitous throughout the Santa Clara Valley by the time these orchards were planted. Similarly, the pumphouse and pump are associated with crop irrigation, and by the time this pump was installed, irrigated agriculture was common in the Santa Clara Valley and such equipment was ubiquitous. Furthermore, the land irrigated by this pump was typical in size and in the types of crops raised for this time period. The orchards, pumphouse, and pump, therefore, do not have important associations with agriculture in the Morgan Hill area, or the greater Santa Clara Valley, and do not meet this criterion.

These resources are not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). These resources on this parcel are associated with individuals engaged in various types of agriculture. John H. Klinke, who built the buildings on the parcel as part of his poultry farm, achieved a measure of success in his career, but his achievements do not merit elevating him to the status of a person important to history. Similarly, research did not reveal that the other owners of this land who may be associated with the orchards recorded on this form and the pumphouse are also not persons important to history. Research did not reveal any other individual associated with these resources that has made demonstrably important contributions to history at the local, state, or national level.

Under NRHP Criterion C or CRHR Criterion 3, the buildings on this parcel are not eligible because they do not possess distinctive characteristics of a type, period, or method of construction, nor are they important works of a master architect. The residence is a Minimal Traditional style building, a style widely popular throughout California in the post World War II era. The style emerged in the late 1930s, as a simpler, less ornate, and more economical house style. Considered a "compromise style," the Minimal Traditional house reflected the form and shape of earlier small house styles, but without the decorative detailing. Generally, these residences were built with low to medium roof pitches with close rather than overhanging eaves. They were modestly sized, of wood frame construction, and were built with exterior walls clad in wood siding, stucco, brick, stone, or a mixture of materials. Minimal Traditional style homes were built in great numbers in California and continued to be popular into the 1960s. The residence recorded on this form is a late, and very modest example of the style and lacks architectural distinction in all regards. The other resources—the garage, two poultry barns, and pumphouse—are all utilitarian and are typical in their designs and materials for their periods of construction, and, therefore, also do not meet this criterion. The pump itself also does not meet this criterion. Centrifugal type pumps were in common use on farms throughout the Santa Clara Valley and other agricultural regions of California, particularly to draw water from streams and canals for irrigation purposes by the time this pump was installed. This pump, along with the associated steel pipes and concrete standpipe, are typical in its design, technology, and materials for its periods of construction. Additionally, the orchards exhibit common design in their linear rows and spacing and do not meet this criterion.[25]

[24] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3. "The American Well Works," *Hendrick's Commercial Register of the United States* (New York: S.E. Hendricks, Company, 1891), 270; "The Pumpt That Satisfies Thousands," *Pacific Rural Press* 84, no. 19 (November 9, 1912), 455; Jim Edwards and Wynette Edwards, *Aurora: A Diverse People Build Their City* (Chicago: Arcadia Publishing, 1998), 58.
[25] McAlester, Virginia Savage, *A Field Guide to American Houses* (New York: Alfred A. Knopf, 2013), 586-595.

Under NRHP Criterion D / CRHR Criterion 4, none of the resources on APN 729-49-005 are a significant or likely source of important information about historic construction materials or technologies that otherwise would not be available through documentary evidence.

These resources do not have any association with, and do not contribute to the significance of the NRHP-listed Malaguerra Winery and are therefore not contributors to the NRHP-listed property.

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, a small addition on the house, missing garage door, dilapidated condition of the barn, missing trees from the orchards, abandonment of these resources, missing elements of the pumphouse and pump, and the change in land use from agricultural to park land has diminished their historic integrity of materials, workmanship, design, setting, feeling, and association of these resources.

Photographs (continued):

Photograph 2: Open sided shelter near garage, camera facing west, August 16, 2017.

Photograph 3: Poultry barn near residence, camera facing southeast, August 16, 2017.

Photograph 4: North poultry barn, camera facing northeast, August 16, 2017.

Photograph 5: Fruit tree orchard near the residence, camera facing northwest, August 16, 2017.

Photograph 6: Walnut tree orchard near the south poultry barn, camera facing southeast, August 16, 2017.

Photograph 7: Pumphouse, camera facing west, September 4, 2019.

Photograph 8: Interior of pumphouse showing pump, and intake and outflow pipes, camera facing southeast, September 4, 2019.

Sketch Map:

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ______________________
Review Code ________ **Reviewer** ______________________ **Date** __________

***Resource Name or #** (Assigned by recorder): APN: 729-50-002

P1. Other Identifier: Irrigation Pumps; Pump 1 and Pump 2

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5′ Quad**: Morgan Hill **Date**: 1955 (photorevised 1980) **T**: ; **R**: ; **Sec**: ; Mount Diablo Meridian

c. Address: City: Zip:

d. UTM: Zone 10S, 618745mE, 4114593mN (Pump 1); 619083mE, 4114414mN (Pump 2)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcle Number (APN): 729-50-002; Anderson Lake County Park, Burnett Area

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records two irrigation pumps on APN 729-50-002, currently owned by the County of Santa Clara and part of Anderson Lake County Park. For the purposes of this form, the two water pumps and associated objects shall be called Pump 1 and Pump 2 (See **Sketch Map**). Pump 1 is the remnants of a vertical turbine pump used to pump groundwater from a deep well for irrigation (**Photograph 1**). Vertical turbine pumps extend deep into the ground and only the above-ground portion of Pump 1 is visible. Markings on the pump identify it as a Berkeley Pump Company brand pump. It is made of steel, cylindrical is shape, and has a pressure gauge on one side. Many elements of the pump are no longer extant, nor is the electric motor that drove the pump. (See Section P3a on Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP39—Water Pump

***P4. Resources Present:** ☐ Building ☐ Structure ☒ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Pump 1, camera facing east, January 4, 2018.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
Pump 1: ca. 1940 (estimate based on pump manufacturer); Pump 2: ca. 1922 (estimate based on land use/ownership change; see Historic Context)

***P7. Owner and Address:**
Santa Clara County
70 West Hedding Street
San Jose, 95110

***P8. Recorded by:** (Name, affiliation, address)
Steven J. Melvin & Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: August 16, 2017 & January 4, 2018

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Supplemental Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," Prepared for the Santa Clara Valley Water District, 2019.

***Attachments:** ☐ None ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

***NRHP Status Code**: 6Z

***Resource Name or #** (Assigned by recorder): APN: 729-50-002

B1. Historic Name: None

B2. Common Name: None

B3. Original Use: Irrigation water pump B4. Present Use: Not in use

***B5. Architectural Style**: Utilitarian

***B6. Construction History**: (Construction date, alteration, and date of alterations) Pump 1: installed ca. 1922; Pump 2: installed ca. 1940; pumps disassembled: estimated 1970s.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**

***B8. Related Features:** __________

B9. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme**: Agriculture **Area**: Santa Clara Valley/Morgan Hill

Period of Significance: n/a **Property Type**: Irrigation Structure **Applicable Criteria**: n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The two water pumps recorded and evaluated on this form do not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). They are not historic properties under Section 106 of the National Historic Preservation Act, nor historical resources for the purposes of the California Environmental Quality Act (CEQA). These two resources have been evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. (See Section B10 on Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: Santa Clara County, "Amended Record of Survey," August 1961, Book 137, Page 5; Santa Clara County, "Record of Survey, Property of Fred Hudson, Jr." April 1960, Book 122, Page 26; US Census, Population Schedule, 1930 and 1940; USGS, Aerial Photographs, Various Years; Santa Clara Valley Water Conservation District, "Coyote Canal, Profile, Alignment, Details," Sheet 2, June 1936; Santa Clara County, "Amended Record of Survey," October 1967, Recorded in Maps, Book 230, Page 22, Santa Clara County Recorder. J.G. McMillan, *Official Map of the County of Santa Clara, California*, 1903; See also footnotes.

B13. Remarks:

***B14. Evaluator**: Steven J. Melvin

***Date of Evaluation**: January 2018

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See Sketch Map on last page.

P3a. Description (continued):

At Pump 2 is a pump, electric motor, and remnants of equipment and a pump house in the middle of an open field (**Photograph 2**). The pump is also a vertical turbine pump with only the above-ground top of the pump visible (**Photograph 3**). This is made of steel and generally cylindrical with grooves at the top for the drive belts that formerly connected to the nearby motor. The pump is mounted on the concrete slab that caps the well below. Pipes extend horizontally from the pump. About seven feet away from the pump head is a Westinghouse brand, "CCL" type electric motor bolted to a raised, board-form concrete platform (**Photograph 4**). The shaft of the motor extends out horizontally on one side and has a grooved wheel attached designed to carry the belts that drove the pump. Scattered on the ground around the pump and motor are sections of pipe, charred lumber, sheets of corrugated metal from the former pumphouse, and other related debris.

B10. Significance (continued):

Historic Context

Euro-American Settlement and Agricultural Development of Southern Santa Clara County

The Santa Clara Valley is among the longest settled areas in California. The Pueblo of San Jose in the northern part of the valley, was one of the small number of *pueblos* established by the Spanish (the others include Los Angeles, San Francisco, and San Diego) in the eighteenth century. Outside of the pueblo boundaries, the valley was largely divided into rancho land grants conveyed to individuals by the Mexican government. Many of the land grants made by the Spanish and Mexican governments in the Santa Clara Valley survived into the American period and some of the property lines are still evident on the landscape.

The first Euro-American settlement in the vicinity of the APE for the project cited in P11 occurred in 1834 when the Mexican government granted 20,052 acres to Juan Alvires known as Rancho Refugio de la Laguna Seca and the 8,927-acre Rancho Ojo de Agua de la Coche in 1835 to Juan Maria Hernandez. The APE is near the southern border of Rancho Refugio de la Laguna Seca and the adjacent Rancho Ojo de Agua de la Coche that encompasses the land now comprising Morgan Hill. Like most of the Mexican-era rancho grants Alvires and Hernandez operated cattle ranches on their land. This pastoral way of life continued into the early 1850s as non-Latino settlers began to arrive in the area, such as Martin Murphy, Sr., William Fisher, and William Tennant. In 1846, Fisher purchased the Rancho Refugio de la Laguna Seca at auction. Fisher died in 1850 and the land, which includes the current APE, passed to his wife, Liberta C. Fisher.[1]

Large landowners in the early period of American settlement such as Fisher and Murphy initially continued the practice of cattle grazing. Other agricultural endeavors included sheep ranching, dairying, and general farming. Sheep ranches and dairy farming were particularly prevalent in southern Santa Clara County. Stock raising continued to be the primary economic activity in Santa Clara County until the drought of 1864, which decimated the herds and caused financial ruin to many ranchers.[2]

The 1864 drought also contributed to a rise in wheat cultivation in the Santa Clara Valley. Wheat had been grown in this area since the 1850s and its acreage grew with each year. The easy cultivation and high fertility of the soil of the valley facilitated wheat production with little capital investment. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop. During the 1860s, this popular crop surpassed cattle ranching as the principal agricultural activity in the valley and by 1870, wheat and barley occupied most of the rural acreage of the county. While wheat supplanted cattle ranching in the valley, some large stock ranches continued to operate in the outlying areas such as in the eastern foothills near the APE

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," prepared for the County of Santa Clara, December 2004, revised February 2012, 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," prepared for City of Morgan Hill, October 2006, 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 11, 12.
[2] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 37-38.

for the project cited in P11, and southwest of Gilroy. The largest of these ranches in the region were owned by the C. M. Weber estate, Henry W. and Charles Coe, Horace Willson, J. P. Sargent, and Henry Miller.[3]

Wheat's primacy in the county began to wane in the 1870s, however, as farmers experienced poor yields, lower prices, and competition from wheat grown in the Central Valley. Santa Clara County farmers responded by adopting a diversified farming approach, raising dairy cows, sheep, poultry, swine, hay, grapes, and fruit trees.[4] By turning away from wheat, Santa Clara County farmers opened the door for what would be the mainstay of Santa Clara Valley agriculture for decades to come: horticulture. Orchards had been planted during the Mexican and early American periods in the valley, but these were very small scale and for personal or limited commercial use. In 1856, the first experimental orchards were set out in the Willow Glen area, just southwest of present-day downtown San Jose. These were generally successful and led to farmers planting more orchards in the 1860s.[5]

In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. This particular variety of plum had a low moisture content making it ideal for drying and, thence, ideal for shipping as refrigerated rail cars had not yet been invented. In addition to prunes, Santa Clara Valley and farmers also planted other stone fruit orchards such as apricots, peaches, and cherries. The completion of the Santa Clara & Pajaro Valley Railroad (which would become part of the Southern Pacific Railroad) through the Santa Clara Valley in 1869 further boosted horticulture as it opened the large eastern US market to Santa Clara Valley fruit via the newly completed transcontinental railroad. This change from grain cultivation to horticulture also triggered changing land ownership patterns. The highly profitable orchards crops prompted the large ranch owners to subdivide and sell their land for small orchards plots of between 5 to 50 acres. A 20-acre orchard farm could generate enough income to support a family. With the technological development of ice-cooled refrigerated rail cars in the 1880s, shipment of fresh fruit also became possible and furthered the popularity of orchard crops. By 1890, the transition to horticultural had spread to every part of the valley where irrigation water from streams or wells was available (**Plate 1**).[6]

[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 12, 13.
[4] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60.
[5] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 14.
[6] Stephen Payne, *Santa Clara County: Harvest of Change*, 78; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15.

Plate 1. Prune orchards near Morgan Hill ca. 1910. (Photo courtesy of San Jose Public Library.)

In addition to orchards, many farmers in the Santa Clara Valley planted another fruit crop: grapes. In the 1860s, José Maria Malaguerra planted one of the earliest vineyards in the county on a 200-acre tract purchased from Liberta C. Fisher where Malaguerra grew grapes and established the Malaguerra Winery, an adjacent property to the east. Other early wineries in the Morgan Hill area include that of Joel W. Ransom who owned a 400-acre farm and by the 1880s had planted in French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes, and built a small winery on his property. Another vineyardists in the Morgan Hill area was Emilio Guglielmo who established a vineyard and commercial winery in the early twentieth century that continues to produce wine up to the present. South of Morgan Hill, the San Martin and Uvas Valley areas developed into a viticulture locales with multiple farms raising wine grapes and building small wineries and brandy distilleries by the 1880s. While occupying considerably less acreage than orchard crops, viticulture remained a common practice, particularly in the southern part of the county, where such renowned wineries as the San Martin Winery were developed and continued to thrive through the twentieth century. The county experienced a general upward trend in viticulture with vineyards occupying over 1,000 acres in 1922 and 4,858 in 1955, most of this acreage lying between Morgan Hill and Gilroy.[7]

Advancements in irrigation technology facilitated the development of intensive horticulture in the Santa Clara Valley. The first type of irrigation pump used on farms was the centrifugal type pump. This type of pump was invented in the early 1800s by developers in the United States and England and by the late 1800s had come into common use on farms to draw irrigation water from streams. Centrifugal pumps gained popularity for their ability to pump large quantities of water, compact size and simplicity, low cost, easy maintenance, and ability pump water containing sediment without clogging. The main limitation of the design was it could not lift water a great vertical distance, and therefore, this type of pump was best applied to pumping surface water, such as out of a creek or canal to irrigate a field, rather than from wells. Centrifugal pumps had a wide range of capacities depending on the size of the pump, and could discharge up to thousands of gallons per minute.[8]

[7] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 15, 16, 18, 19; Santa Clara County, Department of Agriculture, “Annual Crop Report,” 1955, 2.
[8] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, “A History of the Deep Well Turbine

The other common type of pump in the Santa Clara Valley was the vertical turbine pump. Pump manufacturing companies first developed this type of pump in the early twentieth century, particularly for pumping groundwater for irrigation from deep wells. Vertical turbine pumps had the advantage over centrifugal pumps in that they had greater lift potential, that is, they could pump water from greater depths. Vertical turbine pumps came into popular usage on farms beginning around 1915, by which time the technology had advanced to achieve a lift of 350 vertical feet and deliver between 600 and 3,000 gallons of water, making vertical turbine pumps the preferred deep well pump among farmers. Vertical turbine pumps also had a simple, low-maintenance design, and did not require as large of a bore-hole diameter, compared to other well pump systems of the day. Both centrifugal and vertical turbine pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive.[9]

A common method to deliver water from either a centrifugal or vertical turbine pump was by steel pipe. The most common type of pipe design used on farms by the late 1800s was riveted steel pipe. This design consisted of sheet of rolled steel joined together at the longitudinal seam and ends with rivets. By 1905, the lock-bar type design was invented and came into common usage because of its greater tensile strength and less leakage. Lock-bar type pipe was fabricated by joining sheets of rolled steel at the longitudinal seam with an H-shaped bar applied to each edge of the steel sheet and compressed to form a tight seal. By the 1930s, welded steel pipe gradually replaced riveted steel and lock-bar as the preferred pipe design.[10]

Orchard fruit production continued to grow into the twentieth century and orchard farming remained the dominant agricultural activity in the Santa Clara Valley. At this time prunes remained the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District, as discussed below, which ensured sufficient water for irrigation. After World War II, the vast orchards that had come to characterize the Santa Clara Valley gradually gave way to suburban residential and industrial development. This trend started in the northern part of the county around San Jose and slowly spread out from this nucleus in all directions. The southern part of the valley was the last area to be affected by suburbanization, and remained largely rural-agricultural until the 1970s.[11]

Development Morgan Hill

The urban settlement in the Morgan Hill area began as a stage stop along Monterey Road (El Camino Real). The closest of these stage stops to present-day Morgan Hill, and the resources recorded on this form, was Madrone, located about two miles southwest. Madrone began with a hotel and eventually grew into a small community with a post office, livery stable, butcher shop, blacksmith, and wagon shed. Following construction of the railroad in 1869 and a station in Madrone, the community became a primary shipping center for this agricultural region. The early farmers located in the general vicinity were identified as living in Madrone.[12]

Settlement of Morgan Hill began following the establishment of a railroad station there in 1893 and the subdivision of the large ranches in the Morgan Hill area (**Plate 2**). The rise of horticulture had caused land values to increase and many of the large land owners realized that subdividing and selling their land would bring huge profits. Surveyor C.H. Phillips worked with local landowners to subdivide nearly all of the ranchland between Madrone and Gilroy, including Morgan Hill. Phillips was well connected with the Southern Pacific Railroad and worked with the railroad to attract settlers. By 1895, most of the large landholdings had been broken up and were held in smaller tracts ranging from one-half acre town lots in Morgan Hill to

Pump Industry," January 1968, 1-3. "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.

[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3.

[10] American Water Works Association, "AWWA Manual: History, Uses, and Physical Characteristics of Steel Pipe," 2004, 1-2; B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 156-157.

[11] Stephen Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.

[12] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 32, 33.

small farm tracts of five to 100 or more acres. Lots along Monterey Road (the main street in Morgan Hill) sold off fairly quickly, while tracts further away were slower to sell. This subdivision of the large ranches in the Morgan Hill area further facilitated the spread of horticulture in this part of the Santa Clara Valley.[13]

Following the founding of Morgan Hill, the importance of Madrone as the regional shipping center declined and Morgan Hill took over as the main rail depot. Fruit dehydrators, canning factories, and packing plants were built near the Morgan Hill depot to serve the nearby fruit growers. While a town definitely took shape at Morgan Hill, growth was generally slow and the town remained small. When Morgan Hill incorporated in 1906, the official population was just over 500 people and it remained a small town through the first half of the twentieth century.[14]

Plate 2. Morgan Hill ca. 1905 with train passing and orchards beyond (looking east). (Photo courtesy of San Jose Public Library.)

After World War II, as the orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, the Morgan Hill area, being distant from the San Jose region, did not experience the same growth pressures and was able to retain its rural, agricultural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the 1970s when high-tech firms began locating in the city and the State built US Highway 101 as a freeway bypassing the downtown area, which facilitated development of this area as a bedroom community to San Jose and triggered construction of large residential subdivisions east and north of Morgan Hill, and their annexation into the city. In recent decades, and continuing today, relatively dense residential development has spread east of Morgan Hill into the vicinity of Anderson Dam, further altering the once rural and agricultural character of the area.[15]

[13] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 34-37, 39-40; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 16.
[14] Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.
[15] USGS, *Morgan Hill Quadrangle*, 15 minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1971); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1955); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1968); USGS, *Morgan Hill Quadrangle*, 7.5 minute, 1:24,000 (Washington: USGS, 1973); USGS, *Morgan Hill*

***Recorded by**: S.J. Melvin & J. Sarmiento   ***Date**: August 16, 2017 & January 4, 2018   ☒ Continuation ☐ Update

Property History: APN 729-50-002

APN 729-50-002, is a 175.39-acre parcel that contains the two irrigation water pumps recorded. This parcel was once part of Rancho Laguna Seca, a 20,052-acre Mexican land grant patented to Liberta C. Fisher in 1865. Fisher gradually sold off tracts of the rancho in the 1860s and 1870s, and by 1876 had sold several hundred acres, including a large tract of 1,332 acres inclusive of APN 729-50-002 to Charles M. Weber, a cattle rancher and entrepreneur. The land sold to Weber adjoined his Rancho Cañada de San Felipe y Las Animas property that stretched eastward into the Diablo Range, and combined gave Weber a contiguous tract of over 3,000 acres. The Rancho Laguna Seca property also gave Weber frontage along Coyote Creek (**Plate 4**). Weber lived Stockton and used this land in Santa Clara County to graze his herds of cattle. This property remained in the Weber family until the early twentieth century when Weber's heirs began selling off the estate's vast real estate holdings. Among the properties sold was a 2,338-acre tract to the Bay Cities Water Company about 1905. Bay Cities bought the land to acquire its water rights with the objective of developing the water resources in this part of the county for sale to San Francisco. The project never got beyond the planning stage as the San Francisco Board of Supervisors rejected the Bay Cities proposal. Bay Cities, however, held on to the property in Santa Clara County and developed some magnesite mines in the mountains east of Morgan Hill. Following the collapse of the magnesite market after World War I, the company sold the acreage in 1919 to local ranchers, the O'Connell Brothers.[16]

Plate 3. This 1903 Santa Clara County map shows the large tracts of land still owned by the Weber Estate. The large, 1,332-acres tract is the land formerly part of Rancho Laguna Seca.[17]

The O'Connell Brothers retained the land in the high country, but in 1922 sold 88.76 acres in the valley along Coyote Creek to a pair of Italian immigrants brothers, Angelo and Germano Pruzzo, being a portion of the current 175.39-acre APN 729-50-002 containing Pump 1 and Pump 2 (**Plate 4**). The Pruzzos had arrived in the U.S. in the early twentieth century and originally settled in San Francisco, where they lived until purchasing this land along Coyote Creek. Germano Pruzzo lived on the property with his wife, Josephine, and their three children. Angelo Pruzzo, a widower, lived with his son, Charles. In 1924, the Pruzzo brothers split their jointly owned 88.76-acre parcel into two separate, roughly equal properties. It appears that the change of

Quadrangle, 7.5 minute, 1:24,000 (Washington: USGS, 1980); Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill," 36-38.

[16] Thompson & West, *Santa Clara County Atlas* (San Francisco: Thompson & West, 1876); J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903); Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 10, 15; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 18; Santa Clara County Recorder, Bay Cities Water Company to Charles O'Connell, et al, Deed, Deeds:486:400, June 6, 1919.

[17] J.G. McMillan, *Official Map of the County of Santa Clara, California* ([San Jose]: Santa Clara County, 1903).

ownership in 1922 from the O'Connell Brothers to the Pruzzos initiated a change of land use from unirrigated cattle range to irrigated vineyards, fruit orchards, and other crops, a change that would have required the installation of pumps to draw ground water for irrigation, such as Pump 1 and Pump 2 (**Plate 5**). Pump 1, on Germano Pruzzo's property, was installed well after he first developed the land. Lettering on Pump 1 indicates the Berkeley Pump Company manufactured the pump, a firm that did not incorporate until 1937 and did not build their first deep well vertical turbine pump, such as Pump 1, until 1940. Pruzzo, therefore, likely installed Pump 1 circa 1940 to replace a previous pump, or to draw water from a newly drilled well. Pump 2, on Angelo Pruzzo's parcel, does not have any diagnostic lettering and is estimated to have been installed ca. 1922, when the Pruzzo Brothers first bought the land. The remains of this pump indicate it was once sheltered by a small wood-frame and corrugated metal building. Angelo Pruzzo died in 1942, and his land passed to his son Charles Pruzzo, who continued to farm the property and remained the owner into the 1960s. Germano Pruzzo sold his land to Harold H. Seyferth and Betty Seyferth by 1960, and about 1962, the Seyferths sold it to Edward and Helen Teresi.[18]

Plate 4. This 1936 map shows the land of Angelo Pruzzo and Germano Pruzzo.
Please note that the map is reverse oriented with south at the top.[19]

[18] Santa Clara County, "Record of Survey, Property of Fred Hudson, Jr." April 1960, Recorded in Maps, Book 122, Page 26, Santa Clara County Recorder; Santa Clara County, Voter Registration Rolls, Madrone Precinct, 1922-1924; US Census, Population Schedule, 1910, San Francisco, Enumeration District 49, Sheet 2A; US Census, Population Schedule, 1930, Santa Clara County, Burnett Township, Enumeration District 43-3, Sheet 5B; US Census, Population Schedule, 1940, Santa Clara County, Burnett Township, Enumeration District 43-2, Sheet 5A; USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939; USGS, Aerial Photograph, Photo No. CIV-7R-153, June 12, 1956; Santa Clara Valley Water Conservation District, "Coyote Canal, Profile, Alignment, Details," Sheet 2, June 1936; Santa Clara County, "Amended Record of Survey," October 1967, Recorded in Maps, Book 230, Page 22, Santa Clara County Recorder; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 7; Santa Clara County Recorder, Charles O'Connell, et al, to Angelo Pruzzo and Germano Pruzzo, Deed, Deeds:549:234, February 24, 1922; Santa Clara County Recorder, Germano Pruzzo to Angelo Pruzzo, Deed, OR:108:396, September 25, 1924; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," March 31, 2003, 10, 15; Santa Clara County, "Amended Record of Survey," August 1961, Recorded in Maps, Book 137, Page 5, Santa Clara County Recorder; R.L. Polk & Company, *Santa Clara County Directory* (San Francisco: R.L. Polk & Co., 1931, 899).
[19] Santa Clara Valley Water Conservation District, "Coyote Canal, Profile, Alignment, Details," Sheet 2, June 1936.

Plate 5. This 1939 aerial photograph shows the Germano Pruzzo land outlined in green, and the Angelo Pruzzo land outlined in blue.[20]

It appears that both the Angelo Pruzzo and Germano Pruzzo tracts continued to be irrigated agricultural land until the early 1970s when the State of California acquired the property for a US 101 interchange construction project. The highway project never came to pass and the state conveyed this parcel, along with other land, to Santa Clara County in 1979 with the stipulation that it be used for "park, recreational, and historical purposes." The county enveloped the land into Anderson Lake County Park, a county park first established in 1960 and originally consisting of property along the Anderson Lake shoreline. The park thereafter has gradually increased in size by acquiring additional land downstream from Anderson Dam along Coyote Creek, such as APN 729-50-002.[21]

[20] USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939.
[21] AKA, Inc., "Existing Conditions Report, Coyote Creek Parkway, Burnett Avenue Site Plan, Prepared for County of Santa Clara, July 1990, 9, 14; Candace Reed, "Malaguerra Winery," National Register of Historic Places Nomination Form, November 4, 1977, NRHP Reference No. 80000858, Listed October 23, 1980; Historic American Building Survey, "Malaguerra Winery," HABS No. CA-2004, July 1977; Brian Christensen, Senior Park Ranger, Anderson Lake County Park, Interview and email communications with Steven J. Melvin, JRP Historical Consulting, LLC, August 14 and August 16, 2017.

Both Pump 1 and Pump 2 recorded on this form are vertical turbine type water pumps. Pump manufacturing companies first developed this type of pump in the early twentieth century, particularly for pumping groundwater for irrigation from deep wells. Vertical turbine pumps had the advantage over centrifugal pumps, the other common irrigation pump of the time, in that they could pump water from greater depths. Vertical turbine pumps came into popular usage on farms beginning around 1915, by which time the technology had advanced to achieve a lift of 350 vertical feet and deliver between 600 and 3,000 gallons of water, making this type of pump the preferred deep well pump among farmers. Vertical turbine pumps also had a simple, low-maintenance design, and did not require as large of a bore-hole diameter compared to other well pump systems of the day. Like other pumps, vertical turbine pumps were powered by electric motors or gasoline engines mounted at ground level next to the pump and most commonly connecting to the pump by a belt drive.[22]

Evaluation

The two pumps recorded on this form, Pump 1 and Pump 2, do not have important associations with significant historic events, patterns, or trends of development (NRHP Criterion A / CRHR Criterion 1). These two water pumps provided water for irrigation on two small farms in the Santa Clara Valley. By the time these pumps were installed, irrigated agriculture was common in the Santa Clara Valley and such pumps were ubiquitous. Furthermore, the Pruzzo farms were typical in their size and types of crops raised for this time period. These two pumps, therefore, do not have important associations with agriculture in the Morgan Hill area, or the greater Santa Clara Valley, and do not meet this criterion.

These resources are not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). These two pumps are associated with the Germano Pruzzo and Angelo Pruzzo families, who installed the pumps to irrigate their farmland. These individuals owned small farms and worked as farmers, and they did not attain the status of persons important to history related to farming, or any other activity. Additionally, research did not identify any other individuals associated with these resources, such as later owners or occupants, that made demonstrably important contributions to history at the local, state, or national level.

Under NRHP Criterion C or CRHR Criterion 3, these two pumps do not possess distinctive characteristics of a type, period, or method of construction, nor are they important works of a master architect. Both Pump 1 and Pump 2 are vertical turbine pumps used to pump water from deep wells. This type of pump was in common use on farms throughout the Santa Clara Valley and other agricultural regions of California to pump groundwater for irrigation purposes by the time these two pumps were installed. Pump 1 and Pump 2 are typical in their design, technology, and materials for their periods of construction and, therefore, do not meet this criterion.

Under NRHP Criterion D / CRHR Criterion 4, these two pumps are not significant or likely sources of important information about historic construction materials or technologies that otherwise would not be available through documentary evidence.

In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, the deteriorated and largely dismantled condition of these two pumps, the destruction of the pump house at Pump 2, abandonment of these resources, and the change in land use from intensive irrigated agriculture to open park land has greatly diminished the historic integrity of materials, workmanship, design, setting, feeling, and association of these two resources.

[22] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, “A History of the Deep Well Turbine Pump Industry,” January 1968, 1-3.

***Recorded by**: S.J. Melvin & J. Sarmiento *__Date__: August 16, 2017 & January 4, 2018 ☒ Continuation ☐ Update

Photographs (continued):

Photograph 2: Pump 2 showing electric motor at right, top of the vertical turbine pump at left, and other pump and pumphouse remnants, camera facing southeast, January 4, 2018.

Photograph 3: Electric motor at Pump 2, camera facing southwest, January 4, 2018.

Photograph 4: Pump 2 showing the top of the pump that extends down into the ground, the concrete well cap, and pipes, camera facing northeast, January 4, 2018.

***Resource Name or #** (Assigned by recorder): APN: 729-50-002

***Recorded by**: S.J. Melvin & J. Sarmiento *Date: August 16, 2017 & January 4, 2018 ☒ Continuation ☐ Update

Sketch Map:

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ______________________
Review Code ________ **Reviewer** ______________________ **Date** ________

 ***Resource Name or #** (Assigned by recorder): Coyote Canal

P1. Other Identifier: Coyote Canal

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Santa Clara

***b. USGS 7.5′ Quad**: Morgan Hill **Date**: 1955 (photorevised 1980) **T**: ; **R**: ; **Sec**: ; Mount Diablo Meridian

c. Address: City: Zip:

d. UTM: Zone: 10S; 619545.55mE / 4114400.06mN (east end); 617989.83mE / 4114874.24mN (west end)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Canal is located on Assessor Parcel Numbers (APN) 729-49-005; 729-49-004, and 729-50-002 in the Area of Potential Effect (APE) for the project cited in P11.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records the Coyote Canal, an approximately nine-mile-long canal extending from its headworks on Coyote Creek about 1.3 miles downstream of Anderson Dam, then running northwest to approximately Coyote Ranch Road in San Jose where it turns back into Coyote Creek. The Santa Clara Valley Water District (District) built and owns the canal, which is no longer in use. The section of the canal in the APE for the project cited in P11 courses through land owned by the County of Santa Clara and is part of Anderson Lake County Park. The District has a 50-foot wide easement for the canal through this property. For the purpose of recording the canal for this study, the field crew surveyed the entire length of the canal in the APE, and at a few comparison points outside of the APE. Generally, the canal is variously unlined, concrete lined, or lined with stone riprap, is U-shaped or trapezoidal, and is between 15-36 feet wide and 6-10 feet deep (**Photograph 1**). This form also records several structures appurtenant to the canal such as bridges, a drop gate, and a retaining wall. See the attached Linear Feature Records and Continuation Sheets for detailed descriptions and photographs. See also the Location Map on the last page for the locations of recordation points.

P3b. Resource Attributes: (List attributes and codes) HP20 – Canal / Aqueduct

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1:** Typical view of Coyote Canal in APE, camera facing northwest, August 16, 2017.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1936-1937 (District Records)

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

***P8. Recorded by:**
Steven J. Melvin & Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: August 16 & 17, 2017

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Supplemental Historic Resources Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project," 2019.

***Attachments:** ☐ None ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☒ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

Primary # ___
HRI # ___

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): Coyote Canal

B1. Historic Name: Coyote Canal
B2. Common Name: Coyote Canal
B3. Original Use: Part of a water conservation system B4. Present Use: No longer in use
***B5. Architectural Style**: Utilitarian
***B6. Construction History**: (Construction date, alteration, and date of alterations) Built in 1936-1937; realignment at Ramelli Lane: 1965; realignment of segments, tunneling/piping under US 101 and other roadways: 1970s; concrete lining of some segments: date unknown; demolition/removal of headworks dam and other original headworks structures: date unknown; breaches in the canal at several locations: date unknown; alterations of segment through Coyote Creek Golf Club: 2012
***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**
***B8. Related Features:**
B9. Architect: Santa Clara Valley Water Conservation District; Frederick Horace Tibbetts, Chief Engineer b. Builder: Unknown
***B10. Significance: Theme**: Water Development **Area**: Santa Clara Valley
Period of Significance: n/a **Property Type**: Canal **Applicable Criteria**: n/a
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Coyote Canal does not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). It is not an historic property under Section 106 of the National Historic Preservation Act, nor is it an historical resource for the purposes of the California Environmental Quality Act (CEQA). This property has been evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. (See Section B10 on Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District," 1956; Fred H. Tibbetts, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District," 1934; State of California, State Water Resources Board, "Santa Clara Valley Investigation," Bulletin No. 7, 1955; USGS, Aerial Photographs, various years; See also footnotes.

See Location Maps on last page.

B13. Remarks:

***B14. Evaluator**: Steven J. Melvin
***Date of Evaluation**: January 2018

(This space reserved for official comments.)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # ___
HRI # ___
Trinomial ______

***NRHP Status Code**: 6Z

***Resource Name or #** (Assigned by recorder): Coyote Canal

L1. Historic and/or Common Name: Coyote Canal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation**: Point 1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10S; 619548.49mE / 4114400.37mN;

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

At this location near the canal former headworks, the canal has a trapezoidal shape with steeply sloped sides (**Photograph 2**). It is unlined, but it appears some river rocks have been placed on the bottom and sidewalls. Parallel to the canal on the south side is a large, roughly 4-foot high berm, apparently the result of cleaning out the canal over the years. On the other side is an approximately 12-foot wide dirt access road. Some trees and grasses grow on the canal sidewalls, and a drainage pipe enters from the north.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width**: 36 feet (approx.)
- **b. Bottom Width**: 6 feet (approx.)
- **c. Height or Depth**: 10 feet (approx.)
- **d. Length of Segment**: 100 feet (approx.)

L4e. Sketch of Cross-Section (not to scale) **Facing**: Northwest

L5. Associated Resources: None

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

At this location the canal passes through wooded, riparian areas and open grassy meadows in rural Santa Clara County. The terrain is generally flat.

L7. Integrity Considerations: The growth of trees in the canal at this location has diminished the integrity of materials, workmanship, and design.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 2. Coyote Canal, camera facing northwest, August 16, 2017.

L9. Remarks:

L10. Form prepared by:

Steven J. Melvin and Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: August 16, 2017

LINEAR FEATURE RECORD

***NRHP Status Code**: 6Z

***Resource Name or #** (Assigned by recorder): Coyote Canal

L1. Historic and/or Common Name: Coyote Canal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation**: Point 2

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10S; 619016.63mE / 4114294.30mN;

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

At this location the canal is unlined and has a U-shaped cross section and steeply sloped sides (**Photograph 3**). Some rocks are apparent on the sidewalls, but this seems to be because of naturally rocky soil, rather that intentional placement. Parallel to the canal on the both sides are low berms creating from cleaning out the canal. Scattered trees and grasses grow on the canal sidewalls.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width**: 36 feet (approx.)
- **b. Bottom Width**: 6 feet (approx.)
- **c. Height or Depth**: 9 feet (approx.)
- **d. Length of Segment**: 100 feet (approx.)

L4e. Sketch of Cross-Section (not to scale) **Facing**: Northwest

L5. Associated Resources: None

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

At this location the canal passes through wooded, riparian areas and open grassy meadows in rural Santa Clara County. The terrain is generally flat.

L7. Integrity Considerations: The growth of trees in the canal at this location has diminished the integrity of materials, workmanship, and design.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 3. Coyote Canal, camera facing northwest, August 16, 2017.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin and Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: August 16, 2017

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): Coyote Canal

L1. Historic and/or Common Name: Coyote Canal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation**: Point 3

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10 S, 618529.33 mE / 4114537.16 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The canal at this location the canal has a U-shaped cross section with steeply sloped sides and is unlined (**Photograph 4**). Its dimensions are slightly smaller here than at points upstream. Parallel to the canal on the south is a dirt access road. Scattered trees and grasses grow on the canal sidewalls.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width**: 20 feet (approx.)
- **b. Bottom Width**: 5 feet (approx.)
- **c. Height or Depth**: 8 feet (approx.)
- **d. Length of Segment**: 100 feet (approx.)

L4e. Sketch of Cross-Section (not to scale) **Facing**: Northwest

L5. Associated Resources: None

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

At this location the canal passes through wooded areas and meadows in rural Santa Clara County. Overgrown vegetation is present in the segment.

L7. Integrity Considerations: The growth of trees in the canal at this location has diminished the integrity of materials, workmanship, and design.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 4. Coyote Canal, camera facing northwest, August 16, 2017.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin and Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: August 16, 2017

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # ___ _____
HRI # ___ _____
Trinomial ____________________

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): Coyote Canal

L1. Historic and/or Common Name: Coyote Creek

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation**: Point 4

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)
UTM: Zone 10 S, 618100.20mE / 4114788.62mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
This recordation point is just outside of the APE for the project cited in P11. A short section of the canal showing a concrete lined chute (**Photograph 5**). It has a trapezoidal shape and steeply sloped sidewalls. The canal bottom is flat and low headwalls span the canal floor at each end. At the downstream end some river rocks have been placed on the canal floor to control erosion. Parallel on the south side of the canal is a dirt access road.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width**: 20 feet (approx.)
- **b. Bottom Width**: 8 feet (approx.)
- **c. Height or Depth**: 6 feet (approx.)
- **d. Length of Segment**: 100 feet (approx.)

L4e. Sketch of Cross-Section (not to scale) **Facing**: East

L5. Associated Resources: None

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
This segment of the canal passes through meadows in rural Santa Clara County.

L7. Integrity Considerations: The concrete lining and the growth of vegetation through cracks in the concrete have diminished the integrity of materials, workmanship, design, and feeling.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 5. Coyote Canal, camera facing east, August 16, 2017.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin and Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: August 16, 2017

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): Coyote Canal

L1. Historic and/or Common Name: Coyote Canal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation**: Point 5

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10 S, 613108.24mE / 4119536.46mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

This recordation point near Malech Road, which is several miles outside of the APE for the project cited in P11. The canal at this location is concrete lined and has a U-shaped cross section and steep sidewalls (**Photograph 6**). The canal is running along the contour of a steep hillside. Erosion has resulted in some soil filling in the bottom of the canal and vegetation growth within the canal. The concrete is cracked in several places.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width**: 30 feet (approx.)
- **b. Bottom Width**: 6 feet (approx.)
- **c. Height or Depth**: 10 feet (approx.)
- **d. Length of Segment**: 100 feet (approx.)

L4e. Sketch of Cross-Section (not to scale) **Facing**: South

L5. Associated Resources: None

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

At this location the canal passes through a rural area in the foothills just above the valley floor. The terrain is steep and vegetation consists of grasses and scattered trees.

L7. Integrity Considerations: The concrete lining, filling in of the canal with soil, and the growth of vegetation in the canal have diminished the integrity of materials, workmanship, design, and feeling.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 6. Coyote Canal, camera facing south, August 17, 2017.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin and Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: August 17, 2017

LINEAR FEATURE RECORD

***NRHP Status Code**: 6Z

***Resource Name or #** (Assigned by recorder): Coyote Canal

L1. Historic and/or Common Name: Coyote Canal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation**: Point 6

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

UTM: Zone 10 S, 612706.58mE / 4119721.86mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

This recordation point is parallel with and very near Malech Road, and is several miles outside of the APE for the project cited in P11 . The canal at this location is concrete lined and has a trapezoidal cross section with steeply sloped sides (**Photograph 7**). The concrete of the canal floor is covered with dirt and vegetation grows within the canal. The top of the sidewall on one side is eroded and crumbling. A barbed wired fence runs along this edge of the structure.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **e. Top Width**: 15 feet (approx.)
- **f. Bottom Width**: 6 feet (approx.)
- **g. Height or Depth**: 7 feet (approx.)
- **h. Length of Segment**: 100 feet (approx.)

L4e. Sketch of Cross-Section (not to scale) **Facing**: Southeast

L5. Associated Resources: None

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

At this location the canal passes through a rural area in the foothills just above the valley floor and US 101. The terrain is steep and vegetation consists of grasses and scattered trees.

L7. Integrity Considerations: The concrete lining, filling in of the canal with soil, deterioration of the concrete, and the growth of vegetation in the canal have diminished the integrity of materials, workmanship, design, and feeling.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 7. Coyote Canal, camera facing southeast, August 17, 2017.

L9. Remarks:

L10. Form prepared by:
Steven J. Melvin and Jason Sarmiento
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: August 17, 2017

P3a. Description (continued):

In addition to the canal itself, there are several appurtenant structures in the APE for the project cited in P11. Among these are the remnants of the original headworks located about 100 yards from the Coyote Creek channel (**Photograph 8**). This feature consists of two metal screw gates supported by a metal frame with each having a wood standing platform and railing. The lower part of this structure is covered by dirt that has eroded down the hillside. The two screw gates appear to have allowed water into the Coyote Canal via pipes that passed under an earthen crossing of the canal. No pipes were visible, however, and may have been buried by erosion. A short inlet canal on the upstream side of the screw gates that once conveyed water from the creek to the gates is concrete lined, but also severely eroded. Another single screw gate is located nearby on the creek bank, which apparently also conveyed water into the canal. Just upstream from the screw gates, is a recently constructed modern headworks. It is a multi-gate concrete and metal weir with a metal catwalk across the top. It is about 40 feet wide and 10 feet tall (**Photograph 9**).

Within the APE for the project cited in P11 are eight concrete bridges crossing the canal, constructed to allow property owners to access their land. These bridges are all identical in design, materials, and dimensions. They are flat, board-form concrete platform bridges about 12 feet wide and 18 feet long (**Photograph 10**). The bridges have a low curb on each side, some of the curbs have been cut in the middle to allow water to drain. Concrete abutments support the bridges and on the upstream and downstream sides of each are wing walls constructed of either concrete or rock-and-mortar. The bridges all have “SCVWCD 1936” stamped into the concrete. Near one of these bridges is a concrete drop-gate next to an upright, cylindrical gauging station constructed of corrugated metal and sheet metal with a pyramidal roof. It has a concrete foundation that has been reinforced with sandbags (**Photograph 11**). Another feature of the canal is a small retaining wall on one side of the canal. This appears to have been built to prevent erosion of the canal sidewall by irrigation water draining from the upslope fields into the canal (**Photograph 12**). The retaining wall is constructed of rock and mortar and is about ten feet long and six feet tall. In the top center of the wall is a small drainage opening. The canal in the APE has also been breached at three locations. These are 10- to 20-foot wide openings in the south wall of the canal that appear to have been intentional cuts made since abandonment of the canal to allow water to drain out (**Photograph 13**). Also along the canal are a few pipes that appear to have drained water into the canal from adjacent fields and a Pacific Gas & Electric (PG&E) natural gas pipeline crossing the canal.

B10. Significance (continued):

Historic Context

Creation and Development of the Santa Clara Valley Water Conservation District

Irrigation water for the crops grown in the Santa Clara Valley came in large part from groundwater augmented by diversions from the many small creeks flowing from the adjacent mountains. In the early era of irrigation, the valley had abundant groundwater, so much that in places it flowed freely out of the ground under artesian pressure. In the late-nineteenth century, and early twentieth century, however, as horticulture flourished and the demands increased, farmers pumped more and more groundwater out of the natural aquifers. Pump technology steadily improved, allowing deeper wells and greater volumes of water to be drawn. By the 1920s, this once abundant resource had become endangered; groundwater was being depleted faster than it could be replenished and groundwater levels steadily dropped. At the same time, the growth of towns and cities in the region increased municipal demands for the same underground water. Measurements taken in 1929 noted a 50-foot drop in the groundwater level since 1925. Not only was this recognized as an unsustainable trend, drop in water table caused the ground to subside in many areas and increased the pumping costs of farmers.[1]

[1] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934; American Society of Civil Engineers, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.

These factors led valley leaders and local engineers to seek a means reverse this trend and replenish the underground aquifers. Among the leaders of this effort was the Santa Clara Valley Water Conservation Committee formed by a group of prominent Santa Clara Valley citizens. The committee hired prominent northern California hydraulic engineers Fred H. Tibbetts and his partner, Stephen Kieffer, to undertake a study of the valley's water problems and develop a plan. Tibbetts was an established and influential hydraulic engineer of northern California and designed many important flood-control, reclamation, and irrigation works in the Sacramento Valley, including projects for the Nevada Irrigation District. Tibbetts also served as an advisor to the State of California during development of the State Water Plan in the 1920s. It was Tibbetts and Keiffer who developed the original concept of the Santa Clara Valley Water Conservation District (SCVWCD) system, and it was Tibbetts who designed six of the seven dams of the system's original phase of construction between 1932 and 1936.[2] After several years of study, Tibbetts and Kieffer proposed a system of reservoirs, percolation areas, canals, and flood control structures to capture and retain the water of the streams flowing into the valley for the purpose of groundwater recharge. They regarded any water from a creek or stream that made it to San Francisco Bay as "wasted," and the project at this time was called the "Waste Water Salvage Project." To carry out the project, Tibbetts & Kieffer recommended the establishment of a water conservation district to build, own, and manage the system, and which would be supported by taxes levied on the water users in the would-be district. The Santa Clara Valley Water Conservation Committee, and other groups such as the Santa Clara County Citizens' Committee and the Farmers' Committee, enthusiastically supported the plan and in the late 1920s proceeded to lobby for creation of such a district among landowners who would need to vote to approve establishment of a district. Supporters of the plan employed rhetoric to generate support spelling out the dire conditions and the bleak future if nothing was done. Voters defeated establishment of a water conservation district in 1927 and again in 1928, but as water levels in local wells continued to fall, finally approved the measure in 1929 and the Santa Clara Valley Water Conservation District (District) formed on November 12, 1929 "for the primary purpose of salvaging the waste waters of the various streams in the Valley."[3]

With approval of the District and a system plan in place, the District and Tibbets & Kieffer proceeded with construction. The system sought to store and distribute water to the best percolation areas in the Santa Clara Valley where it would soak back into the soil and replenish the groundwater. Tibbets & Kieffer final plan consisted of six major dams, along with canals and percolation facilities. The original upstream storage dams in the foothills of the Santa Cruz Mountains and Diablo Range flanking the Santa Clara Valley were Almaden, Calero, Guadalupe, Vasona, Stevens Creek, and Coyote built in 1935 and 1936. Coyote Reservoir was the largest in the system (**Plate 1**). Downstream, the District built the Coyote Percolation Dam in 1932 on Coyote Creek near Metcalf Road to create an in-stream percolation reservoir. In addition to the Coyote Percolation Reservoir, the District undertook other smaller in-stream improvements to enhance percolation such as constructing low dams in areas naturally conducive to percolation. Three canals rounded out the other original main elements of the system: the Amaden-Calero Canal (1935), and Vasona Canal (1936), and Coyote Canal (1936-37). The Amaden-Calero Canal carried excess water four miles from the smaller Almaden Reservoir to the larger Calero Reservoir. The Vasona Canal carried water from Vasona Reservoir on Los Gatos Creek to San Tomas Aquinas Creek where it flowed to in-stream percolation areas. On the opposite side of the valley, the Coyote Canal diverted water from Coyote Creek at a point in present-day Anderson Lake County Park, and conveyed it nine miles to the Coyote Percolation Reservoir. The water carried by the Coyote Canal was stored water released from Coyote Reservoir upstream in the Diablo Range.[4]

[2] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, 49; American Society of Civil Engineers, *Transactions, Volume 105* (New York: American Society of Civil Engineers, 1940), 1924-1928.
[3] Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," January 31, 1936, 6-10, On file at Water Resources Collections & Archives; Fred H. Tibbetts, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I, Project Report 17," May 8, 1934; J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.
[4] Santa Clara Valley Water Conservation District, "To the Voters of the District," 1936, On file at Water Resources Collections & Archives; Fred H. Tibbetts, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I, Project Report 17," May 8, 1934, 7; Fred H.

Plate 1. Map from 1936 showing the main elements of the Santa Clara Valley Water Conservation District system. The dashed line shows the District service area boundaries at the time. The blue line has been added to highlight the Coyote Canal alignment. The bold dark lines are roads and highways leading to the reservoirs.

Money for the project came in 1934 from a $2 million bond issue passed by the members of the District, which provided funding for the majority of dam construction and the Vasona Canal and a section of the Coyote Canal. A supplemental bond passed in 1936 and federal Public Works Administration funds enabled completion of these early works. The District awarded contracts for the dams to several firms including F.O. Bohnett, D. McDonald Company, Macco Construction, A. Teichert & Son, and Carl N. Swenson Company. Research did not determine the contractor for the Coyote Canal, but Macco Construction built the Coyote Dam and the Coyote Percolation Dam, both of which are also on Coyote Creek, so perhaps also built the Coyote Canal. When District system was completed, it boasted of being the first water conservation system of its type in the state.[5]

Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," January 31, 1936, 17-20, On file at Water Resources Collections & Archives; State of California, State Water Resources Board, "Santa Clara Valley Investigation," Bulletin No. 7, June 1955, 49-51; J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.

[5] Santa Clara Valley Water Conservation District, "This is Your Santa Clara Valley Water Conservation District," ca. 1957, 2-11.

The efforts of the District proved successful and groundwater levels began to rise. Between 1936 and 1943, the water table rose 76 feet on average.[6] While meeting with success, ever increasing water usage associated with increased urbanization, industrial use, and more year-round irrigation led to an improvement and expansion era of the District's system during the 1940s and 1950s. The large elements of this were construction of Anderson Dam, completed in 1950, and Lexington Dam finished in 1952 to increase storage capacity. Other parts of this program were construction of the Coyote-Alamitos Canal and the Alamitos Percolation Pond built (1953), Coyote Canal Extension (1942-1954), Saratoga-Calabazas Pipeline (1953), Evergreen Canal (1954), and the Upper and Lower Page Canals (1954). The District also altered how the Coyote Canal functioned. Originally supplying water to the Coyote Creek Percolation Reservoir, in the 1950s, it became chiefly a feeder canal for the Coyote-Alamitos Canal, Coyote Canal Extension, and the Evergreen Canal, and only rarely suppled water to the Coyote Creek Percolation Reservoir. This area also saw the inclusion of about 4,000 acres in the Evergreen area east of San Jose included in the District, and the merger with the Central Santa Clara Valley Water Conservation District encompassing land from Coyote south to the southern city limits of Morgan Hill. [7]

After the 1950s, the District did not undertake any major construction project, such as large dams, but it conducted maintenance and minor improvements to its existing system while continuing to fulfill its mission of providing water to the Santa Clara Valley. Over time, the District incorporated most of the smaller local water conservation districts, and also, in 1968 merged with the Santa Clara County Flood Control District, forming one agency to manage the water supply and flood programs for most of the county. In the 1970s, the District dropped "Conservation" from its name and officially became the Santa Clara Valley Flood Control District and eventually changed its name to the Santa Clara Valley Water District. Mergers continued in the 1980s with the acquisition by the District of the 34,900-acre South Santa Clara Valley Water Conservation District in 1987, which included two large dams/reservoirs, the Chesbro Dam and Uvas Dam.[8]

History of the Coyote Canal

The Santa Clara Valley Water Conservation District (District) built the Coyote Canal in 1936-1937 as part of its original system of dams, reservoirs, canals, and percolation ponds designed to replenish and maintain groundwater levels in the Santa Clara Valley. The Coyote Canal, constructed downstream from Coyote Dam and Reservoir, diverted water from Coyote Creek that had been released from the reservoir and carried it about 9 miles where it was turned back into the creek just upstream from the Coyote Percolation Pond at present-day Metcalf Park. The Coyote Percolation Pond was sited at a location on Coyote Creek with soil and terrain conducive to maximum groundwater percolation. The diverted into the Coyote Canal was water owned by the District and in excess of the normal creek flow volume. Coyote Creek did not have the capacity below the point of diversion to carry excess the water to the Coyote Percolation Pond and without Coyote Canal any excess water released from the Coyote Reservoir would have overflowed the creek in areas outside of the District boundaries and not reached the Coyote Percolation Pond where it would be most effective in replenishing the underground aquifers. When the Coyote Canal was built, the District service area was smaller and the stretch of Coyote Creek downstream from Coyote Dam and the Coyote Canal point of diversion for several miles was not in the District. The District boundary began approximately at the Coyote Percolation Pond (**Plate**).[9]

[6] J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.
[7] J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste water Salvage Project," December 6, 1956, 2.
[8] Santa Clara Valley Water District, "History of the Santa Clara Valley Water District," Accessed August 2017 at http://www.valleywater.org/About/History.aspx.
[9] J. Robert Roll, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste Water Salvage Project," December 6, 1956, 2-6, 10-11; Santa Clara Valley Water Conservation District, "To the Voters of the District," 1936, On file at Water Resources Collections & Archives; Fred H. Tibbetts, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I, Project Report 17," May 8, 1934, 7; State of California, State Water Resources Board, "Santa Clara Valley Investigation," Bulletin No. 7, June 1955, 49-51.

Construction of the Coyote Canal began in 1936 and continued into 1937. In the APE for the project cited in P11 on APN 729-49-005, the District purchased a 3.02 acre tract for the canal headworks on Coyote Creek from Gianni Traverso and his wife Amelia Traverso in 1937. The District also obtained a perpetual right-of-way easement from the Traversons to run the canal through their land. It is assumed the District made similar purchases and acquired easements for the canal along the entire length of its route.[10]

The District's original plans called for an unlined, trapezoidal-shaped conduit to carry 100 cubic feet per second (cfs). The typical cross section for the 9-mile canal had an 8-foot bottom width and an 18-foot top width with a 1:1 slope (**Plate 2**). The cross section of the canal varied somewhat depending on terrain. While most of the canal was unlined, it had six concrete lined chutes along the route to accommodate elevation drops. Elevation drops were also built into some of the bridges that cross the canal. The Coyote Canal headworks consisted of a 150-foot long rubble masonry dam with wood flashboards built across Coyote Creek, an inlet canal, and headgates (**Plate 3** and **Plate 4**). There was also a small building at the headworks. Water impounded by the dam flowed into the inlet canal, to the headgates where two, 48-inch pipes controlled water flow into the canal. Of these structures, only the remnants of the headgate structure and inlet canal remain.[11]

Plate 2. Two of several "typical" canal sections for the Coyote Canal from original plans dated June 1936.[12]

[10] Santa Clara County Recorder, Gianni Traverso to Santa Clara Valley Water Conservation District, Deed, OR:827:549, July 1, 1937.
[11] Fred H. Tibbetts, "Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I, Project Report 17," May 8, 1934, 7; USGS, Aerial Photograph, Photo No. CIV-294-53, October 20, 1939; USGS, Aerial Photograph, Photo No. CIV-7R-153, June 12, 1956; USGS, Aerial Photograph, Photo No. SCL-1-99, July 18, 1963; USGS, Aerial Photograph, Photo No. 2310-3-118, May 6, 1968; Santa Clara Valley Water Conservation District, "Coyote Canal, Profile, Alignment, Details," Sheet 2, June 1936.
[12] Santa Clara Valley Water Conservation District, "Coyote Canal, Profile, Alignment, Details," Sheet 2, June 1936.

Plate 3. Cross section of original dam from plans dated June 1936.[13]

Plate 4. Elevation drawing of dam from plans dated June 1936.[14]

The District continued to use the Coyote Canal for its original purpose of delivering water to the Coyote Percolation Ponds until the 1950s. An expanded service area and shifting areas of need and use by this time led the District to add to its system by constructing new dams and canals, and refine its water management practices. In the 1950s, the role of the Coyote Canal shifted to being primarily a feeder for newer canals in the District: the Coyote Canal Extension, Coyote-Alamitos Canal, and the Evergreen Canal, which delivered water to other percolation sites in the District. The Coyote Canal did continue to supply some water to the Coyote Percolation Pond, but the majority went elsewhere.[15]

In the 1970s, the construction of the US 101 freeway in this area resulted in the realignment and alteration of the Coyote Canal in many places. Specific alteration are the conduits that carry water under the freeway at several locations and at Coyote Creek Golf Drive and Malech Road, the realignment of segments along Malech Road, and the tunneling and realignment at the Bailey Avenue interchange.[16] Circa 2001, the District ceased using the Coyote Canal and stopped diverting water into the conduit, citing safety, liability, and maintenance concerns. By this time, the canal was in a general

[13] Santa Clara Valley Water Conservation District, “Coyote Canal, Profile, Alignment, Details,” Sheet 2, June 1936.
[14] Santa Clara Valley Water Conservation District, “Coyote Canal, Profile, Alignment, Details,” Sheet 2, June 1936.
[15] J. Robert Roll, “Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on Revised 1956 Waste Water Salvage Project,” December 6, 1956, 2-6, 10-11; State of California, State Water Resources Board, “Santa Clara Valley Investigation,” Bulletin No. 7, June 1955, 49-51; Santa Clara Valley Water Conservation District, “This is Your Santa Clara Valley Water Conservation District,” ca. 1957, 2-11.
[16] USGS, Aerial Photograph, Photo Nos. 2310-3-118, 2310-2-265, 2310-2-254, 2310-2-255, May 6, 1968; USGS, Aerial Photograph, Photo No. CIV-342-110, June 9, 1940; USGS, Aerial Photograph, Photo No. CIV-R351-39, June 16, 1940.

state of disrepair and it had become unnecessary. Presently, rainwater flowing down the adjacent hillsides will occasionally flow into the canal, as will water from Coyote Creek during high flood stages. The District has intentionally breached the canal at several locations in Anderson Lake County Park to allow water out of the canal and prevent it from flowing downstream where it might cause flooding or damage to property adjacent to the canal.[17]

Evaluation

The history and significance of the District's system has been previously examined, but Coyote Canal has not been previously evaluated. In 2006, JRP prepared a report that recorded and evaluated all of the District's dams as individual resources, and together as a historic district. JRP concluded that the seven original, 1930s, District dams to be eligible for the NRHP/CRHR as a discontiguous historic district under NRHP Criterion A/CRHR Criterion 1 for their association with the development of a modern water supply system for the Santa Clara Valley, and NRHP Criterion C/CRHR Criterion 3 as the work of master engineer Fred H. Tibbetts. The seven dams identified as contributors to the historic district are Almaden, Vasona, Stevens Creek, Guadalupe, Coyote, Calero, and Coyote Percolation dams. The four dams built later, such as Anderson Dam, are not contributors to the district. A review of the most recent California Office of Historic Preservation Directory of Properties in the Historic Property Data File dated April 5, 2012, does not include the historic district in its list of properties suggesting that the 2006 documentation was not sent to the State Historic Preservation Officer (SHPO) for concurrence. JRP did not find any of the dams eligible for listing as individual resources, as their importance was derived from being part of a cohesive system.[18]

JRP's specific 2006 significance justifications under Criterion NRHP Criterion A/CRHR Criterion 1 were as follows:

> The SCVWD 1930s dams are the original and integral units of the SCVWCD's system, which played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. The SCVWCD system was important in the economic development of the Santa Clara Valley, because it provided a steady, reliable, and consistent supply of water for municipal, industrial, and agricultural uses. While any dam might be considered important this way, the construction of the seven dams as a unified system provided for continued development on a scale that was larger and provided a supply more certain than that that might have been provided by any single such structure. The fact that later dams provided additional supplies, or that the area receives water from other systems, including (in more recent years) the State Water Project and the San Felipe Division of the USBR Central Valley Project, does not diminish the importance of the original seven. While it is unlikely that construction and operation of the SCVWCD system, as a whole, was the sole driving force behind the economic development of the area, it did play a significant and lasting role in this context.[19]

Under NRHP Criterion C/CRHR Criterion 3, JRP's 2006 evaluation discussed the historic district as significant as the work of master engineer Frederick Horace Tibbetts as follows:

> Tibbetts was an influential hydraulic engineer of northern California, and with his partner Stephen Keiffer was responsible for many important projects. Tibbetts also served as an advisor to the State of California during development of the State Water Plan in the 1920s. It was Tibbetts and Keiffer who developed the original concept of the SCVWCD system, and it was Tibbetts who designed six of the seven dams of the system's original phase of construction between 1932 and 1936.[20]

[17] Santa Clara Valley Water District, CEO Bulletin, "Coyote Canal Damaged," April 7, 2011, 2; Balance Hydrologics, Inc., "Existing and Historical Hydrologic Conditions of the Coyote Creek Parkway, Santa Clara County, California," Prepared for Santa Clara County Department of Parks and Recreation, May 2005, 6, 9, 12.
[18] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006; California Office of Historic Preservation, Directory of Properties in the Historic Property Data File, April 5, 2012.
[19] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, 47-48.
[20] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," July 2006, 49.

JRP concluded that the seven dams also retained sufficient historic integrity to convey their significance. The historic district's period of significance was established as 1932 to 1950. These findings are relevant to the present study and evaluation of the Coyote Canal, which was also built in 1936-1937 as part of the original District system.

By the same reasoning as presented by JRP in 2006, the Coyote Canal has the potential to be eligible for listing in the NRHP / CRHR under NRHP Criterion A / CRHR Criterion 1 as a contributor to the Santa Clara Valley Water District Dams Historic District as the Coyote Canal was an original and integral component of the Santa Clara Valley Water Conservation District's system and played a significant role in providing water to the Santa Clara Valley and contributing to the economic development of the region. The Coyote Canal, however, is not eligible for listing in the NRHP / CRHR because it does not retain sufficient historic integrity to the 1932-1950 period of significance of the historic district. The numerous and substantial alterations resulting in loss of historic integrity are the concrete lining of long sections of this originally earthen canal, demolition or removal of the headworks dam and other original headworks structures, realignment of segments, tunneling/piping under US 101 and other roadways, change in function of the canal, discontinued use of the canal, breaches in the canal at several locations, vegetation growth in the canal, and urban development. All of these combined have resulted in a loss of historic integrity of design, materials, workmanship, setting, location, feeling, and association such that the canal is no longer able to convey its importance to the 1932-1950 period of significance of the historic district.

Similarly, the Coyote Canal, has the potential to be eligible for listing in the NRHP / CRHR under NRHP Criterion C / CRHR Criterion 3, as part of a system designed by master engineer Frederick Horace Tibbetts, but its lack of historic integrity disqualifies it being eligible as a contributor to the SCVWD Dams Historic District under this criterion.

The Coyote Canal is not significant for an association with the lives of persons important to history (NRHP Criterion B/CRHR Criterion 2). Research did not reveal that any individual associated with this property has made demonstrably important contributions to history at the local, state, or national level. This property is also not a significant or likely source of important information about historic construction materials or technologies as this type of structure is well documented in the historic record (NRHP Criterion D / CRHR Criterion 4).

In addition, the Coyote Canal also does not meet NRHP / CRHR Criterion as an individual resources because its potential significance is derived from it being a component of a larger system.

***Resource Name or #** (Assigned by recorder): Coyote Canal

***Recorded by**: S.J. Melvin & J. Sarmiento ***Date**: August 16 & 17, 2017 ☒ Continuation ☐ Update

Photographs (continued):

Photograph 8. Remnants of original headgate structure and inlet canal in APE near original point of diversion, camera facing southwest, August 16, 2017.

Photograph 9. Modern weir of the Coyote Canal in APE, camera facing northeast, August 16, 2017.

Photograph 10. Typical bridge in APE crossing the canal, camera facing north, August 16, 2017.

Photograph 11. Concrete drop gate in APE as part of bridge structure and a metal gauging station, camera facing southeast, August 16, 2017.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # ___
HRI # ___
Trinomial ___

***Resource Name or #** (Assigned by recorder): Coyote Canal
***Recorded by**: S.J. Melvin & J. Sarmiento
***Date**: August 16 & 17, 2017
☒ Continuation ☐ Update

Photograph 12. Stone and mortar retaining wall in APE built on the canal sidewall, camera facing north, August 16, 2017.

Photograph 13. Breach in canal in APE, camera facing southeast, August 16, 2017.

***Resource Name or #** (Assigned by recorder): Coyote Canal

***Map Name**: Morgan Hill ***Scale**:1:24,000 ***Date of Map**: 1980

Showing Recordation Points 1 – 4 (Coyote Canal Highlighted in Blue)

LOCATION MAP

***Resource Name or #** (Assigned by recorder): Coyote Canal

***Map Name**: Morgan Hill *__Scale__:1:24,000 *__Date of Map__: 1980

Showing Recordation Points 5 – 6 (Coyote Canal Highlighted in Blue)

***Resource Name or #** (Assigned by recorder) Anderson Dam
☐ Continuation ☒ Update

P1. Other Identifier: Leroy Anderson Dam
***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara
***b. USGS 7.5′ Quad**: Morgan Hill **Date**: 1955 (photorevised 1980) **T**: 9S **;** **R**: 3E **;** **Sec**: n/a ; Mount Diablo Meridian
***P3b. Resource Attributes:** (List attributes and codes) HP21—Dam; HP4—Ancillary Buildings
***P6. Date Constructed:** 1950
***P8. Recorded by:** Steven J. "Mel" Melvin, JRP Historical Consulting, LLC, 2850 Spafford Street, Davis, CA 95618
***P9. Date Recorded:** September 4, 2019
***P11. Report Citation:** JRP Historical Consulting, LLC, "Supplemental Historic Resource Inventory and Evaluation Report for the Anderson Dam Seismic Retrofit Project, Santa Clara County, California," prepared for the Santa Clara Valley Water District, 2019.

JRP Historical Consulting, LLC (JRP) recorded and evaluated the Anderson Dam in 2006 as part of a report titled "Historic Resources Report: Santa Clara Valley Water District Dams," prepared in July 2006 for the Santa Clara Valley Water District. The 2006 evaluation concluded that the dam was not eligible for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) because it did not meet any of the significance criteria for either register. The 2006 evaluation and conclusion remain valid. Anderson Dam, inclusive of its appurtenant structures and buildings, does not meet the criteria for listing in the NRHP or the CRHR as an individual resource, or as part of a historic district. It is not an historic property under Section 106 of the National Historic Preservation Act, nor is it an historical resource for the purposes of the California Environmental Quality Act (CEQA). A copy of the 2006 DPR 523 form is attached to this Update DPR 523 form and the complete July 2006 report is appended to the report cited above in field P11. For the present study, JRP revisited Anderson Dam on September 4, 2019 and conducted a field survey of the dam to update the 2006 recordation. JRP found the dam and appurtenant buildings and structures generally as described and recorded in 2006. Photographs of the dam and appurtenant structures and buildings taken by JRP on September 4, 2019 are below.

Photograph 1: Upstream face of Anderson Dam, spillway head at right. Camera facing northwest, September 4, 2019.

***Resource Name or #** (Assigned by recorder): Anderson Dam

***Recorded by**: S.J. Melvin *__Date__: September 4, 2019 ☒ Continuation ☐ Update

Photographs (Continued):

Photograph 2. Upstream face of Anderson Dam, spillway head at right. Camera facing southwest, September 4, 2019.

Photograph 3. Downstream face of Anderson Dam. Camera facing northeast, September 4, 2019.

Photograph 4. Crest of Anderson Dam. Camera facing north, September 4, 2019.

Photograph 5. Spillway head of Anderson Dam. Camera facing southwest, September 4, 2019.

Photograph 6. Anderson Dam spillway looking toward the reservoir. Camera facing east, September 4, 2019.

Photograph 7. Anderson Dam outlet chute into Coyote Creek. Camera facing east, September 4, 2019.

Photograph 8. Outlet Valve Building near the reservoir. Camera facing northeast, September 4, 2019.

Photograph 9. Equipment building on the dam crest. Camera facing northwest, September 4, 2019.

***Resource Name or #** (Assigned by recorder): Anderson Dam

***Recorded by**: S.J. Melvin　　***Date**: September 4, 2019　　☒ Continuation ☐ Update

Photograph 10. Equipment building near the outlet chute. Camera facing east, September 4, 2019.

Photograph 11. Equipment building near the outlet chute. Camera facing southeast, September 4, 2019.

***Resource Name or #** (Assigned by recorder): Anderson Dam

***Recorded by**: S.J. Melvin

***Date**: September 4, 2019

☒ Continuation ☐ Update

Photograph 12. Equipment building near the outlet chute. Camera facing northwest, September 4, 2019.

JRP 2006 Anderson Dam DPR 523 Form

from

JRP, Historic Resources Report, Santa Clara Valley Water District Dams, prepared for Santa Clara Valley Water District, 2006

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____
HRI # ____
Trinomial ____
NRHP Status Code 6Z

Other Listings ____
Review Code ____ Reviewer ____ Date ____

 ***Resource Name or #** (Assigned by recorder) Anderson Dam

P1. Other Identifier: Leroy Anderson Dam

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Morgan Hill **Date** 1955 (1980) **T**9S; **R** 1E; MD **B.M.**
c. Address City Zip
d. UTM: (give more than one for large and/or linear resources) Zone: 10; 621496 mE, 4114169 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Anderson Dam is a rolled earth and rock fill dam, with a crest length of 1,385 feet, and height from Coyote Creek's streambed to the spillway crest of 625 feet, and 240 feet in height over all. **(Photograph 1)** The dam has a freeboard of 19.5 feet, and is 40 feet wide at the top and 1,100 feet wide at the base. The dam's intake valves consist of three 60-inch by 84-inch sluice gates. There are three outlet valves, a 12-inch diameter polyjet valve, a 48-inch diameter butterfly valve, and a 42-inch diameter butterfly valve. Its outlet provides for release of a maximum of 550 cfs through a 1,160-foot long, 49-inch diameter steel pipe. (See continuation sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)
***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1, camera facing northwest.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1950, Water Utility Operations Division, Santa Clara Valley Water District, "Dam Safety Program Report."

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
R. Herbert/J. Cheney
JRP Historical Consulting LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006
***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006.

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____

Primary # ____________________
HRI # ____________________

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z
***Resource Name or #** (Assigned by recorder) Anderson Dam

B1. Historic Name: Leroy Anderson Dam
B2. Common Name: Anderson Dam
B3. Original Use: Water storage, ground water recharge, flood control, and recreation. B4. Present Use: Water storage, ground water recharge, flood control, and recreation.
***B5. Architectural Style:** n/a
***B6. Construction History:** (Construction date, alteration, and date of alterations) Constructed 1950; inlet tower extended 1960; spillway enlarged and crest modified 1987 and 1988; new inlet structure for outlet works 1988-1989.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**
***B8. Related Features:**

B9. Architect: G.W. Hunt (Chief Engineer) b. Builder: Guy F. Atkinson Company
***B10. Significance: Theme** n/a **Area** n/a
Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Anderson Dam and its associated outlet and control structures are the resources studied for this evaluation. It does not appear that the dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources (and thus are not historically significant under CEQA guidelines).

The resource inventoried in this form, the Anderson Dam complex, is associated directly with the Santa Clara Valley Water District's water development system in the Santa Clara Valley of California. Anderson Dam was constructed in 1950 by the South Santa Clara Valley Water Conservation District to raise the water table, supply irrigation water and flood protection to Santa Clara Valley. Its construction created a storage reservoir. (See continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes)
***B12. References:**
See footnotes; USGS maps, local newspapers, engineering reports, *Dam Safety Program Report*, Santa Clara Valley Water District October 2004, *Index to Documents Relevant to the Modifications and Repairs of Santa Clara Valley Water District Dams*, Santa Clara Valley Water District, September 1995, etc.

(Sketch Map with north arrow required.)

B13. Remarks:

***B14. Evaluator:** Rand Herbert

***Date of Evaluation:** August 2006

(This space reserved for official comments.)

P3a. Description (continued):

An ogee chute style spillway is located on the west side of the dam, and has a capacity of 57,400 cfs. **(Photograph 2)** The spillway weir is 223 feet in length. Behind the dam, Anderson Reservoir has an 89,073 acre-feet capacity. The Anderson Dam functions together with the Coyote Dam. As the dams are operated as a system, the State of California Department of Water Resources, Division of Safety of Dams (DSOD) imposes a restriction on the capacity of the two dams.

A modern restroom has been constructed at the dam's west side. It is a concrete block building, topped with a front gable metal roof that contains a monitor skylight. **(Photograph 3)** Another concrete block building located on the west side of the dam and reservoir is topped with a flat roof. **(Photograph 4)** This building contains a set of flush doors and one flush single-leaf door. **(Photograph 4)** A third concrete masonry building is located on the dam and is topped with a flat roof. A single, slab single-leaf door serves as its entrance.

At the rear of the dam (north side) is a building with a removable shed roof, its walls sided in stucco. A flush single-leaf metal door accesses this instrument building. Also at the rear of the dam, near the outlet chute, is another control building that is topped with a flat roof, sided in poured concrete and accessed by a flush metal door. **(Photograph 5)**

B10. Significance (continued):

At the turn of the twentieth century the Santa Clara Valley was a predominantly agricultural region with a small urban area concentrated in San Jose and several other small towns. Groundwater levels at this time were sufficiently high that wells often flowed under artesian pressure. However, by 1915 a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67% of the area under irrigation, and the population of its urban centers was on the rise. By the end of the decade the groundwater table had dropped 50 feet in four years, increasing pumping costs and causing the ground to subside.[1] These factors led valley leaders and local engineers to seek a means to replenish the lowering ground water table.

During the 1920s, engineers Fred H. Tibbetts and Stephen Kieffer undertook a study of the problem and proposed a system of dams and water conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters defeated establishment of a water conservation district in 1927 and 1928, when water levels in local wells fell below 100 feet in 1929, the voters approved the measure and established the SCVWCD. By 1934 the district's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge.[2]

The system of dams and reservoirs operated successfully but the continued urban and agricultural growth in the Santa Clara Valley created greater demand for water and additional dams were constructed in the 1950s. Lenihan Dam, known as Lexington Dam, was one of three dams constructed during this period by the SCVWCD. The South Santa Clara Valley

[1] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934, passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.

[2] ASCE, *Historic Civil Engineering Landmarks,* 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District" (January 31, 1936), 6-10, WRCA.

Water Conservation District, serving the southern portion of Santa Clara County, also constructed two dams for the same purposes during the 1950s.

Evaluation Considerations

In 2003, JRP Historical Consulting Services evaluated another dam, the Almaden Dam, of the Santa Clara Valley Water District, in its report, "Historical Resources: Almaden Dam, Santa Clara Valley Water District." At that time, JRP Historical Consulting determined that Almaden Dam, by itself, was not eligible for the National Register of Historic Places or the California Register of Historic Resources because "[it] is part of a larger system, the other parts of which are not part of this evaluation. By itself, the dam would not be considered sufficiently significant to appear eligible for the National Register of Historic Places under Criterion A at either the local, state, or national level. It is possible that the system as a whole, should it be inventoried and evaluated, could qualify as a significant property assuming it has retained its over all integrity."[3] The entire system of Santa Clara Valley District system of dams is the subject of this current evaluation and it still does not appear that Anderson Dam or its appurtenances meet the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

The San Francisco Section of the American Society of Civil Engineers recognized the Santa Clara Valley Water Conservation District system (of which Anderson Dam is a part) in 1976 as a "historic civil engineering landmark." While this designation imparts no particular regulatory status, it represented an acknowledgment of the system's significance to interested northern California civil engineers.[4] The report prepared by the ASCE section listed two "special notes" regarding the SCVWCD system as a whole:

1. This system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin.
2. This water supply development facilitated the post World War II growth of the Santa Clara Valley into one of the major metropolitan areas of the country.[5]

However, even with this designation in mind, it does not appear that Anderson Dam and its outlet structures meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources.

It is difficult to establish a single standard for what might constitute significance for a dam because there are several areas in which that significance might come into play. In general, however, the test would be some type of importance that is not common to other dams in the region or state. Innovation might be one test: for example, was the dam the first to be built specifically to recharge a local aquifer? This was one of the reasons the ASCE San Francisco section considered the

[3] JRP Historical Consulting, "Historic Resources Report: Almaden Dam, Santa Clara Valley Water District," (Davis, California: 2003).

[4] ASCE, *Historic Civil Engineering Landmarks,* 29. The Historic Civil Engineering Landmark Program recognizes historically significant local, national, and international civil engineering projects, structures, and sites. The Historic Civil Works award recognizes projects that were built prior to the advent of engineering as a discipline in the 18th century. The objectives of the program are to: 1) Encourage all civil engineers to become more aware of the history and heritage of their own profession; 2) Increase appreciation by the public of civil engineering contributions to the progress and development of the United States and the world. 3) Identify and designate national historic civil engineering works that have made a significant contribution to the development of the United States and to the profession of civil engineering in particular. 4) Encourage, where appropriate and feasible, the preservation of significant historic civil engineering works. 5) Provide a documented archive of Civil Engineering Historic Landmarks for the use of engineering students, professional writers, researchers, and historians. 6). Promote the inclusion of information on Historic Civil Engineering Landmarks in encyclopedias, guidebooks, and maps used by the general public. (From the ASCE web site, http://www.asce.org /history/hp_resguide2.html)

[5] ASCE, *Historic Civil Engineering Landmarks,* 28.

SCVWCD system an engineering landmark. While Anderson Dam is a part of the Santa Clara Valley Water District, its construction in 1950 was to augment the existing water conservation system that was already in operation since the 1930s. Anderson Dam and its appurtenances were constructed using well established engineering techniques like those used by the District's original water conservation system of dams, constructed in the 1930s. Size or engineering achievement might be another test, if a dam was unusual for its design, or represented a breakthrough in the science of dam engineering, or represents a rare example of its type, which Anderson Dam does not.

Several general observations regarding earth filled dams merit discussion by way of introduction. The first observation is an obvious but important point: there are many earth fill dams in California. Of the dams in California under the jurisdiction of the Division of Safety of Dams 72% are earth fill. Collectively, all of these dams serve important functions, and the dams of the SCVWCD obviously benefited the region's urban areas and agriculture. Individually, however, any one dam is part of a larger system and one of a vast number of similar properties.

Second, it is important to understand dams in general as part of a class of infrastructure improvements that deliver benefits to broad constituencies. Certain types of improvements fit this definition of infrastructure. Most public works projects fall into this category, including state and local road systems, municipal water systems, sewer systems, hospitals, schools, airports, and the like. Major utility features also fall into this category, including electric power generating plants, natural gas pipelines, railroads, and telephone service. These elements of the infrastructure are obviously important to the communities they serve. In time, members of the community come to rely upon these elements for their basic needs, the roads they drive, water they drink, electricity they use, and so forth. Thus, in many communities, dams are essential elements of the infrastructure.

This point is useful in appreciating how significance might be assessed for such properties. In a sense, every element of the infrastructure is important. Unless judgment is exercised, however, every dam, road, bridge, telephone line and sewer system might be seen as eligible for the National Register for its contribution to the local community and its development. To avoid that overbroad conclusion, such infrastructure elements must be assessed within the context of similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating dams.

Another consideration in evaluating significance of dams is the period of significance. The area of significance defines the period of significance. If a dam is significant for its design, the period of significance should be restricted to the era in which the dam was built. However, if it is important for its contribution to the initial settlement of a region, the period of significance should be restricted to the settlement period.

Finally, integrity is assessed for the resource's period of significance. The property must retain integrity to its potential period of significance if it is to meet the criteria for listing in the National Register of Historic Places or as an important resource under California law and regulations.

The following discussion presents an evaluation of Anderson Dam under National Register and California Register criteria and its integrity.

Criterion A or 1: Anderson Dam is an integral unit of the SCVWCD's system, which played a role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. However, as noted above, major infrastructural elements are inherently important to their communities. For example, while the SCVWCD system may have been important in the economic development of the Santa Clara Valley, the same might be said of completion of railroads through the area in the nineteenth century, or construction of modern roads and highway systems in the twentieth century. Moreover, the area receives water from other systems, including (in more recent years) the State Water Project. It is unlikely that construction and operation of the SCVWCD system, as a whole, was the principal driving force behind the economic development of the area. Rather, it was one

of several factors leading to the construction of the Santa Clara Valley. Anderson Dam is one of four dams within the system constructed to augment and add to the water conservation system of dams already in operation since the 1930s.

Criterion B or 2: Anderson Dam does not have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore does not appear eligible under this criterion. While Anderson Dam is associated with the G.W. Hunt and Guy F. Atkinson company, it is inappropriate to use its association with them under Criterion B or 2 to evaluate the dam, as it would better be considered under Criterion C or 3, as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: does Anderson Dam exhibit particular significant design or engineering characteristics, and is it the work of a master engineer. Each of these considerations will be addressed in turn.

First, Anderson Dam is a structure of common design that represented no particular engineering achievement at the time it was constructed. Earth fill dams were common in the 1950s. Of the 811 earth fill dams under the jurisdiction of the state, 197 dams have dates of construction prior to 1936, some dating as early as 1850 and 1851. Nothing in the accounts of Anderson Dam's construction (or construction of other dams in the system) suggests that they were designed and built through anything other than a standard process.

Furthermore, was Anderson Dam an innovation? As discussed above, Anderson Dam was constructed to add to the District's water conservation system that was in operation since the 1930s. The original dams constructed by the District in the 1930s were constructed to operate as a system. Anderson Dam was not part of the original system plan, but rather was added during the post-World War II period when more water conservation was needed. Anderson Dam was constructed using the same engineering methods, and augmented a system that had been in existence and therefore was not an innovation.

Second, was this dam the work of a master, in this case G.W. Hunt or Guy F. Atkinson, and if so, was it an important example of their work? Research did not reveal further information on G.W. Hunt. The Atkinson Company was an influential builder of hydroelectric structures, road, bridge, tunnel, and industrial projects in California and was responsible for many important projects. However, nothing in the historic record suggests that Anderson Dam was of particular importance or a challenging example of his company's work as a builder. Rather, it was one of many dams and large construction projects he designed. Consideration of these factors indicates that Anderson Dam and its outlet features do not appear to meet the criteria for listing in the National Register of Historic Places under Criterion C.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important. In rare instances, structures, such as dams and buildings, can serve as sources of important information about historic construction materials or technologies; however, this property is otherwise documented and does not appear to be a principal source of important information in this regard.

Integrity

As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. Anderson Dam has retained a very good level of integrity in all seven measures. It remains, obviously, in its original location, the setting of which is unchanged from its original construction beyond the growth of trees in the surrounding area. It has not been substantially altered (the only changes being to its intake structure beneath the water surface, and minor changes around the outlet structures) so it retains integrity of design, workmanship, and materials. It remains a part of the SCVWD's system, so its association also has been retained. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while

at or while viewing the site. Anderson Dam has a strong sense of time and place. While the dam retains overall integrity from its period of construction, it does not appear that the dam or its appurtenances meet the required significance criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

P5b. Photographs (cont.):

Photograph 2. Leroy Anderson Dam Spillway, camera facing northwest. April 17, 2006.

Photograph 3. Public Restroom, camera facing north. April 17, 2006.

***Resource Name or #** (Assigned by recorder) Anderson Dam

***Recorded by** Rand Herbert *Date April 17, 2006 ☒ Continuation ☐ Update

Photograph 4. Outlet Valve Building, camera facing northwest. April 17, 2006.

Photograph 5. Instrument buildings, camera facing east. April 17, 2006.

Photograph 6. Anderson Dam during construction, 1950.

Photograph 7. Anderson Dam shortly after construction, c. 1950.

Photograph 8. Anderson Dam Spillway during construction, 1950.

Photograph 9. Leroy Anderson Dam plaque, camera facing west. April 17, 2006.

APPENDIX C

Previous Documentation

Malaguerra Winery National Register of Historic Places Nomination Form, 1980.

JRP, Historic Resources Report, Santa Clara Valley Water District Dams, prepared for Santa Clara Valley Water District, 2006.

Form No. 10-300 REV. (9/77)

PH0693 103

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED DEC 7 1978
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC Malaguerra Winery

OHP

AND/OR COMMON

2 LOCATION

STREET & NUMBER
Burnett Avenue, North of Morgan Hill on U.S. Route101 __NOT FOR PUBLICATION

CITY, TOWN
Morgan Hill X VICINITY OF

CONGRESSIONAL DISTRICT
13

STATE California CODE 06 COUNTY Santa Clara CODE 085

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	X PUBLIC	__OCCUPIED	__AGRICULTURE	__MUSEUM
X BUILDING(S)	__PRIVATE	X UNOCCUPIED	__COMMERCIAL	__PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	X OTHER: none

4 OWNER OF PROPERTY

NAME
County of Santa Clara

STREET & NUMBER
70 West Hedding Street

CITY, TOWN
San Jose, __ VICINITY OF

STATE
California

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC. Santa Clara County Recorder's Office

STREET & NUMBER
70 West Hedding Street

CITY, TOWN
San Jose

STATE
California

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Historic American Buildings Survey, Santa Clara County Project, 1977

DATE
Summer 1977 X FEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS HABS Archives, Prints and Photographs Division, Library of Congress

CITY, TOWN
Washington

STATE
D. C.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM

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of the west facade. The upper level is reached by a doorway set in a dormer opening on the east roof slope.

The modern frame shed-roof addition to the barn is located on the west elevation. It measured 12' x 13' and has a single window on the south elevation. It is built on a grade level concrete slab. This addition will be removed during restoration.

A large chicken barn of post-1950 construction stands on the property to the south of the winery. Because of its siting, it does not intrude significantly upon the historic setting of the Malaguerra Winery.

DEC 7 1978 1 of 4 7/20/78

Malaguerra Winery
Santa Clara County, Calif.
Picture of 1943 shows the
1869 structure (windows 2nd level)
1904 addition wraps around
the south end of the 1869 bldg.
The 2 men are not identified
a 1904 newspaper picture
shows there was little change
between 1904 and early 1940's

B. <u>Malaguerra Winery</u>. Front view of the winery facility. The property was changed to a chicken ranch operation in the 1920's at which time the older stone structures on the left were converted to

living quarters and the additional frame housing structure on the right was added. The structures have been unoccupied for several years. Photo taken in 1976.

A. Malaguerra Winery. Close up of the front of the two-story stone Malaguerra Winery building. The oldest part of the structure built in 1869 is on the left. The newer part on the right was built after 1904. Part of the 1904 winery "barn roof" shows in the upper rear of the photo. Photo taken 1976.

3 of 14

Malaguerra Winery

Santa Clara County, Ca.

OCT 23 1980

nterior view of the easterly end of the 904 structure. The 1904 structure envelops the 1869 Winery. The original wall, roof and attic window in the original southern end wall at the second floor and above are shown in this picture

Picture taken 5/19/78 DEC 7 1978

OCT 23 1980

Malaquerra Winery
Santa Clara County, Ca.
Interior shot of the 1904 addition showing the exterior double doors. 5 of 14
Date of picture 5/19/78 DEC 7 1978

Malaguerra Winery

Santa Clara County, Ca.

Interior of the 1904 addition shows the original second floor attic and roof of the 1869 structure.

Picture taken 5/19/78

6 of 14

Malaquerra Winery
Santa Clara County, Ca.

View of the interior of the 1904 addition showing the westerly end wall. There is an exterior access door on the left providing direct access to the decked "mezzaine" floor. (See stringers below roof joists)

Picture dated 5/19/78

Malaquerra Winery

Santa Clara County, Ca.

Interior view of the basement or first floor of the 1869 Winery structure. Also shown is a part of the original stone wall. It also shows the heavy redwood beams and joists.

Picture taken 5/19/78

8 of 14

OCT 23

DEC 7 1978

Malaguerra Winery

Santa Clara County, Ca.

Close up view of the interior easterly end wall. The basalt stone (a native field stone) used in the walls is found near the location. Basalt rock is rather scarce in this County.

Picture taken 5/19/78

Malaguerra Winery DEC 7 1978

Santa Clara County, Ca.

Interior view of the basement or 1st floor, 1869 structure showing part of the easterly and southerly stone walls.

It shows the heavy redwood posts, beams and joists. In rehabing the Winery, the exposed piping and wiring added circa 1922 will be removed.

Picture taken 5/19/78 10 of 14

Malaguerra Winery

OCT 23 19

Santa Clara County, Ca.

Exterior double doors to the 1904 addition.

11 of 14

Picture date 5/19/78 DEC 7 1979

Malaguerra Winery

Santa Clara County, Ca.

Exterior double doors to the 1904 addition.

Picture date 5/19/78

<u>Malaguerra Winery</u>

Santa Clara County, Ca.

Picture of a portion of the lower portion northerly end wall showing the access double doors. The picture shows the original stone and door beam. The plaster coat including the whitewash will be repaired in the rehabing to a Wine Museum.

Picture taken 5/19/78 13 of 14

Malaguerra Winery

Santa Clara County, Ca.

Picture showing the 1904 addition on the left. The circa 1922 frame construction tacked on the exterior wall and fits in under the 1904 roof over hand and red-wood wooden gutter. The 1922 circa additions will be completely removed in rehabing for a Wine Museum. The circa 1922 shed does not cut into the 1904 structure in any way.

Picture date 5/19/78

OCT 23 198

DEC 7 1978

14 of 14

Historic Resources Report

Santa Clara Valley Water District Dams

Vasona Dam Spillway Apron and Dragon's Teeth

Submitted to

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Prepared by

JRP Historical Consulting LLC
1490 Drew Avenue, Suite 110
Davis, California 95618

July 2006

EXECUTIVE SUMMARY

JRP Historical Consulting Services prepared this Historic Resources Report to evaluate eleven Santa Clara Valley Water District's dams for their eligibility for listing in the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), or that could be determined historical resources for the purposes of the California Environmental Quality Act (CEQA). The purpose of this document is to comply with applicable sections of the National Historic Preservation Act (NHPA) and the implementing regulations of the Advisory Council on Historic Preservation (ACHP) as these pertain to federally funded undertakings and their impacts on historic properties. The dams have also been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines using the criteria outlined in Section 5024.1 of the California Public Resources Code.

This report concludes that seven of the dams and their associated outlet structures, built in the mid-1930s, appear to meet the criteria for listing in the National Register of Historic Places as a discontiguous historic district; they are eligible under Criterion A, for their association with the development of a modern water supply system for the Santa Clara Valley, and under Criterion C, for their significance in the history of water supply systems and their association with Fred H. Tibbetts, engineer, as the work of a master. The remaining four dams, built later or by other organizations and annexed into the district, do not appear to meet the criteria for listing in the National Register of Historic Places, nor do they appear to qualify as resources eligible to the California Register of Historic Resources, and thus are not resources under Section 15064.5(a)(2)-(3) of the CEQA Guidelines. These findings are detailed in the report and the accompanying State of California DPR 523 forms.

TABLE OF CONTENTS

ATTACHMENTS

1. PROJECT LOCATION AND RESEARCH METHODS

The project location is shown in **Appendix A**, **Figure 1** and the project vicinity is shown in **Figure 2**. Following **Figure 2** in **Appendix A**, the APE maps for the project, prepared by URS, are arranged in alphabetical order. The dams and outlet structures are briefly described in Section 4 of this report and a more detailed description and evaluation on DPR 523 forms is provided for them in **Appendix B**.

The resources studied by this project are eleven dams and their associated outlet structures and related features. The Calero and Calero Auxiliary dams, and Fellows Dike, are described and evaluated as one resource, because they were constructed together to form the Calero Reservoir.

JRP conducted an inventory and evaluation survey to record the dams and outlet structures. Additional background research was done through a review of Santa Clara Valley Water District (SCVWD) records, photographs, primary and secondary sources, and historic area maps.

In keeping with the standards of the California Department of Parks and Recreation, Office of Historic Preservation, these features were inspected in the field, photographed, and are described in detail on DPR-523 forms in **Appendix B.** Research for this project was conducted at the Santa Clara Valley Water District, California State Library, Water Resources Center Archives, Bancroft Library, San Jose Public Library, California Division of Safety of Dams, and Shields Library at UC Davis.

Photograph 1. Plaque at center of Almaden Dam. April 17, 2006.

1.1 Project Description and Preparation of the Area of Potential Effect

The Santa Clara Valley Water District (District) is developing a Dam Maintenance Program (DMP) to perform activities that will ensure the reliability and safety of the District's dams and reservoirs for the residents of Santa Clara County and other affected counties, and to comply with the requirements of the State of California Division of Safety of Dams (DSOD), who have jurisdiction over the District's dams, and with the requirements of the Federal Energy Regulatory Commission regarding Anderson Dam.[1]

The following fourteen dam facilities are maintained by the District and will be covered in the DMP: Almaden, Anderson, Calero (composed of three features: Calero Main Dam, with its Auxiliary and Fellows Dike dams), Chesbro, Coyote, Coyote Percolation, Guadalupe, Lenihan, Stevens Creek, Rinconada, Uvas, and Vasona.

Under the DMP, the main categories of routine and preventative maintenance activities that will be performed include: vegetation management; rodent control; drainage, erosion, and seepage control, including bank stabilization; sediment relocation / removal for maintenance of inlet / outlet facilities; lowering of reservoirs for maintenance of inlet / outlet facilities; maintenance / repair of inlet / outlet facilities; valve and valve system maintenance /repair / replacement, including hydraulic systems; concrete repairs and replacement; existing access road grading and resurfacing; exploratory backhoe trenches and borings; inspections (underwater, remotely operated vehicle, manual outlet pipe inspections, and walking / visual inspections) and surveys and monitoring; control and instrumentation system maintenance /repair / replacement / installation; excavations and excavation backfilling; trash and debris removal; maintenance / repair / replacement / installation of minor appurtenances; and miscellaneous minor activities.

For the purposes of the DMP study, the Area of Potential Effect (APE) for Historic Architectural resources was limited to the dam's structural footprint, and included adjacent areas containing control structures, spillways, and related resources. It did not include the area of the reservoir, its banks, or the full extent of all access roads, as these are not subject to activities under the DMP and are typically removed geographically from the dams and their appurtenances.

[1] The text for the project description was prepared by the district and MHA Environmental Consulting, Inc. in July 2006. A full project description detailing all proposed activities can be found in the Program Environmental Impact Report prepared for this project.

2. HISTORICAL CONTEXT AND OVERVIEW

The Santa Clara Valley Water District owns and controls a municipal water supply comprised of eleven dams (with their associated outlet structures and other control buildings), groundwater wells and pumps, water treatment facilities, miles of pipeline, administrative and shop buildings, and other resources. The Santa Clara Valley Water Conservation District (hereafter SCVWCD; now Santa Clara Valley Water District, as noted, SCVWD) built seven dams from 1935-1936 and built or annexed its remaining four dams during the period 1950-1957. The object of the dams and facilities in the SCVWCD system was to provide water to meet the growing demand in the service area. This was done in part by replenishing the declining aquifers of the Santa Clara Valley.

2.1 Pre-Project

The Santa Clara Valley and the Pueblo of San Jose represent some of the longest-settled areas in California. The Pueblo of San Jose was one of the small number of *pueblos* established by the Spanish (the others include Los Angeles, San Francisco, and San Diego) in the eighteenth century. The valley itself was divided into large rancho and mission grants that survived through the Mexican period. Many of the land grants made by the Spanish and Mexican governments in the Santa Clara Valley survived into the American Period. San Jose briefly served as the state's capitol, and after 1860 was the center of a rich agricultural area. San Jose was surrounded by fields and orchards, many of which were irrigated through well water and diversions from local creeks.

At the turn of the twentieth century the Santa Clara Valley remained a predominantly agricultural area with a small urban center concentrated in San Jose, and with other small towns as tributaries. Groundwater levels at this time were sufficiently high that wells often flowed under artesian pressure. However, by 1915 a combination of modern pumps allowing increased pumping and drought resulted in a substantial drop in groundwater levels. By 1920 the valley's farmers had approximately 67% of the area under irrigation, and the population of its urban centers was on the rise. By the end of the decade the groundwater table had dropped 50 feet in four years, increasing pumping costs and causing the ground to subside.[2] These factors led valley leaders and local engineers to seek a means to replenish the lowering ground water table.

[2] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934; American Society of Civil Engineers, San Francisco Section. *Historic Civil Engineering Landmarks of San Francisco and Northern California*. San Francisco: Pacific Gas and Electric Company, October 1977, 25.

2.2 Construction of the Dams and the SCVWCD System

During the 1920s Fred H. Tibbetts and his partner, Stephen Kieffer, hydraulic engineers, undertook a study of the valley's water problems and proposed a system of dams and conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters at first defeated establishment of a water conservation district in 1927 and 1928, when water levels in local wells fell below 100 feet in 1929, the voters approved the measure and established the SCVWCD.[3]

By 1934 the district's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge. The original main storage dams were Calero, Almaden, Guadalupe, Vasona and Stevens Creek, built in 1935, and Coyote Reservoir, finished in 1936. Coyote Percolation Dam was also built at this time. Almaden and Calero were connected by the Almaden-Calero Canal, which shunted water from the relatively wet Almaden basin into the larger storage capacity afforded by Calero Reservoir.[4] The *San Jose Mercury Herald* explained the system to its readers in November 1934:

> EQUALIZE STORAGE … Between the Almaden and the Calero reservoirs will run a four-mile equalizing canal, which will be part of the project on which bids are called Monday. This canal is necessary because the Almaden canyon, which has a large watershed and run-off, has only a small reservoir areas, while the Calero canyon has a very small watershed and run-off but a large reservoir area.

The *Herald* went on to explain that the district's dams, as a system, were the "'first line of defense' in the valley's plan to conserve its run-off each year." It added, "in them is stored the excess rainfall, the flow of which is regulated to run down the respective creeks at a rate that will give maximum absorption in the gravel percolation areas farther down."[5] The district awarded construction contracts for the dams, following passage of a bond by district voters and after receiving federal Public Works Administration funds, to several companies. The award for

[3] ASCE. *Historic Civil Engineering Landmarks,* 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," 6-10, January 31, 1936, WRCA.

[4] ASCE. *Historic Civil Engineering Landmarks*. 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; *San Jose Mercury Herald*, November 17, 1934, December 15, 1934.

[5] *San Jose Mercury Herald*, November 17, 1934.

Almaden and Calero dams with their connecting canal, and the Stevens Creek Dam, went to a consortium of two construction companies, F.O. Bohnett of Campbell and the D. McDonald Company of Sacramento. The two firms had worked together in the past and provided a bid more that $300,000 below the district's Chief Engineer Tibbetts' estimated cost. At this time the Almaden Dam was described as 90 feet high and 500 feet long. It, along with Calero and Stevens Creek, were to be "of earth-fill construction, with concrete spillways and outlets at creek bed level to serve riparian owners below as well as to keep an effective percolation in the creeks."[6]

The following table lists the individual dams, their date of construction, their engineers, and the construction company that built them. It is apparent that Fred Tibbetts was the driving force behind the engineering of the system.

Dam	***Date of Construction***	***Engineer / Construction Company***
Almaden	1935	Fred Tibbetts / F.O. Bohnett & D. McDonald
Calero	1935	Fred Tibbetts / F.O. Bohnett & D. McDonald
Stevens Creek	1935	Fred Tibbetts / F.O. Bohnett & D. McDonald
Vasona	1935	Fred Tibbetts / Carl Swenson Co.
Coyote	1935-36	Fred Tibbetts / Macco Construction Co.
Coyote Percolation	1932	Fred Tibbetts / Macco Construction Co.
Guadalupe	1935	T.D. Sawyer / Teichert & Sons, Inc.

Coyote Percolation Dam was finished in 1932, and the SCVWCD finished its first six storage dams by 1936. Of these, four of which were rolled earth fill, and two were rolled earth and rock fill. With their construction, and the downstream features in the creek beds to improve percolation, it was not long before the dams began to store water and improve groundwater conditions. In 1937, groundwater levels reached 131 feet below the surface, whereas twenty years earlier it was only 56 feet. By 1943 the groundwater level in the valley returned to the average level of the 1920s (50 feet); however, increased urbanization, wartime industrial requirements, and year-round irrigation began to again adversely affect the water table. As a result the district decided to build two additional dams (Lexington, storing 20,210 acre feet, and

[6] *San Jose Mercury Herald*, December 15, 1934. Other bidders included some of the most famous dam building companies in California and the western US, including Morrison & Knudsen, Bechtel, Guy F. Atkinson, and Teichert & Son of Sacramento. Bohnett and McDonald were asked to reevaluate their bids, owing to the fact that they were so far below the estimate, but both agreed that their figures were firm and fair; Bohnett noted that "that is our bid, it is sound, and we stick by it." *San Jose Mercury Herald*, December 18, 1934.

Anderson, storing 91,280 acre feet).[7] The district completed Lexington Dam in 1952, and Anderson Dam in 1950. Both dams were designed by G.W. Hunt, and constructed by the Guy F. Atkinson Company.

With the success of the SCVWCD reservoir system, voters south of San Jose established the South Santa Clara Valley Water Conservation District in 1938. The new district in the south covered 34,900 acres with the goal of preventing land subsidence, increasing groundwater yields, and reducing flood flows of the creeks south of San Jose that flowed into the Pajaro River.[8] To accomplish these goals, the new district, which was managed by elected citizens and members of the Board of Supervisors, began constructing percolation facilities on area creeks. By the 1950s, the South Santa Clara Valley Water Conservation District established plans for two dams and reservoirs on the Llagas and Uvas creeks to work together as one unit.[9]

The Chesbro Dam on Llagas Creek and the Uvas Dam on Uvas Creek were engineered by the San Francisco engineering firm Blackie and Wood. Perry A. Haviland, later Alameda County Supervisor and County Engineer, and Fred R. Tibbetts originally established the firm as Haviland and Tibbetts in 1909. After graduating with a bachelor's degree in civil engineering from University of California, Berkeley in 1917, Edwin Earl Blackie worked for an irrigation district in Anderson, California. After a brief period in Southern California, Blackie moved to Sacramento and was employed as a civil engineer by the State of California.[10] He joined Tibbetts' firm after 1930 and assumed control of the firm upon Fred Tibbetts' death in 1938. Harold Ira Wood joined the firm in 1918. After working on various hydroelectric development and irrigation projects, Wood left the firm in 1930. However, in 1934, he was again associated with Tibbetts as the Supervising Field Engineer for the SCVWCD. Blackie and Wood became partners in 1939. The civil engineering firm concentrated on water conservation, flood control, reclamation, irrigation and power projects. Wood retired shortly after the Uvas Dam was completed. Blackie continued to work until 1973.

Although most of the smaller local water conservation districts had merged with SCVWCD by 1968, the people served by the South Santa Clara Valley Water Conservation District voted to

[7] ASCE. *Historic Civil Engineering Landmarks*. 28.

[8] Harold Wood, Blackie & Wood, "Report to the Honorable Board of Directors of the South Santa Clara Valley Water Conservation District on Uvas Creek Dam, Reservoir, Conduit and Well Replenishment Project Proposed to be Constructed Jointly with Santa Clara Valley Water Conservation District and on Proposed Llagas Creek Dam, Reservoir and Well Replenishment Project" Project Report No, 15 (San Francisco: Blackie and Wood, Civil Engineers, March 1953), 2-3.

[9] California History Center, *Water in Santa Clara Valley*, passim.

[10] Local Board for City of Anderson, [Draft] Registration Card # 28 and Registrar's Report # 4-3-12 A (June 5, 1917), Ancestry.com, available at http://content.ancestry.com/iexec/?htx=View&r=an&dbid=6482&iid=CA-1531273-2162&fn=Edwin+Earle&ln=Blackie &st= r&pid=29461024 accessed on July 20, 2006; U. S. Census Bureau, Fourteenth Census of the United States: 1920 - Population, Corcoran Township, Kings County, California, 1920, Sheet 7-A, line 18; U. S. Census Bureau, Fifteenth Census of the United States: 1930 Population Schedule, Sacramento City, Sacramento County, California, Sheet 3A, line 45.

remain independent. In 1981, the board of directors changed the district's name to the Gavilan Water Conservation District. SCVWD eventually annexed the south district in 1987 and assumed control of the Chesbro and Uvas dams at that time.[11]

In the years since the original set of dams were completed, relatively little was done to alter their original construction. The district has made improvements to intake structures and outlet gates, and made repairs to cracks caused by earthquakes.[12] During these years the district underwent some enlargement and changes in function, finally becoming the Santa Clara Valley Water District in the 1970s. During this time, the district constructed the Rinconada Water Treatment plant. The plant includes a large earthen embankment that is considered a dam under state regulation (see **Photograph 43**). Because it is of recent construction (1968)[13] and is not a dam in the same sense as the district's eleven storage reservoirs, it has not been included in this analysis. In addition, during these years the district received additional supplies of water from the State Water Project through the South Bay Aqueduct.[14]

[11] Santa Clara Valley Water District, "History of the Santa Clara Valley Water District" available at http://www.valleywater.org/About_Us/History/1900s_to_1940s.shtm, accessed on July 20, 2006.

[12] File for Dam Number 72-004, Almaden Dam. Division of Safety of Dams, State of California, Sacramento, California; personal communication with Tiffany Hernandez, SCVWD, October 31, 2003.

[13] Rinconada Water Treatment Plant first operated in 1968. Santa Clara Valley Water District, "Rinconada Water Treatment Plant" available at http://www.valleywater.org/Water/Water_Quality/How_we_clean_your_water/The_treatment_process.shtm, accessed on August 2, 2006.

[14] http://www.valleywater.org/About_Us/History/, accessed October 20, 2003.

3. DESCRIPTION OF THE RESOURCES

3.1. Discussion of Resource Types

Earth filled dams, with attendant concrete spillways and outlet control features, are relatively common structures. In 1979, 812 of the 1,144 dams under the jurisdiction of the State of California's Division of Safety of Dams were earth fill types (i.e., 71% of the total).[15] Of these, 517 were two to 15 meters in height, 247 were 15 to 45 meters in height, and 48 were more than 45 meters in height, including Oroville Dam, the tallest earth filled dam in the world. Of the 812 earth fill types, 585 contained less than 100,000 cubic yards of fill, while 227 contained more. In Santa Clara County, earth filled dams are the most common type. Of the 39 dams in the county, 32 are earth filled, and another four are earth and rock filled.[16]

Two of the 1930s-era dams, Coyote Percolation Dam and Vasona Dam, have large concrete gates / flashboard components. In the case of Vasona Dam, the concrete section represents a large portion (although not the majority) of the structure. Coyote Percolation Dam is almost entirely formed by steel gates and concrete abutments / related structures.

3.2. Descriptions of Properties

Almaden Dam

Like the five other SCVWCD dams built at the same time, Almaden Dam is a rolled earth fill dam, originally built with a crest length of 475 feet, and height from Almaden Creek's streambed to the spillway crest of 97 feet, and 100 feet in height over all. The dam has a freeboard of eight feet, and is 20 feet wide at the top and 545 feet wide at the base. Its side slope ratio is 2.5:1 on both the upstream and downstream sides. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 250,000 cubic yards of fill. Its outlet provides for release of a maximum of 250 cfs through a steel pipe encased in concrete placed through the dam's foundation and connecting to the stream bed and Almaden – Calero Canal (after passing beneath the spillway). At the dam crest is a small, shed roof concrete block structure with a single personnel door that serves as a valve

[15] Not all dams in California are under the jurisdiction of the Division of Safety of Dams – dams smaller than six feet in height or small total capacity, certain agricultural impoundments, water tanks, or federal structures are outside its jurisdiction. Department of Water Resources, Division of Safety of Dams. *Dams Within the Jurisdiction of the State of California*, Bulletin 17-79, December 1979, xvii.

[16] DWR/DSD. *Dams Within the Jurisdiction of the State of California*, xx. Of the remaining two, Coyote Percolating Dam is a flashboard and buttress type, while Williams Dam is a gravity structure.

control housing. The spillway is located on the eastern side of the dam, and has a capacity of 6,000 cfs. As noted above, Frederick Horace Tibbetts, an influential hydraulic engineer whose offices were in San Francisco but who resided in Santa Clara County and served as the chief engineer of the SCVWCD, designed the dam. It was built by Bohnett and McDonald. The upstream face of the dam serves as the cover photograph of this report.

There are two sets of buildings at the outlet. The first, a single rectangular, concrete masonry block building approximately ten by ten with a single personnel door and flat roof, is located in the stream bed and serves as the outlet for the dam into Almaden Creek for replenishment of groundwater downstream. The second set is comprised of two concrete block rectangular buildings with personnel doors and vents, located at the end of the outlet controlling flows into the Almaden – Calero Canal. Also at this location are manually operated slide gates on the downhill side of the canal wall, to allow for drainage into Almaden Creek, and a large steel trash rack covering the opening of the short pipe/tunnel under the spillway that carries the canal. All are part of the dam's original construction. Photographs of these features appear below.

Photograph 2. Almaden Dam, upstream face. April 17, 2006.

Photograph 3. Outlet control building in stream bed. April 17, 2006**.**

Photograph 4. Outlet control building in Almaden-Calero Canal. April 17, 2006.

Photograph 5. Upper end of spillway. April 17, 2006.

Photograph 6. Outlet control building in stream bed with downstream face of Almaden Dam in background. April 17, 2006.

Photograph 7. Concrete block valve control housing on dam crest west of spillway. April 17, 2006.

Calero & Auxiliary Dams

Two dams, the Calero Dam and the Auxiliary Dam, were constructed in 1935. Together they create the 10,050 acre-feet Calero Reservoir. Calero Dam is an earth dam, with a crest length of 840 feet, and spillway elevation of 483.5 feet, and 98 feet in height over all. The dam has a freeboard of six and a half feet, and is 20 feet wide at the top and 495 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 722,000 cubic yards of fill. The dam features a 42-inch diameter sluice inlet valve and a 30-inch diameter butterfly outlet valve. Its outlet provides for release of a maximum of 185 cfs through a 481-foot long, 36-inch diameter steel pipe. An ogee chute-style spillway is located on the east side of the dam, and has a capacity of 5,260 cfs. The spillway weir is 82 feet in length. The Auxiliary Dam is an earth filled saddle dam standing 40 feet high with a crest length of approximately 500 feet. Constructed at the same time as the Calero Dam, the Auxiliary Dam is located about 1,167 yards east of Calero Dam. The dam has a freeboard of six and a half feet, and is 20 feet wide at the top. Fellows Dike serves to protect a ranch established prior to the main Calero Dam's constructions from flooding from the reservoir.

Photograph 8. Concrete block valve control housing on Calero Dam, camera facing west. April 17, 2006.

Photograph 9. Calero Spillway, camera facing northeast. April 17, 2006.

Photograph 10. Calero Dam control & outer buildings, camera facing southeast.
April 17, 2006.

Photograph 11. Calero Auxiliary Dam, camera facing west. April 17, 2006.

Photograph 12. Fellows Dike, camera facing north. April 17, 2006.

Coyote Dam

Coyote Dam was constructed in 1935-1936. It is a rolled earth filled dam, with a crest length of 970 feet, and height of the spillway crest elevation 779.9 feet. The dam has a freeboard of 25 feet, and is 100 feet wide at the top and 945 feet wide at the base. Its slopes have ratios of 4:1 below an elevation of 718 feet, and 3.5:1 from elevations 718 to 758 feet, and 3:1 above an elevation of 758 feet. It originally contained 1.2 million cubic yards of fill. The intake valves consist of slide gates. A modern concrete outlet tunnel features 48-inch diameter fixed cone and six-inch diameter ball valves. In 1990, the Anderson Pacific Company installed a 702-foot long concrete lined outlet tunnel with a 96-inch diameter. Anderson Pacific sealed the original outlet closed with grout. Its outlet provides for release of a maximum of 450 cfs. In 1984/1985 the entire spillway was replaced due to severe deterioration. An ogee section spillway is located on the north side of the dam, and has a capacity of 33,000 cfs. The spillway leads to the modern outlet chute. The spillway weir is 110 feet in length. Behind the dam, the Coyote Reservoir has a 22,925 acre-feet capacity. The Anderson and Coyote dams are operated as a system.

At the crest of the dam is a building that is used to house outlet chute controls. It is topped with a shed roof and sided in smooth stucco. Set in the north wall are metal louvered vents and several metal pipes. The building is accessed by two flush, metal, single-leaf doors.

Photograph 13. Coyote Dam, camera facing west. February 8, 2006.

Photograph 14. Coyote Dam Spillway. February 8, 2006.

Photograph 15. Coyote Dam outlet control building (new). February 8, 2006.

Coyote Percolation Dam:

Coyote Percolation Dam was constructed in 1932. It is a low concrete weir located in the stream bed of the Coyote River at Metcalf Road. The pond is formed by an 8-foot high removable flashboard dam, with a reinforced concrete floor and concrete abutments. The pond is 32 acres and percolates natural flow at medium river stages and also storage flow from Anderson Dam when the natural flow is low or decreased. The structure is equipped with two large booms for placing and removing the flashboards. The weir can be flashed up to the approximate height of the channel banks, approximately 20 feet above the streambed. This structure is located on a channel that crosses Coyote Creek, and rests on clay and gravel banks of the stream channel. The spillway weir is 110 feet in length. Behind the dam, the Coyote Reservoir has a 22,925 acre-feet capacity. The Anderson and Coyote Percolation Dams are operated as a system.

Photograph 16. Coyote Percolation Dam, camera facing north. February 8, 2006.

Photograph 17. Coyote Percolation Dam radial gates, camera facing east.
April 17, 2006.

Photograph 18. Coyote Percolation Dam, modern fishway, camera facing west.
April 17, 2006.

Guadalupe Dam:

Guadalupe Dam, constructed in 1935, is a rolled earth filled dam, with a crest length of 650 feet, and an elevation of 617.3 feet. The dam is 129 feet in height over all. The dam has a freeboard of 9.7 feet, and is 20 feet wide at the top and 650 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. The dam also features a functional curb, which was constructed when the freeboard was restored in 1972. It originally contained 612,000 cubic yards of fill. The dam features a 42-inch diameter sluice gate intake valve and a 30-inch diameter butterfly outlet valve. Its outlet provides for release of a maximum of 235 cfs through a 720-foot long, 36-inch diameter steel pipe. A side channel spillway is located on the south side of the dam, and has a capacity of 6,000 cfs. The spillway weir has a length of 80 feet. Behind the dam, the Guadalupe Reservoir has a capacity of 3,228 acre-feet.

There are two buildings associated with this dam. Along the upstream face of the dam is a single rectangular, concrete instrument storage structure. Small metal doors along the structure's shed roof access the instruments inside. This structure was the location for the dam's plaque, which has been removed. The second structure is located at the upstream (west) side of the dam, and is the storage location for outlet pipe instruments. It is a single rectangular, concrete masonry block building with a flat roof and parapet walls. There are screened openings on two of its sides. This building is accessed through a flush, metal single-leaf door.

Photograph 19. Guadalupe Dam. April 17, 2006.

Photograph 20. Guadalupe Dam spillway. April 17, 2006.

Photograph 21. Guadalupe Dam concrete block control building. April 17, 2006.

Stevens Creek Dam:

Stevens Creek Dam was constructed in 1935. It is a rolled earth filled dam, with a crest length of 1,000 feet, its spillway elevation is 534.9 feet, and 129 feet in height over all. The dam has a freeboard of 19.2 feet, and is 20 feet wide at the top and 750 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 567,000 cubic yards of fill. The dam features two 42-inch diameter sluice intake valves and two 30-inch butterfly outlet valves. Its outlet provides for release of a maximum of 410 cfs through an 890-foot long, 50-inch diameter steel pipe. A side channel spillway is located on the south side of the dam, and has a capacity of 15,715 cfs. The spillway weir has a length of 172 feet. Behind the dam, the Stevens Creek Reservoir has a 3,465 acre-feet capacity. There are several structures at the dam site. An instrument storage box, adjacent to a shed, is located on the dam's upstream (north) side. The instrument box is sided in concrete masonry block, rests on a concrete foundation, and is the location of the dam's bronze plaque. The building adjacent to it also rests on a concrete foundation, is topped with a shed roof and is sided in concrete masonry block. One flush, metal, single-leaf door serves as the entrance to this building. At the dam's downstream (rear) side to the east, is an outlet pipe structure. It is a small, rectangular, concrete masonry building with a flat roof and parapet walls. Two metal hatches are located on the roof. A flush, metal, single-leaf personnel door accesses the building. Another instrument storage box is located along the dam's upstream side, slightly further south than the instrument box described above. Two metal hatches at the structure's roof access the instruments inside.

Photograph 22. Stevens Creek Dam, camera facing east. April 17, 2006.

Photograph 23. Stevens Creek Dam spillway, camera facing south. April 17, 2006.

Photograph 24. Stevens Creek Dam concrete block control building. April 17, 2006.

Photograph 25. Stevens Creek Dam outlet building, camera facing east. April 17, 2006.

Vasona Dam

Vasona Dam, constructed in 1935, is a rolled earth and concrete buttress dam, with a crest length of 1,000 feet. Its spillway elevation is 294.8 feet, and 30 feet in height over all. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 70,000 cubic yards of fill. The concrete buttress spillway is located on the west side of the dam, and has a capacity of 12,600 cfs. The dam has a freeboard of ten feet, and is 20 feet wide at the top and 153 feet wide at the base. Its side slope ratio is 2:1 on its upstream side and 3:1 at its downstream slope. Outlet valves consist of a 42-inch diameter slide gate and two 13-foot by 10-foot radial gates. Its outlet provides for release of an estimated maximum of 125 cfs through a 20-foot long, 42-inch diameter pipe. Vasona Reservoir has a 400 acre-feet capacity

Photograph 26. Vasona Dam, camera facing south. April 17, 2006.

Photograph 27. Vasona Dam, radial gate and flashboard section, camera facing north. April 17, 2006.

Photograph 28. Vasona Dam flashboard section and concrete apron, camera facing north. April 17, 2006.

Photograph 29. Vasona Dam concrete section, camera facing north. April 17, 2006.

Anderson Dam

Anderson Dam is a rolled earth and rock fill dam, with a crest length of 1,385 feet, and height from Coyote Creek's streambed to the spillway crest of 625 feet, and 240 feet in height over all. The dam has a freeboard of 19.5 feet, and is 40 feet wide at the top and 1,100 feet wide at the base. The dam's intake valves consist of three 60-inch by 84-inch sluice gates. There are three outlet valves, a 12-inch diameter polyjet valve, a 48-inch diameter butterfly valve, and a 42-inch diameter butterfly valve. Its outlet provides for release of a maximum of 550 cfs through a 1,160-foot long, 49-inch diameter steel pipe. An ogee chute style spillway is located on the west side of the dam, and has a capacity of 57,400 cfs. The spillway weir is 223 feet in length. Behind the dam, Anderson Reservoir has an 89,073 acre-feet capacity. The Anderson Dam functions together with the Coyote Dam. As the dams are operated as a system, the State of California Department of Water Resources, Division of Safety of Dams (DSOD) imposes a restriction on the capacity of the two dams.

A modern restroom has been constructed at the dam's west side. It is a concrete block building, topped with a front gable metal roof that contains a monitor skylight. Another concrete block building located on the west side of the dam and reservoir is topped with a flat roof. This building contains a set of flush doors and one flush single-leaf door. A third concrete masonry building is located on the dam and is topped with a flat roof. A single, slab single-leaf door serves as its entrance.

At the rear of the dam (north side) is a building with a removable shed roof, its walls sided in stucco. A flush single-leaf metal door accesses this instrument building. Also at the rear of the dam, near the outlet chute, is another control building that is topped with a flat roof, sided in poured concrete and accessed by a flush metal door.

Photograph 30. Anderson Dam, camera faxing north. April 17, 2006.

Photograph 31. Anderson Dam spillway. April 17, 2006.

Photograph 32. Anderson Dam, modern control building, camera facing northwest. April 17, 2006.

Photograph 33. Anderson Dam outlet control buildings, camera facing southeast. April 17, 2006.

Lexington (Lenihan) Dam

Lexington (now Lenihan) Dam is a rolled earth filled dam, with a crest length of 830 feet, and 195 feet in height over all. The dam has a freeboard of 16.7 feet, and is 40 feet wide at the top and 1,370 feet wide at the base. Alma Bridge Road roadway crosses the crest, and because of this the crest slopes across the axis from the middle of the roadway towards the upstream and downstream faces for drainage purposes. Therefore, the dam's side slope ratio is 5.25H:1H down to elevation 648, and 5.5H:1V from elevation 648 to the upstream toe. It originally contained 2,124,000 cubic yards of fill. The dam's inlet valves consist of two 36-inch diameter butterfly valves and a 16-inch diameter sluice gate. Its outlet provides for release of a maximum of 410 cfs through a 50-inch diameter steel pipe and a 48-inch diameter RCP pipe with a combined length of 1,573 feet. An ogee chute spillway is located on the west abutment of the dam, and has a capacity of 43,500 cfs. The spillway weir is 150 feet in length. Behind the dam, the Lexington Reservoir has a 19,044 acre-feet capacity.

Photograph 34. Lexington (Lennihan) Dam, camera facing west. April 17, 2006.

Photograph 35. Lexington (Lennihan) Dam control building, camera facing southeast. April 17, 2006.

Photograph 36. Lexington (Lennihan) Dam spillway, camera facing west. April 17, 2006.

Photograph 37. Lexington (Lennihan) Dam modern spillway channel bridge, camera facing west. April 17, 2006.

Chesbro Dam

Chesbro Dam is a rolled earth filled dam, with a crest length of 690 feet, and height from Llagas Creek's streambed to the spillway crest of 525 feet, and 95 feet in height over all. **(Photographs 38-39)** The dam has a freeboard of ten feet, and is 20 feet wide at the top and 428 feet wide at the base. Its side slope ratio is 2:1 on both the upstream and downstream sides. It contains 467,000 cubic yards of fill. The dam features both a 54-inch diameter butterfly inlet valve and a butterfly outlet valve. Its outlet provides for release of an estimated maximum of 740 cfs through a 480-foot, 56-inch diameter steel pipe. A side channel spillway is located on the northwest side of the dam, and has a capacity of 11,000 cfs. The spillway weir is 203 feet long. Behind the dam, the Chesbro Reservoir has an 8,952 acre-feet capacity.

There are several buildings along the dam and the outlet chute. The first is located on the eastern shore of the reservoir away from the dam itself. It is a 6' x 8' concrete masonry building and is topped with a shed roof. Two flush, metal, single-leaf doors access the building. The building also serves as the location of the dam's plaque.

The outlet pipe and instrument building are located on the dam's rear (south) side. The outlet pipe is covered in board-formed concrete and an instrument building rests upon it. This concrete masonry building is topped with a shed roof sheathed in rolled composition shingle.

On the face of the dam on its east end is a concrete block building that is topped with a shed roof. The building rests on a concrete foundation and contains a flush, single-leaf metal door. An identical concrete masonry building with a shed roof is located at the east side of the dam.

Photograph 38. Chesbro Dam, camera facing east. April 17, 2006.

Photograph 39. Chesbro Dam spillway ogee, camera facing west. April 17, 2006.

Photograph 40. Chesbro Dam outlet, camera facing northwest. April 17, 2006.

Photograph 41. Chesbro Dam concrete block control building, camera facing south. The upstream face of the dam is visible in the background. April 17, 2006.

Photograph 42. Chesbro Dam concrete block control building. April 17, 2006.

Uvas Dam

Uvas Dam is a rolled earth and rock filled dam, with a crest length of 1,100 feet, and height from Uvas Creek's streambed to the spillway crest of 487.5 feet, and with a over all height of a 105 feet. **(Photograph 43)** The dam has a freeboard of 12.5 feet, and is 20 feet wide at the top and 600 feet wide at the base. Its side slope ratio is between 2H:1V and 3 ½ H:1V on both the upstream and downstream sides. It contains 800,000 cubic yards of fill. The dam features a 42-inch sluice intake valve, a 30-inch diameter butterfly outlet valve, and a 20-inch diameter gate outlet valve. Its outlet provides for release of an estimated maximum of 165 cfs through an 850-foot long, 36-inch diameter steel pipe. An ogee chute style spillway is located on the south side of the dam. **(Photograph 44)** Behind the dam, the Uvas Reservoir has a 9,935 acre-feet capacity.

At the outlet of the dam is a building once used as an office for the Gavilan Water Conservation District when it owned and operated Uvas Dam. This rectangular brick masonry building rests on a concrete foundation and is topped with an offset, side gable roof sheathed with composition shingles. The bricks curve at the building's corners. The front door and a concrete slab porch are sheltered under the elongated side of the roof. **(Photograph 45)** Scalloped, vertical wood trim is located in the gables. All of the building's windows and the door are covered with plywood.

The dam site has several instrument storage and outlet structures: a concrete control structure, a concrete outlet structure, a concrete access pump structure that is covered by a metal top, and a stucco instrument shed, located to the side of the outlet chute that is sided in concrete block and has metal louvered vents. Adjacent to this structure is a concrete valve box**.** Another concrete block building with a shed roof is located at the downstream side of the dam (**Photograph 46**). Two concrete seepage weirs, shown in **Photographs 47,** are located on the downstream side of the dam as well as in a small pool of water at the downstream toe of the dam. Also at the rear of the dam is a metal outlet chute.

Photograph 43. Crest of Uvas Dam, camera facing west. April 17, 2006.

Photograph 44. Uvas Dam Spillway, camera facing east. April 17, 2006.

Photograph 45. Former Gavilan Water Conservation District office building, camera facing east. April 17, 2006.

Photograph 46. Instrument structure and concrete valve box. April 17, 2006.

Photograph 47. Concrete seepage weirs on the downstream face of Uvas Dam. April 17, 2006.

The Rinconada Water Treatment plant includes a large earthen embankment that is considered a dam under state regulation. A photograph of it appears below (see **Photograph 48**). As noted above, it is of recent construction (1968) and is not a dam in the same sense as the district's eleven storage reservoirs, it has not been included in this analysis.

Photograph 48. Rinconada Water Treatment Plant, camera facing west. April 17, 2006.

4. EVALUATION OF SIGNIFICANCE

4.1. Summary of National Register and CEQA Eligibility Status

The eleven main SCVWD dams and their associated outlet and control structures are the resources studied for this evaluation. Seven of the dams appear to meet the criteria for listing in the National Register of Historic Places and the California Register of Historical Resources as contributors to a discontiguous historic district. The remaining four dams do not appear to meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

Summary of Evaluation of SCVWD Dams: National Register and California Register / CEQA Guidelines:

Name	Evaluation	Construction Date
Coyote Percolation Dam	Eligible as part of a discontiguous district	1932
Coyote	Eligible as part of a discontiguous district	1935-36
Almaden	Eligible as part of a discontiguous district	1935
Calero	Eligible as part of a discontiguous district	1935
Vasona	Eligible as part of a discontiguous district	1935
Guadalupe	Eligible as part of a discontiguous district	1935
Stevens Creek	Eligible as part of a discontiguous district	1935
Anderson Dam	Not eligible	1950
Lenihan Dam	Not eligible	1952
Chesbro Dam	Not eligible	1955
Uvas Dam	Not eligible	1957

4.2. Criteria of Significance

The eligibility criteria for listing in the National Register of Historic Places are codified in 36 CFR Part 60. They are further expanded upon in numerous guidelines published by the Keeper of the National Register.[17] Eligibility to the National Register of Historic Places rests on twin factors: significance and integrity. A property must have both significance and integrity to be

[17] The most widely accepted guidelines are contained in U.S. Department of the Interior, *Guidelines for Applying the National Register Criteria for Evaluation*, National Register Bulletin 15. (U.S. Government Printing Office: 1991).

considered eligible for listing on the National Register. Loss of integrity, if sufficiently great, will overwhelm the historical significance of a resource and render it ineligible. Likewise, a resource can have complete integrity, but if it lacks significance, it must also be considered ineligible.

Integrity is determined through application of seven factors: location, design, setting, workmanship, materials, feeling, and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship, as they apply to historic buildings, relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria, pertaining to the overall ability of the property to convey a sense of the historical time and place in which it was constructed.

Historical significance is judged by application of four criteria, denominated A through D.

> Criterion A: association with "events that have made a significant contribution to the broad patterns of our history"
> Criterion B: association with "the lives of persons significant in our past"
> Criterion C: resources "that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction"
> Criterion D: resources "that have yielded, or may be likely to yield, information important to history or prehistory."[18]

To apply these criteria, it is necessary to address both significance and integrity because the period of significance establishes the baseline or standard against which integrity is measured. In addition, a resource must be at least fifty years old in order to be eligible to the National Register, unless it meets specific and exacting criteria for special significance.

The eligibility criteria for listing a property in the California Register closely parallel that of the National Register of Historic Places. CEQA requires consideration of the possible impacts to and the evaluation of historic resources using the criteria set forth by the California Register of Historic Resources (CRHR). Each resource must be determined to be *significant* under the local, state, or national level under one of four criteria, paraphrased below, in order to be determined eligible:

[18] Criterion D is largely applied to archeological sites and, therefore, is not used in the evaluation of most historic architectural resources.

Criterion 1: Resources associated with important events that have made a significant contribution to the broad patterns of our history.
Criterion 2: Resources associated with the lives of persons important to our past.
Criterion 3: Resources that embody the distinctive characteristics of a type, period, or method of construction, or represents the work of a master.
Criterion 4: Resources that have yielded, or may be likely to yield, information important in prehistory or history.[19]

4.3. General Discussion of Historical Significance in Reference to SCVWD Dams

The resources inventoried in this report are associated directly with the Santa Clara Valley Water District's water development system in the Santa Clara Valley of California. The dams were important components in the initial mid 1930s to mid 1950s construction of the system, supplying important municipal and domestic water, flood protection and irrigation water to Santa Clara Valley.

The San Francisco Section of the American Society of Civil Engineers recognized the Santa Clara Valley Water Conservation District system (of which the dams are a part) in 1976 as a "historic civil engineering landmark." While this designation, by itself, imparts no particular regulatory status, it represented a strong statement and acknowledgment of the system's significance to interested northern California civil engineers.[20] The report prepared by the ASCE San Francisco Section listed two "special notes" regarding the SCVWCD system as a whole:

1. This system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin.

[19] Like Criterion D of the National Register, Criterion 4 of the California Register is largely applied to archeological sites and, therefore, is not used in the evaluation of most historic architectural resources; California Public Resources Code, Sections 4850 through 4858; California Office of Historic Preservation, "Instructions for Nominating Historical Resources to the California Register of Historical Resources," August 1997.

[20] ASCE. *Historic Civil Engineering Landmarks*. 29. The Historic Civil Engineering Landmark Program recognizes historically significant local, national, and international civil engineering projects, structures, and sites. The Historic Civil Works award recognizes projects that were built prior to the advent of engineering as a discipline in the 18th century. The objectives of the program are to: 1) Encourage all civil engineers to become more aware of the history and heritage of their own profession; 2) Increase appreciation by the public of civil engineering contributions to the progress and development of the United States and the world. 3) Identify and designate national historic civil engineering works that have made a significant contribution to the development of the United States and to the profession of civil engineering in particular. 4) Encourage, where appropriate and feasible, the preservation of significant historic civil engineering works. 5) Provide a documented archive of Civil Engineering Historic Landmarks for the use of engineering students, professional writers, researchers, and historians. 6). Promote the inclusion of information on Historic Civil Engineering Landmarks in encyclopedias, guidebooks, and maps used by the general public. (From the ASCE web site, http:// www.asce.org/history/hp_resguide2.html).

2. This water supply development facilitated the post World War II growth of the Santa Clara Valley into one of the major metropolitan areas of the country.[21]

However, even with this designation in mind, it does not appear that the entire population of SCVWD dams meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources; rather, only those that were part of the district's original plan from the 1930s would appear to meet this standard.

Several general observations regarding dams merit discussion by way of introduction. The first observation is an obvious but important point: there are many earth fill dams in California. As noted above, 71% of dams in California under the jurisdiction of the Division of Safety of Dams (as of 1989) are of earth fill construction. Collectively, all of these dams serve important functions, and the dams of the SCVWCD obviously benefited the region's urban areas and agriculture. Individually, however, any one of the district's dams is simply part of a larger system and one of a vast number of similar properties.

Second, it is important to understand dams in general as part of a class of infrastructure improvements that deliver benefits to broad constituencies. Certain types of improvements fit this definition of infrastructure. Most public works projects fall into this category, including state and local road systems, municipal water systems, sewer systems, hospitals, schools, airports, and the like. Major utility features also fall into this category, including electric power generating plants, natural gas pipelines, railroads, and telephone service. These elements of the infrastructure are obviously important to the communities they serve. In time, members of the community come to rely upon these elements for their basic needs, the roads they drive, water they drink, electricity they use, and so forth. Thus, in many communities, dams, with their domestic water and irrigation systems, are essential elements of the infrastructure.

This point is useful in appreciating how significance might be assessed for such properties. In a sense, every element of the infrastructure is important. Unless judgment is exercised, however, every dam, road, bridge, telephone line and sewer system might be seen as eligible for the National Register for its contribution to the local community and its development. To avoid that overbroad conclusion, such infrastructure elements must be assessed within the context of similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating dams.

It is difficult to establish a single standard for what might constitute significance for a dam because there are several areas in which that significance might come into play. In general,

[21] ASCE. *Historic Civil Engineering Landmarks*, 28.

however, the test would be some aspect of importance that is not common to other dams in the region or state. Innovation might be one test: for example, was the dam the first to be built specifically to recharge a local aquifer? This was one of the reasons the ASCE San Francisco section considered the SCVWCD system an engineering landmark. Size or engineering achievement might be another test, if a dam was unusual for its design, or represented a breakthrough in the science of dam engineering, or represents a rare example of its type.

Another consideration in evaluating significance for dams is to establish a defensible period of significance. The period of significance should be defined, taking into account the area of significance. If a dam is significant for its design, the period of significance should be restricted to the era in which the dam was built. If it is important for its contribution to the initial settlement of a region, the period of significance should be restricted to the settlement period.

Finally, integrity should be assessed on the basis of the period of significance for a property. A property's integrity should be specifically tied to its period of significance, a linkage that is derived from National Register guidelines and regulations. The property must retain integrity to its potential period of significance if it is to meet the criteria for listing in the National Register of Historic Places or as an important resource under California law and regulations.

4.4. Evaluation of SCVWD Dams and Their Appurtenant Structures

The following discussion presents an evaluation of Almaden, Vasona, Stevens Creek, Guadalupe, Coyote, Calero, and Coyote Percolation dams (hereafter referred to as the SCVWD 1930s dams) as a discontiguous district under National Register / California Register significance criteria A / 1 and C / 3; the dams also retain sufficient integrity to merit such a listing. An evaluation of the resources addressed by this report is also included on the DPR 523 forms attached in Appendix B.

Criterion A or 1: The SCVWD 1930s dams are the original and integral units of the SCVWCD's system, which played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. The SCVWCD system was important in the economic development of the Santa Clara Valley, because it provided a steady, reliable, and consistent supply of water for municipal, industrial, and agricultural uses. While any dam might be considered important this way, the construction of the seven dams as a unified system provided for continued development on a scale that was larger and provided a supply more certain than that that might have been provided by any single such structure. The fact that later dams provided additional supplies, or that the area receives water from other systems, including (in more recent years) the State Water Project, does not diminish the importance of the original seven. While it is unlikely that construction and operation of the SCVWCD system, as a whole, was the sole driving force behind the economic development of the area, it did play a significant and lasting role in this context.

Criterion B or 2: Research did not suggest that the resources subject to this study have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore none of the properties appear eligible under this criterion. While the original system is closely associated with Fred H. Tibbetts, an influential hydraulic engineer, it is inappropriate to use its association with Tibbetts under Criterion B or 2 to evaluate the dam, as it would better be considered under Criterion C or 3, as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: do the SCVWD 1930s dams exhibit particular significant design or engineering characteristics, and is it the work of a master engineer? Each of these considerations will be addressed in turn.

First, the SCVWD 1930s dams are structures of common design that represented no particular engineering achievement at the time they were constructed. Earth fill dams were common in the 1930s. Of the 811 earth fill dams under the jurisdiction of the state, 197 have dates of construction prior to 1936, some dating to as early as 1850 and 1851. Interestingly, Harold I. Wood, the field supervising engineer on the SCVWCD project had recently been involved in construction of the El Capitan Dam in San Diego County. That dam was described as the largest earth fill dam in the world in 1934.[22] Nothing in the accounts of district's dams' construction suggests that they were designed and built through anything other than a standard process.

Second, were the SCVWD 1930s dams an innovative system, as the San Francisco Section of the ASCE maintained? Certainly, the concept of using a dam to flood an aquifer had been done before in northern California; it was this idea that the Spring Valley Water Company used in building Sunol Dam on Alameda Creek to saturate the lands behind the structure.[23]

The SCVWCD's supporters acknowledged that the concept was not particularly innovative, noting in 1931 that "the plan has the unanimous approval of engineers here and elsewhere." They added, "it has been used successfully throughout Southern California for many years."[24] In addition, the History and Heritage Committee of the Los Angeles Section of the ACSE listed three landmarks in May of 1974 that were structures that served similar functions: the Deep Gallery Spreading Grounds of the City of Los Angeles (1904), Pecoles Canyon Submerged Dam

[22] DWR/DSD, *Dams Within the Jurisdiction of the State of California*, 1-52; *San Jose Mercury Herald*, December 5, 1934.

[23] Interestingly, the San Francisco Section called out the Sunol System as an historic civil engineering landmark as well. ASCE, *Historic Civil Engineering Landmarks*.

[24] Tibbetts, *Report to the Honorable Board of Directors*, May 8, 1934. See "Statement by the General Water Advisory Committees."

(1886-87), and the Spreading Grounds of the Los Angeles County Flood Control Project (1917-32).[25] That being said, the significance of the SCVWD 1930s dams as a system is that water in the system's reservoirs was (and is) used to replenish downstream groundwater; as noted above, this fact was reported by the San Francisco Section, which stated "this system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin."

Third, was this dam the work of a master, in this case Frederick Horace Tibbetts (1882-1938), and if so, was it an important example of his work? Tibbetts was an influential hydraulic engineer of northern California, and with his partner Stephen Keiffer was responsible for many important projects. Tibbetts also served as an advisor to the State of California during development of the State Water Plan in the 1920s. It was Tibbetts and Keiffer who developed the original concept of the SCVWCD system, and it was Tibbetts who designed six of the seven dams of the system's original phase of construction between 1934 and 1936. He died in 1938, soon after the first phase of the system was completed. The ASCE prepared a biography of Tibbetts in 1940. In it they noted,

> Fred H. Tibbetts will probably be best remembered for his extensive flood-control, reclamation, and irrigation work in the Sacramento Valley and his highly successful water-conservation project in the Santa Clara Valley. However, his field of activity during a period of some thirty years of engineering practice extended well beyond the limits of the State of California, and embraced many of the varied branches of the profession. Few engineers in the history of California have contributed so extensively to the development of its agricultural lands and the control and conservation of its waters.
>
> … The second outstanding irrigation project [the other being for the Nevada Irrigation District] was one undertaken for the Santa Clara Valley Water Conservation District for the purpose of replenishing the underground water supply. The district, largely planted to orchards, was irrigated almost entirely by pumping from wells and, to 1934, the ground-water table had been dropping continuously at the rate of about 5 ft per year until some of the pumping lifts were in excess of 200 ft. This condition was remedied by the construction of six detention reservoirs in the foothills and various regulating and distributing works in stream beds designed to retard runoff and induce percolation into the underground storage basin. A definite rise of the ground-water level has been experienced since completion of this work. The total cost of this project was about $3,000,000.[26]

[25] History and Heritage Committee of the Los Angeles Section of the ASCE, "Summary of Historic Civil Engineering Landmarks." Dated May 1974, updated to July 1980.
[26] *Transactions,* vol. 105 (New York: American Society of Civil Engineers, 1940), 1924-1928.

Tibbetts was also placed in the Silicon Valley Engineering Hall of Fame, in recognition of his contributions to the Santa Clara Valley:

> Fred H. Tibbetts was the first Chief Engineer for the Santa Clara Valley Water Conservation District, the predecessor to the Santa Clara Valley Water District. In the early years of the twentieth century, he was a leader in the development and implementation of a master plan for local surface and groundwater development that still serves Santa Clara County's growing population. His vision of a system of dams, reservoirs, canal, and percolation facilities directly contributed to making available adequate water supplies and to the curtailment, in later years, of rapidly-advancing ground surface subsidence and saltwater intrusion.
>
> Mr. Tibbetts was a practicing civil engineer who lived in Campbell, California and performed his engineering studies of Santa Clara Country water resources in the 1920s and 1930s. Water historians agree that Mr. Tibbetts' contributions to the development of Santa Clara County place him among the true visionary engineering leaders of his time. His ingenious blueprint for water conservation dramatically influenced the development of the Valley and has provided opportunities for generations of people and industries that have made Santa Clara Valley their home.
>
> In 1976, the American Society of Civil Engineers recognized as a historic landmark the system of dams and reservoirs constructed in Santa Clara County under Mr. Tibbetts' guidance. The project was cited as "the first and only instance of a major water supply being developed in a single" groundwater basin involving the control of numerous independent tributaries to effectuate almost optimal conservation of practically all the resources of water flowing into the basin." Mr. Tibbetts' contributions are recorded in the book "Water in the Santa Clara Valley: a History" published in 1981 by the California History Center of De Anza College.[27]

These factors indicate that the SCVWD 1930s dams and their associated features can be considered the work of a master, Fred H. Tibbetts, and thus appear to meet the criteria for listing in the National Register of Historic Places under Criterion C and the California Register of Historical Resources under Criterion 3. Interestingly, Tibbetts' ashes are interred in a concrete addition to the original control structure on Coyote Dam.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important.

[27] Silicon Valley Engineering Hall of Fame website, available on line: http://www.svec.org/hof/1992.html, accessed July 25, 2006.

Integrity

As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. The SCVWD 1930s dams have retained a very good level of integrity in all seven measures. They remain, obviously, in their original location, the settings of which are largely unchanged from its original construction beyond the growth of trees and construction of scattered residences in the surrounding areas. They have not, over-all, been substantially altered, although Coyote Dam has received a new outlet tunnel, Coyote Percolation Dam has received a new fishway, and several of the dams have had minor changes to intake structures (typically located beneath the water surface) and minor changes around the outlet structures. The result is that the dams retain integrity of design, workmanship, and materials. They remain part of the SCVWD's system, so its association also has been retained. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while at or while viewing the site. All of the dams have a strong sense of time and place.

Period of Significance for the SCVWD 1930s Dams

The period of significance for the SCVWD 1930s dams would start in 1932, with construction of the Coyote Percolation Dam, through 1950, when construction of the second generation of dams began.

Discontiguous District Boundaries

The dams are widely separated by distance, located in different streamsheds. It is therefore logical to consider them as a discontiguous district in which the dams and their appurtenant features are considered contributing elements. For the purposes of this evaluation, the SCVWD 1930s dams' discontiguous district boundaries are the footprint of the individual dams themselves, as shown in APE maps in Appendix A.[28]

The 1950s-Era Dams

Four dams – Anderson, Lexington (now Lenihan), Uvas, and Chesbro – were either built by the SCVWD or other districts that have since been subsumed into the SCVWD. They are additive to the original plan, and provide additional water supplies. They were built after a sufficient period of time, and in two cases by a different agency, so that they should be considered as separate resources and not as part of the discontiguous district or as a district of their own. They do not have the connection to the original plan, or to Tibbetts, and thus do not appear to meet the criteria for listing in the National Register or California Register.

[28] The APE maps for the facilities are arranged in alphabetical order.

5. FINDINGS AND CONCLUSIONS

JRP Historical Consulting Services prepared this report to evaluate eleven dams and their associated control structures for their eligibility for listing on the National Register of Historic Places or the California Register of Historical Resources. The purpose of this document is to comply with applicable sections of the National Historic Preservation Act and the implementing regulations of the Advisory Council on Historic Preservation as these pertain to federally-funded undertakings and their impacts on historic properties. This report concludes that the SCVWD 1930s dams and their associated control structures appear to meet the criteria for listing in the National Register or under CEQA Guidelines.

Summary of Evaluation of SCVWD Dams: National Register and California Register / CEQA Guidelines:

Map Reference No.	Name	Evaluation	Construction Date
1	Coyote Percolation Dam	Eligible as part of a discontiguous district	1932
2	Coyote	Eligible as part of a discontiguous district	1935-36
3	Almaden	Eligible as part of a discontiguous district	1935
4	Calero	Eligible as part of a discontiguous district	1935
5	Vasona	Eligible as part of a discontiguous district	1935
6	Guadalupe	Eligible as part of a discontiguous district	1935
7	Stevens Creek	Eligible as part of a discontiguous district	1935
8	Anderson Dam	Not eligible	1950
9	Lenihan Dam	Not eligible	1952
10	Chesbro Dam	Not eligible	1955
11	Uvas Dam	Not eligible	1957

The dams and their outlet structures within the APE for this study have been recorded and evaluated using the standards outlined by the OHP in its pamphlet *Instructions for Recording Historical Resources* (March 1995).

5.1 Analysis of Effect

Chapter 1 contains a project description for this undertaking. It is the conclusion of this analysis that seven of the eleven dams (or, in the case of Calero Dam, complexes) are eligible for listing in the National Register of Historic Places as a discontiguous district. If this evaluation is concurred with by the lead federal agency and California State Historic Preservation Officer, a Finding of Effect analysis should be prepared to assess if the proposed undertaking will have an adverse effect on the resources that make up the district. If the analysis indicates that the effect is adverse, the district will need to establish a mitigation plan for those adverse effects through a memorandum of agreement with the lead federal agency and the Office of Historic Preservation.

6. PREPARERS' QUALIFICATIONS

This project was conducted under the direction of Rand Herbert (M.A.T. in History, University of California at Davis), a principal at JRP with more than 27 years experience conducting these types of studies. Mr. Herbert conducted the field survey, directed the research, and wrote the main portions of the historic context, description of resources, and evaluations for this report. Based on his level of education and experience, Mr. Herbert qualifies as an architectural historian and historian under the United States Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

Former JRP staff historian Julia Cheney (Public History M.A. program at California State University, Sacramento) assisted in fieldwork, prepared portions of the form, mapping and report production. Ms. Cheney qualifies as an historian under the United States Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61). Ms. Cheney is now employed by MHA Environmental Consultants Inc.

Mr. Herbert was assisted in report preparation and production by staff historian Kathleen Kennedy (MA in History, California State University, Sacramento). Ms. Kennedy qualifies as an historian under the United States Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

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http://www.fobbf.org/roots_dam.html, accessed October 20, 2003.

Maps

USGS. *Santa Teresa Hills, California.* 7.5 Minute Quadrangle, 1953, 1968.

Personal Communications

Tiffany Hernandez, SCVWD, October 31, 2003.

Appendix A: Maps

Error!

Appendix B: DPR523 Forms

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code 6Z
Other Listings ______
Review Code ______ Reviewer ______ Date ______

***Resource Name or #** (Assigned by recorder) Anderson Dam

P1. Other Identifier: Leroy Anderson Dam

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Morgan Hill **Date** 1955 (1980) **T**9S; **R** 1E; MD **B.M.**
c. Address City Zip
d. UTM: (give more than one for large and/or linear resources) Zone: 10; 621496 mE, 4114169 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Anderson Dam is a rolled earth and rock fill dam, with a crest length of 1,385 feet, and height from Coyote Creek's streambed to the spillway crest of 625 feet, and 240 feet in height over all. **(Photograph 1)** The dam has a freeboard of 19.5 feet, and is 40 feet wide at the top and 1,100 feet wide at the base. The dam's intake valves consist of three 60-inch by 84-inch sluice gates. There are three outlet valves, a 12-inch diameter polyjet valve, a 48-inch diameter butterfly valve, and a 42-inch diameter butterfly valve. Its outlet provides for release of a maximum of 550 cfs through a 1,160-foot long, 49-inch diameter steel pipe. (See continuation sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)
***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #)
Photograph 1, camera facing northwest.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1950, Water Utility Operations Division, Santa Clara Valley Water District, "Dam Safety Program Report."

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
R. Herbert/J. Cheney
JRP Historical Consulting LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006
***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006.
***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) Anderson Dam

B1. Historic Name: Leroy Anderson Dam

B2. Common Name: Anderson Dam

B3. Original Use: Water storage, ground water recharge, flood control, and recreation. B4. Present Use: Water storage, ground water recharge, flood control, and recreation.

***B5. Architectural Style:** n/a

***B6. Construction History:** (Construction date, alteration, and date of alterations) Constructed 1950; inlet tower extended 1960; spillway enlarged and crest modified 1987 and 1988; new inlet structure for outlet works 1988-1989.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**

***B8. Related Features:**

B9. Architect: G.W. Hunt (Chief Engineer) b. Builder: Guy F. Atkinson Company

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Anderson Dam and its associated outlet and control structures are the resources studied for this evaluation. It does not appear that the dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources (and thus are not historically significant under CEQA guidelines).

The resource inventoried in this form, the Anderson Dam complex, is associated directly with the Santa Clara Valley Water District's water development system in the Santa Clara Valley of California. Anderson Dam was constructed in 1950 by the South Santa Clara Valley Water Conservation District to raise the water table, supply irrigation water and flood protection to Santa Clara Valley. Its construction created a storage reservoir. (See continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See footnotes; USGS maps, local newspapers, engineering reports, *Dam Safety Program Report*, Santa Clara Valley Water District October 2004, *Index to Documents Relevant to the Modifications and Repairs of Santa Clara Valley Water District Dams*, Santa Clara Valley Water District, September 1995, etc.

(Sketch Map with north arrow required.)

B13. Remarks:

***B14. Evaluator:** Rand Herbert

***Date of Evaluation:** August 2006

(This space reserved for official comments.)

P3a. Description (continued):

An ogee chute style spillway is located on the west side of the dam, and has a capacity of 57,400 cfs. **(Photograph 2)** The spillway weir is 223 feet in length. Behind the dam, Anderson Reservoir has an 89,073 acre-feet capacity. The Anderson Dam functions together with the Coyote Dam. As the dams are operated as a system, the State of California Department of Water Resources, Division of Safety of Dams (DSOD) imposes a restriction on the capacity of the two dams.

A modern restroom has been constructed at the dam's west side. It is a concrete block building, topped with a front gable metal roof that contains a monitor skylight. **(Photograph 3)** Another concrete block building located on the west side of the dam and reservoir is topped with a flat roof. **(Photograph 4)** This building contains a set of flush doors and one flush single-leaf door. **(Photograph 4)** A third concrete masonry building is located on the dam and is topped with a flat roof. A single, slab single-leaf door serves as its entrance.

At the rear of the dam (north side) is a building with a removable shed roof, its walls sided in stucco. A flush single-leaf metal door accesses this instrument building. Also at the rear of the dam, near the outlet chute, is another control building that is topped with a flat roof, sided in poured concrete and accessed by a flush metal door. **(Photograph 5)**

B10. Significance (continued):

At the turn of the twentieth century the Santa Clara Valley was a predominantly agricultural region with a small urban area concentrated in San Jose and several other small towns. Groundwater levels at this time were sufficiently high that wells often flowed under artesian pressure. However, by 1915 a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67% of the area under irrigation, and the population of its urban centers was on the rise. By the end of the decade the groundwater table had dropped 50 feet in four years, increasing pumping costs and causing the ground to subside.[1] These factors led valley leaders and local engineers to seek a means to replenish the lowering ground water table.

During the 1920s, engineers Fred H. Tibbetts and Stephen Kieffer undertook a study of the problem and proposed a system of dams and water conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters defeated establishment of a water conservation district in 1927 and 1928, when water levels in local wells fell below 100 feet in 1929, the voters approved the measure and established the SCVWCD. By 1934 the district's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge.[2]

The system of dams and reservoirs operated successfully but the continued urban and agricultural growth in the Santa Clara Valley created greater demand for water and additional dams were constructed in the 1950s. Lenihan Dam, known as Lexington Dam, was one of three dams constructed during this period by the SCVWCD. The South Santa Clara Valley

[1] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934, passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.
[2] ASCE, *Historic Civil Engineering Landmarks*, 28; http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District" (January 31, 1936), 6-10, WRCA.

Water Conservation District, serving the southern portion of Santa Clara County, also constructed two dams for the same purposes during the 1950s.

Evaluation Considerations

In 2003, JRP Historical Consulting Services evaluated another dam, the Almaden Dam, of the Santa Clara Valley Water District, in its report, "Historical Resources: Almaden Dam, Santa Clara Valley Water District." At that time, JRP Historical Consulting determined that Almaden Dam, by itself, was not eligible for the National Register of Historic Places or the California Register of Historic Resources because "[it] is part of a larger system, the other parts of which are not part of this evaluation. By itself, the dam would not be considered sufficiently significant to appear eligible for the National Register of Historic Places under Criterion A at either the local, state, or national level. It is possible that the system as a whole, should it be inventoried and evaluated, could qualify as a significant property assuming it has retained its over all integrity."[3] The entire system of Santa Clara Valley District system of dams is the subject of this current evaluation and it still does not appear that Anderson Dam or its appurtenances meet the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

The San Francisco Section of the American Society of Civil Engineers recognized the Santa Clara Valley Water Conservation District system (of which Anderson Dam is a part) in 1976 as a "historic civil engineering landmark." While this designation imparts no particular regulatory status, it represented an acknowledgment of the system's significance to interested northern California civil engineers.[4] The report prepared by the ASCE section listed two "special notes" regarding the SCVWCD system as a whole:

1. This system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin.
2. This water supply development facilitated the post World War II growth of the Santa Clara Valley into one of the major metropolitan areas of the country.[5]

However, even with this designation in mind, it does not appear that Anderson Dam and its outlet structures meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources.

It is difficult to establish a single standard for what might constitute significance for a dam because there are several areas in which that significance might come into play. In general, however, the test would be some type of importance that is not common to other dams in the region or state. Innovation might be one test: for example, was the dam the first to be built specifically to recharge a local aquifer? This was one of the reasons the ASCE San Francisco section considered the

[3] JRP Historical Consulting, "Historic Resources Report: Almaden Dam, Santa Clara Valley Water District," (Davis, California: 2003).

[4] ASCE, *Historic Civil Engineering Landmarks*, 29. The Historic Civil Engineering Landmark Program recognizes historically significant local, national, and international civil engineering projects, structures, and sites. The Historic Civil Works award recognizes projects that were built prior to the advent of engineering as a discipline in the 18th century. The objectives of the program are to: 1) Encourage all civil engineers to become more aware of the history and heritage of their own profession; 2) Increase appreciation by the public of civil engineering contributions to the progress and development of the United States and the world. 3) Identify and designate national historic civil engineering works that have made a significant contribution to the development of the United States and to the profession of civil engineering in particular. 4) Encourage, where appropriate and feasible, the preservation of significant historic civil engineering works. 5) Provide a documented archive of Civil Engineering Historic Landmarks for the use of engineering students, professional writers, researchers, and historians. 6). Promote the inclusion of information on Historic Civil Engineering Landmarks in encyclopedias, guidebooks, and maps used by the general public. (From the ASCE web site, http://www.asce.org /history/hp_resguide2.html)

[5] ASCE, *Historic Civil Engineering Landmarks,* 28.

SCVWCD system an engineering landmark. While Anderson Dam is a part of the Santa Clara Valley Water District, its construction in 1950 was to augment the existing water conservation system that was already in operation since the 1930s. Anderson Dam and its appurtenances were constructed using well established engineering techniques like those used by the District's original water conservation system of dams, constructed in the 1930s. Size or engineering achievement might be another test, if a dam was unusual for its design, or represented a breakthrough in the science of dam engineering, or represents a rare example of its type, which Anderson Dam does not.

Several general observations regarding earth filled dams merit discussion by way of introduction. The first observation is an obvious but important point: there are many earth fill dams in California. Of the dams in California under the jurisdiction of the Division of Safety of Dams 72% are earth fill. Collectively, all of these dams serve important functions, and the dams of the SCVWCD obviously benefited the region's urban areas and agriculture. Individually, however, any one dam is part of a larger system and one of a vast number of similar properties.

Second, it is important to understand dams in general as part of a class of infrastructure improvements that deliver benefits to broad constituencies. Certain types of improvements fit this definition of infrastructure. Most public works projects fall into this category, including state and local road systems, municipal water systems, sewer systems, hospitals, schools, airports, and the like. Major utility features also fall into this category, including electric power generating plants, natural gas pipelines, railroads, and telephone service. These elements of the infrastructure are obviously important to the communities they serve. In time, members of the community come to rely upon these elements for their basic needs, the roads they drive, water they drink, electricity they use, and so forth. Thus, in many communities, dams are essential elements of the infrastructure.

This point is useful in appreciating how significance might be assessed for such properties. In a sense, every element of the infrastructure is important. Unless judgment is exercised, however, every dam, road, bridge, telephone line and sewer system might be seen as eligible for the National Register for its contribution to the local community and its development. To avoid that overbroad conclusion, such infrastructure elements must be assessed within the context of similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating dams.

Another consideration in evaluating significance of dams is the period of significance. The area of significance defines the period of significance. If a dam is significant for its design, the period of significance should be restricted to the era in which the dam was built. However, if it is important for its contribution to the initial settlement of a region, the period of significance should be restricted to the settlement period.

Finally, integrity is assessed for the resource's period of significance. The property must retain integrity to its potential period of significance if it is to meet the criteria for listing in the National Register of Historic Places or as an important resource under California law and regulations.

The following discussion presents an evaluation of Anderson Dam under National Register and California Register criteria and its integrity.

Criterion A or 1: Anderson Dam is an integral unit of the SCVWCD's system, which played a role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. However, as noted above, major infrastructural elements are inherently important to their communities. For example, while the SCVWCD system may have been important in the economic development of the Santa Clara Valley, the same might be said of completion of railroads through the area in the nineteenth century, or construction of modern roads and highway systems in the twentieth century. Moreover, the area receives water from other systems, including (in more recent years) the State Water Project. It is unlikely that construction and operation of the SCVWCD system, as a whole, was the principal driving force behind the economic development of the area. Rather, it was one

of several factors leading to the construction of the Santa Clara Valley. Anderson Dam is one of four dams within the system constructed to augment and add to the water conservation system of dams already in operation since the 1930s.

Criterion B or 2: Anderson Dam does not have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore does not appear eligible under this criterion. While Anderson Dam is associated with the G.W. Hunt and Guy F. Atkinson company, it is inappropriate to use its association with them under Criterion B or 2 to evaluate the dam, as it would better be considered under Criterion C or 3, as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: does Anderson Dam exhibit particular significant design or engineering characteristics, and is it the work of a master engineer. Each of these considerations will be addressed in turn.

First, Anderson Dam is a structure of common design that represented no particular engineering achievement at the time it was constructed. Earth fill dams were common in the 1950s. Of the 811 earth fill dams under the jurisdiction of the state, 197 dams have dates of construction prior to 1936, some dating as early as 1850 and 1851. Nothing in the accounts of Anderson Dam's construction (or construction of other dams in the system) suggests that they were designed and built through anything other than a standard process.

Furthermore, was Anderson Dam an innovation? As discussed above, Anderson Dam was constructed to add to the District's water conservation system that was in operation since the 1930s. The original dams constructed by the District in the 1930s were constructed to operate as a system. Anderson Dam was not part of the original system plan, but rather was added during the post-World War II period when more water conservation was needed. Anderson Dam was constructed using the same engineering methods, and augmented a system that had been in existence and therefore was not an innovation.

Second, was this dam the work of a master, in this case G.W. Hunt or Guy F. Atkinson, and if so, was it an important example of their work? Research did not reveal further information on G.W. Hunt. The Atkinson Company was an influential builder of hydroelectric structures, road, bridge, tunnel, and industrial projects in California and was responsible for many important projects. However, nothing in the historic record suggests that Anderson Dam was of particular importance or a challenging example of his company's work as a builder. Rather, it was one of many dams and large construction projects he designed. Consideration of these factors indicates that Anderson Dam and its outlet features do not appear to meet the criteria for listing in the National Register of Historic Places under Criterion C.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important. In rare instances, structures, such as dams and buildings, can serve as sources of important information about historic construction materials or technologies; however, this property is otherwise documented and does not appear to be a principal source of important information in this regard.

Integrity

As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. Anderson Dam has retained a very good level of integrity in all seven measures. It remains, obviously, in its original location, the setting of which is unchanged from its original construction beyond the growth of trees in the surrounding area. It has not been substantially altered (the only changes being to its intake structure beneath the water surface, and minor changes around the outlet structures) so it retains integrity of design, workmanship, and materials. It remains a part of the SCVWD's system, so its association also has been retained. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while

at or while viewing the site. Anderson Dam has a strong sense of time and place. While the dam retains overall integrity from its period of construction, it does not appear that the dam or its appurtenances meet the required significance criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

P5b. Photographs (cont.):

Photograph 2. Leroy Anderson Dam Spillway, camera facing northwest. April 17, 2006.

Photograph 3. Public Restroom, camera facing north. April 17, 2006.

Photograph 4. Outlet Valve Building, camera facing northwest. April 17, 2006.

Photograph 5. Instrument buildings, camera facing east. April 17, 2006.

Photograph 6. Anderson Dam during construction, 1950.

Photograph 7. Anderson Dam shortly after construction, c. 1950.

Photograph 8. Anderson Dam Spillway during construction, 1950.

Photograph 9. Leroy Anderson Dam plaque, camera facing west. April 17, 2006.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________________
HRI # ____________________
Trinomial ____________________
NRHP Status Code 6Z

Other Listings ____________________
Review Code __________ **Reviewer** ____________________ **Date** __________

***Resource Name or #** (Assigned by recorder) Chesbro Dam

P1. Other Identifier: Chesbro Dam

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Morgan Hill **Date** 1953 (1978) **T**9S; **R** 2E **B.M.**
c. Address City Zip
d. UTM: (give more than one for large and/or linear resources) Zone: 10; 613490 mE, 4109557 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Chesbro Dam is a rolled earth filled dam, with a crest length of 690 feet, and height from Llagas Creek's streambed to the spillway crest of 525 feet, and over all 95 feet in height. **(Photographs 1-2)** The dam has a freeboard of ten feet, and is 20 feet wide at the top and 428 feet wide at the base. Its side slope ratio is 2:1 on both the upstream and downstream sides. It contains 467,000 cubic yards of fill. The dam features both a 54-inch diameter butterfly inlet valve and a butterfly outlet valve. Its outlet provides for release of an estimated maximum of 740 cfs through a 480-foot, 56-inch diameter steel pipe. A side channel spillway is located on the northwest side of the dam, and has a capacity of 11,000 cfs. **(Photograph 2)** The spillway weir is 203 feet long. Behind the dam, the Chesbro Reservoir has an 8,952 acre-feet capacity.

There are several buildings along the dam and the outlet chute. The first is located on the eastern shore of the reservoir away from the dam itself. It is a 6' x 8' concrete masonry building and is topped with a shed roof. Two flush, metal, single-leaf doors provide access. The building also serves as the location of the dam's plaque. **(Photograph 3)**

(See continuation sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)

***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1, camera facing east.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1955, Water Utility Operations Division, Santa Clara Valley Water District, "Dam Safety Program Report

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
R. Herbert/J. Cheney
JRP Historical Consulting LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006.

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

Primary # ____________________
HRI # ____________________

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) Chesbro Dam

B1. Historic Name: Chesbro Dam

B2. Common Name: Chesbro Dam

B3. Original Use: Water storage and ground water recharge B4. Present Use: Water storage and ground water recharge

***B5. Architectural Style:** n/a

***B6. Construction History:** (Construction date, alteration, and date of alterations) Constructed 1955; repair crack systems caused by 1989 earthquake damage.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**

***B8. Related Features:**

B9. Architect: Blackie & Wood b. Builder: Norman I. Fadel, Inc.

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Chesbro Dam and its associated outlet and control structures are the resources studied for this evaluation. It does not appear that the dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

The resource inventoried in this form, the Chesbro Dam complex, is associated directly with the Santa Clara Valley Water District's water development system in the Santa Clara Valley of California. Chesbro Dam is an important component of the 1950s effort to meet the areas growing water needs by raising the water table, supplying irrigation water, and flood protection to Santa Clara Valley. (See continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See footnotes; USGS maps; local newspapers; engineering reports; *Dam Safety Program Report*, Santa Clara Valley Water District, October 2004; *Index to Documents Relevant to the Modifications and Repairs of Santa Clara Water District Dams*, Santa Clara Valley Water District, 1995, etc.

(Sketch Map with north arrow required.)

B13. Remarks:

***B14. Evaluator:** Rand Herbert

***Date of Evaluation:** August 2006

(This space reserved for official comments.)

P3a. Description (continued):

The outlet pipe and instrument building are located on the dam's downstream (south) side. The outlet pipe is covered in board-formed concrete and an instrument building rests upon it. This concrete masonry building is topped with a shed roof sheathed in rolled composition shingle. **(Photograph 4)**

A concrete block building topped with a shed roof is located on the east end of the dam's face. The building rests on a concrete foundation and contains a flush, single-leaf metal door. A similar concrete masonry building with a shed roof is located at the east side of the dam. **(Photograph 5)**

B10. Significance (continued):

At the turn of the twentieth century the Santa Clara Valley was a predominantly agricultural region with a small urban area concentrated in San Jose and several other small towns. Groundwater levels at this time were sufficiently high that wells often flowed under artesian pressure. However, by 1915 a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67% of the area under irrigation, and the population of its urban centers was on the rise. By the end of the decade the groundwater table had dropped 50 feet in four years, increasing pumping costs and causing the ground to subside.[1] These factors led valley leaders and local engineers to seek a means to replenish the lowering ground water table.

During the 1920s, engineers Fred H. Tibbetts and Stephen Kieffer undertook a study of the problem and proposed a system of dams and water conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters defeated establishment of a water conservation district in 1927 and 1928, when water levels in local wells fell below 100 feet in 1929, the voters approved the measure and established the SCVWCD. By 1934 the district's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge.[2]

After the success of the SCVWCD system of dams and stream improvements the South Santa Clara Valley Water Conservation District was established in 1938. The district in the south covered 34,900 acres and was established to prevent land subsidence, drying wells, and reduced flood capacity of the creeks south of San Jose to the Pajaro River.[3] To accomplish these goals the district, which was managed by elected citizens and members of the Board of Supervisors, began

[1] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I,* Project Report 17 (S.l.: .n.p., May 8, 1934), passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.

[2] ASCE, *Historic Civil Engineering Landmarks,* 28; Santa Clara Valley Water District, "History of the Santa Clara Valley Water District," available at http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County"; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," (January 31, 1936), 6-10, WRCA.

[3] Harold Wood, Blackie & Wood, "Report to the Honorable Board of Directors of the South Santa Clara Valley Water Conservation District on Uvas Creek Dam, Reservoir, Conduit and Well Replenishment Project Proposed to be Constructed Jointly with Santa Clara Valley Water Conservation District and on Proposed Llagas Creek Dam, Reservoir and Well Replenishment Project" Project Report No. 15 (San Francisco: Blackie and Wood, Civil Engineers, March 1953), 2-3.

constructing percolation facilities on area creeks. By the 1950s, the South Santa Clara Valley Water Conservation District established plans for two dams and reservoirs on the Llagas and Uvas creeks to work together as one unit.[4]

The Chesbro Dam on Llagas Creek and the Uvas Dam on Uvas Creek were engineered by the San Francisco engineering firm Blackie and Wood. Perry A. Haviland, later Alameda County Supervisor and county engineer, and Fred R. Tibbetts originally established the firm as Haviland and Tibbetts in 1909. Before joining the firm, Edwin Earl Blackie graduated with a bachelor's degree in civil engineering from University of California, Berkeley in 1917, worked for an irrigation district in Anderson, California and was employed as a civil engineer by the state of California in Sacramento.[5] He joined Tibbetts' firm after 1930 and gained control of the firm upon Fred Tibbetts' death in 1938. Harold Ira Wood joined the firm in 1918. After working on various hydroelectric development and irrigation projects, Wood left the firm in 1930. However, in 1934, he was again associated with Tibbetts as the Supervising Field Engineer for the SCVWCD. Blackie and Wood became partners in 1939. The civil engineering firm concentrated on water conservation, flood control, reclamation, irrigation and power projects. Wood retired shortly after the Uvas Dam was completed. Blackie continued to work until 1973.[6]

Although most of the local water conservation districts merged with SCVWCD in 1968, the people served by the South Santa Clara Valley Water Conservation District voted to remain independent. In 1981, the board of directors changed the district's name to the Gavilan Water Conservation District. SCVWCD annexed the southern district in 1987 and gained control of the Chesbro and Uvas dams at that time.[7]

Evaluation Considerations

In 2003, JRP Historical Consulting Services evaluated another dam, the Almaden Dam, of the Santa Clara Valley Water District, in the report, "Historical Resources: Almaden Dam, Santa Clara Valley Water District." At that time JRP determined that Almaden Dam, by itself, was not eligible for the National Register of Historic Places or the California Register of Historic Resources because "[it] is part of a larger system, the other parts of which are not part of this evaluation. By itself, the dam would not be considered sufficiently significant to appear eligible for the National Register of Historic Places under Criterion A at either the local, state, or national level. It is possible that the system as a whole, should it be inventoried and evaluated, could qualify as a significant property assuming it has retained its over all integrity."[8] The entire system of Santa Clara Valley District system of dams is the subject of this current evaluation. It still does not appear that Chesbro Dam or its appurtenances meet the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

The San Francisco Section of the American Society of Civil Engineers recognized the Santa Clara Valley Water Conservation District system (of which Chesbro Dam is now a part) in 1976 as a "historic civil engineering landmark." While this designation imparts no particular regulatory status, it represented an acknowledgment of the system's significance

[4] California History Center, *Water in Santa Clara Valley*, passim.
[5] Local Board for City of Anderson, [Draft] Registration Card # 28 and Registrar's Report # 4-3-12 A (June 5, 1917), Ancestry.com, available at http://content.ancestry.com/iexec/?htx=View&r=an&dbid=6482&iid=CA-1531273-2162&fn=Edwin+Earle&ln=Blackie &st= r&pid=29461024, accessed on July 20, 2006; U. S. Census Bureau, Fourteenth Census of the United States: 1920 - Population, Corcoran Township, Kings County, California, 1920, Sheet 7-A, line 18; U. S. Census Bureau, Fifteenth Census of the United States: 1930 Population Schedule, Sacramento City, Sacramento County, California, Sheet 3A, line 45.
[6] Water Resources Center Archives, "Blackie (E.E.) & Tibbetts (Fred H.) Papers" summary available at the Online Archive of California, http://content.cdlib.org/search?type=archival+collection&rmode=ead&style =oac-ead&text=Blackie+and+Tibbetts, accessed July 20, 2006; Thornton Corwin, "Harold I. Wood (1886-1973)," in American Society of Civil Engineers, *Transactions of the American Society of Civil Engineers,* 579. Available at www.pubs.asce.org/WWWdisplay.cgi?7499921, accessed on July 20, 2006.
[7] Santa Clara Valley Water District, "History of the Santa Clara Valley Water District," available at http://www.valleywater.org/About_Us/History/1900s_to_1940s.shtm, accessed on July 20, 2006.
[8] JRP Historical Consulting, "Historic Resources Report: Almaden Dam, Santa Clara Valley Water District," (Davis, California: 2003).

to interested northern California civil engineers.[9] The report prepared by the ASCE section listed two "special notes" regarding the SCVWCD system as a whole:

1. This system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin.
2. This water supply development facilitated the post World War II growth of the Santa Clara Valley into one of the major metropolitan areas of the country.[10]

However, even with this designation in mind, it does not appear that Chesbro Dam and its outlet structures meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources.

It is difficult to establish a single standard for what might constitute significance for a dam because there are several areas in which that significance might come into play. In general, however, the test would be some type of importance that is not common to other dams in the region or state. Innovation might be one test: for example, was the dam the first to be built specifically to recharge a local aquifer? This was one of the reasons the ASCE San Francisco section considered the SCVWCD system an engineering landmark. While Chesbro Dam is currently a part of the Santa Clara Valley Water District, its construction in 1955 was under the South Santa Clara Valley Water Conservation District (renamed Gavilan Water Conservation District in 1980) to augment the water conservation system that was already in operation since the 1930s.[11] Chesbro Dam and its appurtenances were constructed using engineering techniques already in use by the Santa Clara Valley Water District's original water conservation system of dams, constructed in the 1930s. These engineering techniques proved successful with the first set of dams constructed in the area and therefore were implemented when building Chesbro Dam. Size or engineering achievement might be another test, if a dam was unusual for its design, or represented a breakthrough in the science of dam engineering, or represents a rare example of its type, which Chesbro Dam does not.

Several general observations regarding dams merit discussion by way of introduction. The first observation is an obvious but important point: there are many earth fill dams in California. Approximately 72% of dams in California under the jurisdiction of the Division of Safety of Dams are earth fill. Collectively, all of these dams serve important functions, and the dams of the SCVWCD obviously benefited the region's urban areas and agriculture. Individually, however, any one dam is one of a large number of similar resources.

[9] ASCE, *Historic Civil Engineering Landmarks*, 29. The Historic Civil Engineering Landmark Program recognizes historically significant local, national, and international civil engineering projects, structures, and sites. The Historic Civil Works award recognizes projects that were built prior to the advent of engineering as a discipline in the 18th century. The objectives of the program are to: 1) encourage all civil engineers to become more aware of the history and heritage of their own profession; 2) increase appreciation by the public of civil engineering contributions to the progress and development of the United States and the world, 3) identify and designate national historic civil engineering works that have made a significant contribution to the development of the United States and to the profession of civil engineering in particular, 4) encourage, where appropriate and feasible, the preservation of significant historic civil engineering works, 5) provide a documented archive of Civil Engineering Historic Landmarks for the use of engineering students, professional writers, researchers, and historians, as well as promote the inclusion of information on Historic Civil Engineering Landmarks in encyclopedias, guidebooks, and maps used by the general public. (From the ASCE web site, http://www.asce.org /history/hp_resguide 2.html). However the Chesbro Dam was not part of the SCVWCD system at the time of ASCE's recognition of the system.

[10] ASCE, *Historic Civil Engineering Landmarks*, 28.

[11] In 1987 the Santa Clara Valley Water District annexed the Gavilan Water Conservation District and its dams and reservoirs, including Uvas and Chesbro. In doing this, the District gained complete control over the system of dams in Santa Clara County. Santa Clara Valley Water District website: http://www.valleywater.org, accessed March 22, 2006.

Second, it is important to understand dams in general as part of a class of infrastructure improvements that deliver benefits to broad constituencies. Certain types of improvements fit this definition of infrastructure. Most public works projects fall into this category, including state and local road systems, municipal water systems, sewer systems, hospitals, schools, airports, and the like. Major utility features also fall into this category, including electric power generating plants, natural gas pipelines, railroads, and telephone service. These elements of the infrastructure are obviously important to the communities they serve. In time, members of the community come to rely upon these elements for their basic needs, the roads they drive, water they drink, electricity they use, and so forth. Thus, in many communities, dams are essential elements of the infrastructure.

This point is useful in appreciating how significance might be assessed for such properties. In a sense, every element of the infrastructure is important. Unless judgment is exercised, however, every dam, road, bridge, telephone line and sewer system might be seen as eligible for the National Register for its contribution to the local community and its development. To avoid that overbroad conclusion, such infrastructure elements must be assessed within the context of similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating dams.

Another consideration in evaluating significance of dams is the period of significance. The area of significance defines the period of significance. If a dam is significant for its design, the period of significance should be restricted to the era in which the dam was built. However, if it is important for its contribution to the initial settlement of a region, the period of significance should be restricted to the settlement period.

Finally, integrity is assessed for the resource’s period of significance. The property must retain integrity to its potential period of significance if it is to meet the criteria for listing in the National Register of Historic Places or as an important resource under California law and regulations.

The following discussion presents an evaluation of Chesbro Dam under National Register and California Register criteria and its integrity.

Evaluation of Significance:

Criterion A or 1: Chesbro Dam is an integral unit of the SCVWD’s system, which played a role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. However, as noted above, major infrastructural elements are inherently important to their communities. For example, while the SCVWCD system may have been important in the economic development of the Santa Clara Valley, the same might be said of completion of railroads through the area in the nineteenth century, or construction of modern roads and highway systems in the twentieth century. Moreover, the area receives water from other systems, including (in more recent years) the State Water Project. It is unlikely that construction and operation of the SCVWCD system, as a whole, was the principal driving force behind the economic development of the area. Like Uvas Dam, Chesbro Dam was one of several dams within the system constructed to serve needs in the southern end of the district.

Criterion B or 2: Chesbro Dam does not have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore does not appear eligible under this criterion. While Chesbro Dam is associated with the engineering firm Blackie and Wood, it is inappropriate to use its association with Edwin E. Blackie and Harold I. Wood under Criterion B or 2 to evaluate the dam because of their role as engineers of the dam. Rather, role of Blackie and Wood should be considered under Criterion C or 3, considering the dam as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

***Recorded by** Rand Herbert *Date April 17, 2006 ☒ Continuation ☐ Update

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: does Chesbro Dam exhibit particular significant design or engineering characteristics, and is it the work of a master engineer. Each of these considerations will be addressed in turn.

First, Chesbro Dam is a structure of common design that represented no particular engineering achievement at the time it was constructed. Earth fill dams were common. Some of the state's more than 800 such dams date to as early as 1850 and 1851. Nothing in the accounts of Chesbro Dam's construction suggests that they were designed and built through anything other than a standard process.

Furthermore, Chesbro Dam was constructed to provide the South Santa Clara Valley Water Conservation District with an additional water conservation unit that would augment the Santa Clara Valley Water District's system, already in place since the 1930s. The original dams constructed by the Santa Clara Valley Water District in the 1930s were constructed to operate as a system. Chesbro Dam was not part of the original system's plan, but rather was constructed in the southern portion of the county during the post-World War II period when more water conservation was needed. Chesbro Dam was constructed using the same engineering methods and planning that had been in existence and therefore was not an innovation.

Second, was this dam the work of a master, in this case Blackie and Wood, and if so, was it an important example of their work? While individually and as a firm Blackie and Wood had prolific careers that focused on projects in both northern and southern California as well as other states including Alaska, Arizona, and Nevada. However, their work in civil engineering does not appear to have been pioneering or outstanding in the community of engineers. Nor does anything in the historic record suggests that Chesbro Dam was of particular importance or a challenging example of their work as engineers. Rather, it was one of many dams and large construction projects that they designed. Consideration of these factors indicates that Chesbro Dam and its outlet features do not appear to meet the criteria for listing in the National Register of Historic Places under Criterion C or 3.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important. In rare instances, structures, such as dams and buildings, can serve as sources of important information about historic construction materials or technologies; however, this property is otherwise documented and does not appear to be a principal source of important information in this regard.

Integrity

As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. Chesbro Dam has retained a very good level of integrity in all seven measures. It remains, obviously, in its original location, the setting of which is unchanged from its original construction beyond the growth of trees in the surrounding area. It has not been substantially altered (the only changes being to its intake structure beneath the water surface, and minor changes around the outlet structures) so it retains integrity of design, workmanship, and materials. Although it was previously operated out side of the SCVWD system, Chesbro Dam was constructed to work in conjunction with it. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while at or while viewing the site. Chesbro Dam has a strong sense of time and place. While the dam retains overall integrity from its period of construction, it does not appear that the dam or its appurtenances meet the significance criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

Photographs (cont.):

Photograph 2. Chesbro Dam Spillway, camera facing west. April 17, 2006.

Photograph 3. Concrete instrument structure and dam plaque, camera facing south. April 17, 2006.

Photograph 4. Outlet pipe and instrument building, camera facing northwest. April 17, 2006.

Photograph 5. Instrument building on Chesbro Dam, camera facing south. April 17, 2006.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code 6Z

Other Listings ______
Review Code ______ Reviewer ______ Date ______

 ***Resource Name or #** (Assigned by recorder) Lenihan Dam

P1. Other Identifier: Lenihan Dam
***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Los Gatos **Date** 1953 (1980) **T**9S; **R** 1E; MD **B.M.**
c. Address City Zip
d. UTM: (give more than one for large and/or linear resources) Zone: 10; 591885 mE, 4122854N mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
Lenihan Dam is a rolled earth filled dam, with a crest length of 830 feet, and 195 feet in height over all. **(Photograph 1)** The dam has a freeboard of 16.7 feet, and is 40 feet wide at the top and 1,370 feet wide at the base. Alma Bridge Road roadway **(Photograph 2)** crosses the crest, and because of this the crest slopes across the axis from the middle of the roadway towards the upstream and downstream faces for drainage purposes. Therefore, the dam's side slope ratio is 5.25H:1H down to elevation 648, and 5.5H:1V from elevation 648 to the upstream toe. It originally contained 2,124,000 cubic yards of fill. The dam's inlet valves consist of two 36-inch diameter butterfly valves and a 16-inch diameter sluice gate. Its outlet provides for release of a maximum of 410 cfs through a 50-inch diameter steel pipe and a 48-inch diameter RCP pipe with a combined length of 1,573 feet. An ogee chute spillway is located on the west abutment of the dam, and has a capacity of 43,500 cfs. **(Photographs 3** and **4)** The spillway weir is 150 feet in length. Behind the dam, the Lexington Reservoir has a 19,044 acre-feet capacity.

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)
***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1, camera facing west. April 17, 2006.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1952, Water Utility Operations Division, Santa Clara Valley Water District, "Dam Safety Program Report

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
Rand Herbert
JRP Historical Consulting LLC
1490 Drew Ave., Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006
***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006.

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) Lenihan Dam

B1. Historic Name: Lexington Dam and Windy Point Dam

B2. Common Name: Lenihan Dam

B3. Original Use: Ground water recharge B4. Present Use: Ground water recharge and recreation

***B5. Architectural Style:** n/a

***B6. Construction History:** (Construction date, alteration, and date of alterations) Constructed 1952; outlet pipe modifications 1956; extension of spillway chute and construction of maintenance access bridge 1956; inlet structure extension 1960; replacement of lines and valves 1985; inlet structure modifications 1988; repair of collapsed section of outlet pipe 1989; repair of earthquake-induced cracks caused by Loma Prieta earthquake 1990; air vent 1992; crest and spillway chute walls raised 1996; freeboard restoration 1997.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**

***B8. Related Features:**

B9. Architect: G.W. Hunt (Chief Engineer) b. Builder: Guy F. Atkinson

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Lenihan Dam and its associated outlet and control structures are the resources studied for this evaluation. It does not appear that the dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

The resource inventoried in this form, the Lenihan Dam complex, is associated directly with the Santa Clara Valley Water District's water development system in the Santa Clara Valley of California. Lenihan Dam is an important component in the system, supplying important flood protection and irrigation water to Santa Clara Valley. Its construction created a storage reservoir. (See continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See footnotes; Water Utility Operations Division, Infrastructure Planning Unit, *Dam Safety Program Report*, October 2004; USGS maps, local newspapers, engineering reports, "*Index to Documents Relevant to the Modifications and Repairs of Santa Clara Valley Water District Dams*," September 1995, etc.

(Sketch Map with north arrow required.)

B13. Remarks:

***B14. Evaluator:** Rand Herbert

***Date of Evaluation:** August 2006

(This space reserved for official comments.)

B10. Significance (continued):

At the turn of the twentieth century the Santa Clara Valley was a predominantly agricultural region with a small urban area concentrated in San Jose and several other small towns. Groundwater levels at this time were sufficiently high that wells often flowed under artesian pressure. However, by 1915 a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67% of the area under irrigation, and the population of its urban centers was on the rise. By the end of the decade the groundwater table had dropped 50 feet in four years, increasing pumping costs and causing the ground to subside.[1] These factors led valley leaders and local engineers to seek a means to replenish the lowering ground water table.

During the 1920s, engineers Fred H. Tibbetts and Stephen Kieffer undertook a study of the problem and proposed a system of dams and water conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters defeated establishment of a water conservation district in 1927 and 1928, when water levels in local wells fell below 100 feet in 1929, the voters approved the measure and established the SCVWCD. By 1934 the district's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge.[2]

The system of dams and reservoirs operated successfully but the continued urban and agricultural growth in the Santa Clara Valley created greater demand for water and additional dams were constructed in the 1950s. Lenihan Dam, known as Lexington Dam, was one of three dams constructed during this period by the SCVWCD. The South Santa Clara Valley Water Conservation District, serving the southern portion of Santa Clara County, also constructed two dams for the same purposes during the 1950s.

Evaluation Considerations

In 2003, JRP Historical Consulting Services evaluated another dam, the Almaden Dam, of the Santa Clara Valley Water District, in the report, "Historical Resources: Almaden Dam, Santa Clara Valley Water District." At that time JRP determined that Almaden Dam, by itself, was not eligible for the National Register of Historic Places or the California Register of Historic Resources because "[it] is part of a larger system, the other parts of which are not part of this evaluation. By itself, the dam would not be considered sufficiently significant to appear eligible for the National Register of Historic Places under Criterion A at either the local, state, or national level. It is possible that the system as a whole, should it be inventoried and evaluated, could qualify as a significant property assuming it has retained its over all integrity."[3] The entire system of Santa Clara Valley District system of dams is the subject of this current evaluation. It still does not appear that Lenihan Dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

[1] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I*, Project Report 17 (s.l.: n.p., May 8, 1934), passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.
[2] ASCE, *Historic Civil Engineering Landmarks,* 28; Santa Clara Valley Water District, "History of the Santa Clara Valley Water District," available at http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District," (January 31, 1936), 6-10, WRCA .
[3] JRP Historical Consulting, "Historic Resources Report: Almaden Dam, Santa Clara Valley Water District," (Davis, California, 2003).

The San Francisco Section of the American Society of Civil Engineers recognized the Santa Clara Valley Water Conservation District system (of which Lenihan Dam is a part) in 1976 as a "historic civil engineering landmark." While this designation imparts no particular regulatory status, it represented an acknowledgment of the system's significance to interested northern California civil engineers.[4] The report prepared by the ASCE section listed two "special notes" regarding the SCVWCD system as a whole:

1. This system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin.
2. This water supply development facilitated the post World War II growth of the Santa Clara Valley into one of the major metropolitan areas of the country.[5]

However, even with this designation in mind, it does not appear that Lenihan Dam and its outlet structures meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources.

It is difficult to establish a single standard for what might constitute significance for a dam because there are several areas in which that significance might come into play. In general, however, the test would be some type of importance that is not common to other dams in the region or state. Innovation might be one test: for example, was the dam the first to be built specifically to recharge a local aquifer? This was one of the reasons the ASCE San Francisco section considered the SCVWCD system an engineering landmark. While Lenihan Dam is a part of the Santa Clara Valley Water District, its construction in 1952 was to augment the water conservation system that was already in operation since the 1930s. Lenihan Dam and its appurtenances were constructed using engineering techniques already in use by the District's original water conservation system of dams, constructed in the 1930s. These engineering techniques proved successful with the first set of dams constructed and therefore were implemented when building Lenihan Dam. Size or engineering achievement might be another test, if a dam was unusual for its design, or represented a breakthrough in the science of dam engineering, or represents a rare example of its type, which Lenihan Dam does not.

Several general observations regarding dams merit discussion by way of introduction. The first observation is an obvious but important point: there are many earth fill dams in California. Of the dams in California under the jurisdiction of the Division of Safety of Dams 72% are earth fill. Collectively, all of these dams serve important functions, and the dams of the SCVWCD obviously benefited the region's urban areas and agriculture. Individually, however, any one dam is one of a vast number of similar resources.

Second, it is important to understand dams in general as part of a class of infrastructure improvements that deliver benefits to broad constituencies. Certain types of improvements fit this definition of infrastructure. Most public works projects fall into this category, including state and local road systems, municipal water systems, sewer systems, hospitals, schools, airports, and the like. Major utility features also fall into this category, including electric power generating plants, natural gas pipelines, railroads, and telephone service. These elements of the infrastructure are obviously important to the communities

[4] ASCE, *Historic Civil Engineering Landmarks*, 29. The Historic Civil Engineering Landmark Program recognizes historically significant local, national, and international civil engineering projects, structures, and sites. The Historic Civil Works award recognizes projects that were built prior to the advent of engineering as a discipline in the 18th century. The objectives of the program are to: 1) encourage all civil engineers to become more aware of the history and heritage of their own profession; 2) increase appreciation by the public of civil engineering contributions to the progress and development of the United States and the world, 3) identify and designate national historic civil engineering works that have made a significant contribution to the development of the United States and to the profession of civil engineering in particular, 4) encourage, where appropriate and feasible, the preservation of significant historic civil engineering works, 5) provide a documented archive of Civil Engineering Historic Landmarks for the use of engineering students, professional writers, researchers, and historians, 6) promote the inclusion of information on Historic Civil Engineering Landmarks in encyclopedias, guidebooks, and maps used by the general public. From ASCE web site, http://www.asce.org/history/hp_resguide2.html.

[5] ASCE, *Historic Civil Engineering Landmarks*, 28.

they serve. In time, members of the community come to rely upon these elements for their basic needs, the roads they drive, water they drink, electricity they use, and so forth. Thus, in many communities, dams are essential elements of the infrastructure.

This point is useful in appreciating how significance might be assessed for such properties. In a sense, every element of the infrastructure is important. Unless judgment is exercised, however, every dam, road, bridge, telephone line and sewer system might be seen as eligible for the National Register for its contribution to the local community and its development. To avoid that overbroad conclusion, such infrastructure elements must be assessed within the context of similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating dams.

Another consideration in evaluating significance of dams is the period of significance. The area of significance defines the period of significance. If a dam is significant for its design, the period of significance should be restricted to the era in which the dam was built. However, if it is important for its contribution to the initial settlement of a region, the period of significance should be restricted to the settlement period.

Finally, integrity is assessed for the resource's period of significance. The property must retain integrity to its potential period of significance if it is to meet the criteria for listing in the National Register of Historic Places or as an important resource under California law and regulations.

The following discussion presents an evaluation of Lenihan Dam under National Register and California Register criteria and its integrity.

Criterion A or 1: Lenihan Dam is integral unit of the SCVWCD's system, which played a role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. However, as noted above, major infrastructural elements are inherently important to their communities. For example, while the SCVWCD system may have been important in the economic development of the Santa Clara Valley, the same might be said of completion of railroads through the area in the nineteenth century, or construction of modern roads and highway systems in the twentieth century. Moreover, the area receives water from other systems, including (in more recent years) the State Water Project. It is unlikely that construction and operation of the SCVWCD system, as a whole, was the principal driving force behind the economic development of the area. Rather, it was one of several factors leading to the construction of the Santa Clara Valley dams. Lenihan Dam was one of several dams within the system constructed to augment and add to the existing water conservation system.

Criterion B or 2: Lenihan Dam does not have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore does not appear eligible under this criterion. While Lenihan Dam is associated with engineer G.W. Hunt and the Guy F. Atkinson company, it is inappropriate to use its association with them under Criterion B or 2 to evaluate the dam, as it would better be considered under Criterion C or 3, as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: does Lenihan Dam exhibit particular significant design or engineering characteristics, and is it the work of a master engineer. Each of these considerations will be addressed in turn.

First, Lenihan Dam is a structure of common design that represented no particular engineering achievement at the time it was constructed. Earth fill dams were common. Of the 811 earth fill dams under the jurisdiction of the state, some dated to as early as 1850 and 1851. Nothing in the accounts of Lenihan Dam's construction (or construction of other dams in the system) suggests that they were designed and built through anything other than a standard process.

Furthermore, Lenihan Dam was constructed to augment the District's water conservation system that was in operation since the 1930s. The original dams constructed by the District in the 1930s were constructed to operate as a system. Lenihan Dam was not part of the original plan, but rather was added during the post-World War II period when more water conservation was needed. Lenihan Dam was constructed using the same engineering methods and planning that had been in existence and therefore was not an innovation.

Second, was this dam the work of a master, in this case engineer G.W. Hunt or Guy F. Atkinson, and if so, was it an important example of their work? Research did not reveal further information on G.W. Hunt. The Atkinson Company was an influential builder of hydroelectric structures, road, bridge, tunnel, and industrial projects in California and was responsible for many important projects. However, nothing in the historic record suggests that Lenihan Dam was of particular importance or a challenging example of his work as a builder. Rather, it was one of many dams and large construction projects he constructed. Consideration of these factors indicates that Lenihan Dam and its outlet features do not appear to meet the criteria for listing in the National Register of Historic Places under Criterion C.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important. In rare instances, structures, such as dams and buildings, can serve as sources of important information about historic construction materials or technologies; however, this property is otherwise documented and does not appear to be a principal source of important information in this regard.

Integrity

As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. Lenihan Dam has retained a very good level of integrity in all seven measures. It remains, obviously, in its original location, the setting of which is unchanged from its original construction beyond the growth of trees in the surrounding area. It has not been substantially altered (the only changes being to its intake structure beneath the water surface, and minor changes around the outlet structures) so it retains integrity of design, workmanship, and materials. It remains a part of the SCVWD's system, so its association also has been retained. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while at or while viewing the site. Lenihan Dam has a strong sense of time and place. While the dam retains overall integrity from its period of construction, it does not appear that the dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

***Resource Name or #** (Assigned by recorder) Lenihan Dam

***Recorded by** Rand Herbert *Date April 17, 2006 ☒ Continuation ☐ Update

Photographs (cont.):

Photograph 2. Lenihan Dam Spillway Channel Bridge, camera facing west. April 17, 2006.

Photograph 3. Lenihan Dam Spillway, camera facing west. April 17, 2006.

***Resource Name or #** (Assigned by recorder) Lenihan Dam

***Recorded by** Rand Herbert *Date April 17, 2006 ☒ Continuation ☐ Update

Photograph 4. Lenihan Dam Spillway, camera facing west. April 17, 2006.

Photograph 5. Lenihan Dam control building, camera facing southeast. April 17, 2006.

Photograph 5. Lenihan (Lexington) Dam plaque attached to north wall of the control building, camera facing south. April 17, 2006.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________________
HRI # ____________________
Trinomial ____________________
NRHP Status Code 6Z

Other Listings ____________________
Review Code __________ Reviewer ____________________ Date __________

***Resource Name or #** (Assigned by recorder) Uvas Dam

P1. Other Identifier: Uvas Dam

***P2. Location:** ☐ Not for Publication ☒ Unrestricted ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Mount Madonna **Date** 1996 **T**10S; **R** 2E **B.M.**
c. Address City Zip
d. UTM: (give more than one for large and/or linear resources) Zone: ; mE, mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Uvas Dam is a rolled earth and rock filled dam, with a crest length of 1,100 feet, and height from Uvas Creek's streambed to the spillway crest of 487.5 feet, and with a over all height of a 105 feet. **(Photograph 1)** The dam has a freeboard of 12.5 feet, and is 20 feet wide at the top and 600 feet wide at the base. Its side slope ratio is between 2H:1V and 3 ½ H:1V on both the upstream and downstream sides. It contains 800,000 cubic yards of fill. The dam features a 42-inch sluice intake valve, a 30-inch diameter butterfly outlet valve, and a 20-inch diameter gate outlet valve. Its outlet provides for release of an estimated maximum of 165 cfs through an 850-foot long, 36-inch diameter steel pipe. An ogee chute style spillway is located on the south side of the dam. **(Photograph 2)** Behind the dam, the Uvas Reservoir has a 9,935 acre-feet capacity. (See continuation sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)
***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #)
Photograph 1, camera facing west.
April 17, 2006.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1957, Water Utility Operations Division, Santa Clara Valley Water District, "Dam Safety Program Report

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
R. Herbert/J. Cheney
JRP Historical Consulting LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006
***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," 2006.

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

Primary # ________________
HRI # ________________

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) Uvas Dam

B1. Historic Name: Uvas Dam

B2. Common Name: Uvas Dam

B3. Original Use: Water storage and ground water recharge B4. Present Use: Water storage, ground water recharge, recreation

***B5. Architectural Style:** n/a

***B6. Construction History:** (Construction date, alteration, and date of alterations) Constructed 1957; addition of grout curtains, horizontal drains, and relief wells 1958; new drainage system 1985; double-row grout curtain 1996.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date: Original Location:**

***B8. Related Features:**

B9. Architect: Blackie & Wood (Engineer) b. Builder: Piombo Construction Co.

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Uvas Dam and its associated outlet and control structures are the resources studied for this evaluation. It does not appear that the dam or its appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

The resource inventoried in this form, the Uvas Dam complex, is associated directly with the Santa Clara Valley Water District's water development system in the Santa Clara Valley of California. Uvas Dam was constructed in the late 1950s by the South Santa Clara Valley Water Conservation District to raise the water table, supply irrigation water and flood protection to Santa Clara Valley. Its construction created a storage reservoir. (See continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See footnotes; USGS maps; local newspapers; engineering reports; *Dam Safety Program Report*, Santa Clara Valley Water District, October 2004; *Index to Documents Relevant to the Modifications and Repairs of Santa Clara Water District Dams*, Santa Clara Valley Water District, 1995, etc.

(Sketch Map with north arrow required.)

B13. Remarks:

***B14. Evaluator:** Rand Herbert

***Date of Evaluation:** April 17, 2006

(This space reserved for official comments.)

P3a. Description (continued):

At the outlet of the dam is a building once used as an office for the Gavilan Water Conservation District when it owned and operated Uvas Dam. This rectangular brick masonry building rests on a concrete foundation and is topped with an offset, side gable roof sheathed with composition shingles. The bricks curve at the building's corners. The front door and a concrete slab porch are sheltered under the elongated side of the roof. **(Photograph 3)** Scalloped, vertical wood trim is located in the gables. All of the building's windows and the door are covered with plywood.

The dam site has several instrument storage and outlet structures: a concrete control structure **(Photograph 4)**, a concrete outlet structure (**Photograph 5**), a concrete access pump structure that is covered by a metal top **(Photograph 6)**, and a stucco instrument shed, located southwest of the outlet chute that is sided in concrete block and has metal louvered vents. Adjacent to this structure is a concrete valve box **(Photograph 7).** Another concrete block building with a shed roof is located at the downstream side of the dam (**Photograph 8**). Two concrete seepage weirs are located on the downstream side of the dam as well as in a small pool of water at the downstream toe of the dam. **(Photographs 9-10)** Also at the rear of the dam is a metal outlet chute. **(Photograph 11)**.

B10. Significance (continued):

At the turn of the twentieth century, Santa Clara Valley was a predominantly agricultural region with a small urban area concentrated in San Jose and several other small towns. Groundwater levels at this time were sufficiently high that wells often flowed under artesian pressure. However, by 1915, a combination of increased pumping and drought resulted in a substantial drop in groundwater levels. In addition, by 1920 the valley's farmers had approximately 67% of the area under irrigation, and the population of its urban centers was on the rise. By the end of the decade the groundwater table had dropped 50 feet in four years, increasing pumping costs and causing the ground to subside.[1] These factors led valley leaders and local engineers to seek a means to replenish the lowering ground water table.

During the 1920s, engineers Fred H. Tibbetts and Stephen Kieffer undertook a study of the problem and proposed a system of dams and water conservation facilities to aid in recharging the valley's groundwater. They called for establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the streams that were tributary to the valley for the purpose of groundwater recharge. The political effort to support their plan was led by Leroy Anderson and other prominent Santa Clara Valley citizens, who formed the Santa Clara Valley Water Conservation Committee. While the voters defeated establishment of a water conservation district in 1927 and 1928, when water levels in local wells fell below 100 feet in 1929, the voters approved the measure and established the SCVWCD. By 1934 the district's plans had settled on construction of six major dams, along with streambed improvements and small, inexpensive in-stream structures to enhance groundwater recharge.[2]

After the success of the SCVWCD system of dams and stream improvements, the South Santa Clara Valley Water Conservation District was established in 1938. The district in the south covered 34,900 acres and was established to prevent

[1] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I,* Project Report 17 (s.l.: n.p., May 8, 1934), passim; American Society of Civil Engineers, San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California (*San Francisco: Pacific Gas and Electric Company, October 1977), 25.
[2] ASCE, *Historic Civil Engineering Landmarks,* 28; Santa Clara Valley Water District, "History of the Santa Clara Valley Water District," available at http://www.valleywater.org/About_Us/History/, accessed October 20, 2003; Fred H. Tibbetts, "Water Conservation Project In Santa Clara County; Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District" (January 31, 1936), 6-10, WRCA .

land subsidence, drying wells, and reduced flood capacity of the creeks south of San Jose to the Pajaro River.[3] To accomplish these goals the district, which was managed by elected citizens and members of the Board of Supervisors, began constructing percolation facilities on area creeks. By the 1950s, the South Santa Clara Valley Water Conservation District established plans for two dams and reservoirs on the Llagas and Uvas creeks to work together as one unit.[4]

The Chesbro Dam on Llagas Creek and the Uvas Dam on Uvas Creek were engineered by the San Francisco engineering firm Blackie and Wood. Perry A. Haviland, later Alameda County Supervisor and county engineer, and Fred R. Tibbetts originally established the firm as Haviland and Tibbetts in 1909. Before joining the firm, Edwin Earl Blackie graduated with a bachelor's degree in civil engineering from University of California, Berkeley in 1917, worked for an irrigation district in Anderson, California and was employed as a civil engineer by the state of California in Sacramento.[5] He joined Tibbetts' firm after 1930 and gained control of the firm upon Fred Tibbetts' death in 1938. Harold Ira Wood joined the firm in 1918. After working on various hydroelectric development and irrigation projects, Wood left the firm in 1930. However, in 1934, he was again associated with Tibbetts as the Supervising Field Engineer for the SCVWCD. Blackie and Wood became partners in 1939. The civil engineering firm concentrated on water conservation, flood control, reclamation, irrigation and power projects. Wood retired shortly after the Uvas Dam was completed. Blackie continued to work until 1973.[6]

Although most of the local water conservation districts merged with SCVWCD in 1968, the people served by the South Santa Clara Valley Water Conservation District voted to remain independent. In 1981, the board of directors changed the district's name to the Gavilan Water Conservation District. SCVWCD annexed the south district in 1987 and gained control of the Chesbro and Uvas dams at that time.[7]

Evaluation Considerations

In 2003, JRP Historical Consulting Services evaluated another dam, the Almaden Dam, of the Santa Clara Valley Water District, in the report, "Historical Resources: Almaden Dam, Santa Clara Valley Water District." At that time JRP determined that Almaden Dam, by itself, was not eligible for the National Register of Historic Places or the California Register of Historic Resources because "[it] is part of a larger system, the other parts of which are not part of this evaluation. By itself, the dam would not be considered sufficiently significant to appear eligible for the National Register of Historic Places under Criterion A at either the local, state, or national level. It is possible that the system as a whole, should it be inventoried and evaluated, could qualify as a significant property assuming it has retained its over all integrity."[8] The entire system of Santa Clara Valley District system of dams is the subject of this current evaluation and it still does not appear that

[3] Harold Wood, Blackie & Wood, "Report to the Honorable Board of Directors of the South Santa Clara Valley Water Conservation District on Uvas Creek Dam, Reservoir, Conduit and Well Replenishment Project Proposed to be Constructed Jointly with Santa Clara Valley Water Conservation District and on Proposed Llagas Creek Dam, Reservoir and Well Replenishment Project" Project Report No. 15 (San Francisco: Blackie and Wood, Civil Engineers, March 1953), 2-3.
[4] California History Center, *Water in Santa Clara Valley*, passim.
[5] Local Board for City of Anderson, [Draft] Registration Card # 28 and Registrar's Report # 4-3-12 A (June 5, 1917), Ancestry.com, available at http://content.ancestry.com/iexec/?htx=View&r=an&dbid=6482&iid=CA-1531273-2162&fn=Edwin+Earle&ln=Blackie &st= r&pid=29461024 accessed on July 20, 2006; U. S. Census Bureau, Fourteenth Census of the United States: 1920 - Population, Corcoran Township, Kings County, California, 1920, Sheet 7-A, line 18; U. S. Census Bureau, Fifteenth Census of the United States: 1930 Population Schedule, Sacramento City, Sacramento County, California, Sheet 3A, line 45.
[6] Water Resources Center Archives, "Blackie (E.E.) & Tibbetts (Fred H.) Papers" summary available at the Online Archive of California, http://content.cdlib.org/search?type=archival+collection&rmode=ead&style =oac-ead&text=Blackie+and+Tibbetts, accessed July 20, 2006; Thornton Corwin, "Harold I. Wood (1886-1973), in American Society of Civil Engineers, *Transactions of the American Society of Civil Engineers*, 579. Available at www.pubs.asce.org/WWWdisplay.cgi?7499921, accessed on July 20, 2006.
[7] Santa Clara Valley Water District, "History of the Santa Clara Valley Water District" available at http://www.valleywater.org/About_Us/History/1900s_to_1940s.shtm, accessed on July 20, 2006.
[8] JRP Historical Consulting, "Historic Resources Report: Almaden Dam, Santa Clara Valley Water District," (Davis, California, 2003).

Uvas Dam or its appurtenances meet the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources (and thus are not historically significant under CEQA guidelines).

The San Francisco Section of the American Society of Civil Engineers (ASCE) recognized the Santa Clara Valley Water Conservation District system (of which Uvas Dam is now a part) in 1976 as a "historic civil engineering landmark." While this designation imparts no particular regulatory status, it represented an acknowledgment of the system's significance to interested northern California civil engineers.[9] The report prepared by the ASCE section listed two "special notes" regarding the SCVWCD system as a whole:

1. This system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin.

2. This water supply development facilitated the post World War II growth of the Santa Clara Valley into one of the major metropolitan areas of the country.[10]

However, even with this designation in mind, it does not appear that Uvas Dam and its outlet structures meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources.

It is difficult to establish a single standard for what might constitute significance for a dam because there are several areas in which that significance might come into play. In general, however, the test would be some type of importance that is not common to other dams in the region or state. Innovation might be one test: for example, was the dam the first to be built specifically to recharge a local aquifer? This was one of the reasons the ASCE San Francisco section considered the SCVWCD system an engineering landmark. While Uvas Dam is currently a part of the Santa Clara Valley Water District, its construction in 1957 was under the South Santa Clara Valley Water Conservation District (renamed Gavilan Water Conservation District in 1980) to augment the water conservation system that was already in operation since the 1930s.[11] Uvas Dam and its appurtenances were constructed using engineering techniques already in use by the Santa Clara Valley Water District's original water conservation system of dams, constructed in the 1930s. These engineering techniques proved successful with the first set of dams constructed in the area and therefore were implemented when building Uvas Dam. Size or engineering achievement might be another test, if a dam was unusual for its design, or represented a breakthrough in the science of dam engineering, or represents a rare example of its type, which Uvas Dam does not.

[9] ASCE, *Historic Civil Engineering Landmarks*, 29. The Historic Civil Engineering Landmark Program recognizes historically significant local, national, and international civil engineering projects, structures, and sites. The Historic Civil Works award recognizes projects that were built prior to the advent of engineering as a discipline in the 18th century. The objectives of the program are to: 1) encourage all civil engineers to become more aware of the history and heritage of their own profession; 2) increase appreciation by the public of civil engineering contributions to the progress and development of the United States and the world, 3) identify and designate national historic civil engineering works that have made a significant contribution to the development of the United States and to the profession of civil engineering in particular, 4) encourage, where appropriate and feasible, the preservation of significant historic civil engineering works, 5) provide a documented archive of Civil Engineering Historic Landmarks for the use of engineering students, professional writers, researchers, and historians, as well as promote the inclusion of information on Historic Civil Engineering Landmarks in encyclopedias, guidebooks, and maps used by the general public. (From the ASCE web site, http://www.asce.org /history/hp_resguide 2.html). However the Uvas Dam was not part of the SCVWCD system at the time of ASCE's recognition of the system.
[10] ASCE, *Historic Civil Engineering Landmarks*, 28.
[11] In 1987 the Santa Clara Valley Water District annexed the Gavilan Water Conservation District and its dams and reservoirs, including Uvas and Uvas. In doing this, the District gained complete control over the system of dams in Santa Clara County. Santa Clara Valley Water District website: http://www.valleywater.org, accessed March 22, 2006.

Several general observations regarding dams merit discussion by way of introduction. The first observation is an obvious but important point: there are many earth fill dams in California. 72% of dams in California under the jurisdiction of the Division of Safety of Dams are earth fill. Collectively, all of these dams serve important functions, and the dams of the SCVWCD obviously benefited the region's urban areas and agriculture. Individually, however, any one dam is part of a larger system and one of a vast number of similar properties.

Second, it is important to understand dams in general as part of a class of infrastructure improvements that deliver benefits to broad constituencies. Certain types of improvements fit this definition of infrastructure. Most public works projects fall into this category, including state and local road systems, municipal water systems, sewer systems, hospitals, schools, airports, and the like. Major utility features also fall into this category, including electric power generating plants, natural gas pipelines, railroads, and telephone service. These elements of the infrastructure are obviously important to the communities they serve. In time, members of the community come to rely upon these elements for their basic needs, the roads they drive, water they drink, electricity they use, and so forth. Thus, in many communities, dams are essential elements of the infrastructure.

This point is useful in appreciating how significance might be assessed for such properties. In a sense, every element of the infrastructure is important. Unless judgment is exercised, however, every dam, road, bridge, telephone line and sewer system might be seen as eligible for the National Register for its contribution to the local community and its development. To avoid that overbroad conclusion, such infrastructure elements must be assessed within the context of similar property types. For a road to be significant, for example, it must be shown to be important within the context of other roads, recognizing that each road has made some type of contribution to the community. A similar type of judgment must be exercised in evaluating dams.

Another consideration in evaluating significance of dams is the period of significance. The area of significance defines the period of significance. If a dam is significant for its design, the period of significance should be restricted to the era in which the dam was built. However, if it is important for its contribution to the initial settlement of a region, the period of significance should be restricted to the settlement period.

Finally, integrity is assessed for the resource's period of significance. The property must retain integrity to its potential period of significance if it is to meet the criteria for listing in the National Register of Historic Places or as an important resource under California law and regulations.

The following discussion presents an evaluation of Uvas Dam under National Register and California Register criteria and its integrity.

Evaluation of Significance:

Criterion A or 1: Uvas Dam is an integral unit of the SCVWD's system, which played a role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. However, as noted above, major infrastructural elements are inherently important to their communities. For example, while the SCVWCD system may have been important in the economic development of the Santa Clara Valley, the same might be said of completion of railroads through the area in the nineteenth century, or construction of modern roads and highway systems in the twentieth century. Moreover, the area receives water from other systems, including (in more recent years) the State Water Project. It is unlikely that construction and operation of the SCVWCD system, as a whole, was the principal driving force behind the economic development of the area. Rather, it was one of several factors leading to the construction of the Santa Clara Valley dams. Uvas Dam was one of several dams within the system constructed to augment and add to the existing water conservation system of dams; like Chesbro Dam, it was built by a different district and only later added to the SCVWD system.

Criterion B or 2: Uvas Dam does not have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore does not appear eligible under this criterion. While Uvas Dam is associated with the engineering firm Blackie and Wood, it is inappropriate to use its association with Edwin E. Blackie and Harold I. Wood under Criterion B or 2 to evaluate the dam because of their role as designers of the dam. Rather, role of Blackie and Wood should be considered under Criterion C or 3, considering the dam as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: does Uvas Dam exhibit particular significant design or engineering characteristics, and is it the work of a master engineer. Each of these considerations will be addressed in turn.

First, Uvas Dam is a structure of common design that represented no particular engineering achievement at the time it was constructed. Earth fill dams were common since the 1930s. Of the 811 earth fill dams under the jurisdiction of the state, 197 dams have dates of construction prior to 1936, some dating as early as 1850 and 1851. Nothing in the accounts of Uvas Dam's construction (or construction of other dams in the system) suggests that they were designed and built through anything other than a standard process.

Furthermore, Uvas Dam was constructed to provide the South Santa Clara Valley Water Conservation District with an additional water conservation unit to serve the Santa Clara Valley Water District's system, already in place since the 1930s. The original dams constructed by the Santa Clara Valley Water District in the 1930s were constructed to operate as a system. Uvas Dam was not part of the original system's plan, but rather was constructed in the southern portion of the county during the post-World War II period when more water conservation was needed. Uvas Dam was constructed using standard engineering methods and planning that had been in existence and therefore was not an innovation.

Second, was this dam the work of a master, in this case Blackie and Wood, and if so, was it an important example of their work? While individually and as a firm Blackie and Wood had prolific careers, which focused on projects in both northern and southern California as well as other states including Alaska, Arizona, and Nevada. However, their work in civil engineering does not appear to have been pioneering or outstanding in the community of engineers. Nor, does anything in the historic record suggests that Uvas Dam was of particular importance or a challenging example of their work as engineers. Rather, it was one of many dams and large construction projects that they designed. Consideration of these factors indicates that Uvas Dam and its outlet features do not appear to meet the criteria for listing in the National Register of Historic Places under Criterion C or 3.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important. In rare instances, structures, such as dams and buildings, can serve as sources of important information about historic construction materials or technologies; however, this property is otherwise documented and does not appear to be a principal source of important information in this regard.

Integrity
As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. Uvas Dam has retained a very good level of integrity in all seven measures. It remains, obviously, in its original location, the setting of which is unchanged from its original construction beyond the growth of trees in the surrounding area. It has not been substantially altered (the only changes being to its intake structure beneath the water surface, and minor changes around the outlet structures) so it retains integrity of design, workmanship, and materials. Although it was previously operated out side of the SCVWD system, Uvas Dam was constructed to work in conjunction with it. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while at or while viewing the site. Uvas Dam has a strong sense of time and place. While the dam retains overall integrity from its period of construction, it does not appear that the dam or its

appurtenances meet the criteria for listing in the National Register of Historic Places nor the California Register of Historical Resources, and thus are not historically significant under CEQA guidelines.

Photographs (cont.)

Photograph 2. Uvas Dam Spillway, camera facing east. April 17, 2006.

Photograph 3. Former Gavilan Water Conservation District office building, camera facing east. April 17, 2006.

Photograph 4. Concrete block control structure, camera facing northwest. April 17, 2006.

Photograph 5. Uvas Dam outlet building. April 17, 2006.

Photograph 6. Outlet man-way, camera facing east. April 17, 2006.

Photograph 7. Uvas Dam control building. April 17,2006.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # ______________________
HRI # ______________________
Trinomial ______________________

*Resource Name or # (Assigned by recorder) Uvas Dam

*Recorded by R. Herbert/J. Cheney *Date April 17, 2006 ☒ Continuation ☐ Update

Photograph 8. Instrument structure and concrete valve box. April 17, 2006.

Photograph 9. Concrete seepage weirs on rear of Uvas Dam. April 17, 2006.

Photograph 10. Uvas Dam seepage weirs. April 17, 2006.

Photograph 11. Uvas Dam outlet chute. April 17, 2006.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # ______________________
HRI # ______________________
Trinomial ______________________
NRHP Status Code 3

Other Listings ______________________
Review Code ________ **Reviewer** ______________________ **Date** ________

 ***Resource Name or #** (Assigned by recorder) Santa Clara Valley Water District Dams

P1. Other Identifier: Santa Clara Valley Water District Dams of the Original 1930s-Era Construction

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** ________ **Date** ________ **T**____; **R** ____; ___ ¼ **of Sec** ____; ______ **B.M.**

c. Address ____________ City__________ Zip ____________

d. UTM: (give more than one for large and/or linear resources) Zone ______; ____________mE/ ____________mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form documents the original seven dams constructed by the Santa Clara Valley Water Conservation District between 1934 and 1936. This group of resources is the original system of dams developed to collect and store water to augment ground water supplies. The features of this system are Coyote Dam, Coyote Percolation Dam, Almaden Dam, Guadalupe Dam, Vasona Dam, Stevens Creek Dam, and Calero Dam. (See Continuation Sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)

***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Coyote Percolation Dam, camera facing north. April 17, 2006.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1934-1935, Santa Clara Valley Water District

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
R. Herbert/J. Cheney
JRP Historical Consulting LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historical Resources Report: Santa Clara Valley Water District Dams" (2006).

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record Artifact Record ☐ Photograph Record ☐ Other (list) ____________

NRHP Status Code: 3

***Resource Name or #** (Assigned by recorder) Santa Clara Valley Water District Dams

D1. Historic Name: Santa Clara Valley Water Conservation District Original System Dams

D2. Common Name: Same as D1.

D3. Detailed Description (Discuss overall coherence of the district, its setting, visual characteristics, and minor features. List all elements of district.):
Descriptions of the seven individual dams that are elements of this District appear below. Each is considered a contributing feature or element within this district. Together these dams formed the Santa Clara Valley Water Conservation District's original water conservation system.

Coyote Dam: Coyote Dam was constructed in 1935-1936. It is a rolled earth filled dam, with a crest length of 970 feet, and height of the spillway crest elevation 779.9 feet. The dam has a freeboard of 25 feet, and is 100 feet wide at the top and 945 feet wide at the base. Its slopes have ratios of 4:1 below an elevation of 718 feet, and 3.5:1 from elevations 718 to 758 feet, and 3:1 above an elevation of 758 feet.

It originally contained 1.2 million cubic yards of fill. The intake valves consist of slide gates. A modern concrete outlet tunnel features 48-inch diameter fixed cone and six-inch diameter ball valves. In 1990, the Anderson Pacific Company installed a new 702-foot long concrete lined outlet tunnel with a 96-inch diameter. Anderson Pacific sealed the original outlet closed with grout. The new outlet provides for release of a maximum of 450 cfs. In 1984/1985 the entire spillway was replaced due to severe deterioration; the new spillway is in the location of the original structure. An ogee section spillway is located on the north side of the dam, and has a capacity of 33,000 cfs. The spillway leads to the modern outlet chute. The spillway weir is 110 feet in length. Behind the dam, the Coyote Reservoir has a 22,925 acre-feet capacity. Coyote Dams is operated as a coordinated system in conjunction with Anderson Dam, located downstream. (See Continuation Sheet.)

***D4. Boundary Description** (Describe limits of district and attach map showing boundary and district elements.):
The Santa Clara Valley Water District Dams constructed in the 1930s comprise a discontiguous historic district of seven discrete elements. Each dam is in a different location on streams in the San Jose area. The boundaries that make up this district are formed by the dams and their appurtenant structures owned by the SCVWD. They are shown on the accompanying maps.

***D5. Boundary Justification:**
The Office of Historic Preservation offers guidance concerning the determination of district boundaries: "Boundaries should encompass, but not exceed, the extent of the significant resources and land area that contribute to the importance of the district." For this evaluation, the Santa Clara Valley Water District dams constructed in the 1930s encompass the acreage and associated structures that make up these dams' structure; the full shoreline and reservoir surface area fluctuates seasonally and is not included in the boundary.

***D6. Significance: Theme:** Engineering **Area:** California
Period of Significance: 1934-1936 **Applicable Criteria:** A and C
(Discuss district's importance in terms of its historical context as defined by theme, period of significance, and geographic scope. Also address the integrity of the district as a whole.)

See Continuation Sheet.

***D7. References** (Give full citations including the names and addresses of any informants, where possible.):

See Continuation Sheet.

***D8. Evaluator:** R. Herbert/J.Cheney **Date:** August 2006
Affiliation and Address: JRP Historical Consulting LLC, 1490 Drew Ave., Suite 110, Davis, CA 95618

NRHP Status Code: 3

***Resource Name or #** (Assigned by recorder) Santa Clara Valley Water District Dams

D3. Detailed Description (Continued)

Coyote Dam (Continued)

At the crest of the dam is a building that is used to house outlet controls. It is topped with a shed roof and sided in smooth stucco. Set in the north wall are metal louvered vents and several metal pipes. The building is accessed by two flush, metal, single-leaf doors.

Photograph 2. Coyote Dam, camera facing west. February 8, 2006.

Photograph 3. Coyote Dam Spillway. February 8, 2006.

Photograph 4. Coyote Dam outlet control building. February 8, 2006.

NRHP Status Code: 3

***Resource Name or #** (Assigned by recorder) Santa Clara Valley Water District Dams

Coyote Percolation Dam. Coyote Percolation Dam was constructed in 1932, making it one of the oldest structures on the system. It forms a relatively low concrete weir located in the streambed of Coyote Creek at Metcalf Road. Its small reservoir is formed by an 8-foot high removable flashboard dam, with a reinforced concrete floor and concrete abutments. The reservoir covers 32 acres and percolates natural flow at medium river stages and also storage flow from Anderson Dam when the natural flow is low or decreased. The weir can be flashed up to the approximate height of the channel banks, approximately 20 feet above the streambed. This structure is located on Coyote Creek, and rests on clay and gravel banks of the stream channel.

Photograph 5. Coyote Percolation Dam, camera facing north. February 8, 2006.

Photograph 6. Coyote Percolation Dam, camera facing east. April 17, 2006.

Photograph 7. Coyote Percolation Dam, camera facing west. April 17, 2006.

Guadalupe Dam: Guadalupe Dam, constructed in 1935, is a rolled earth filled dam, with a crest length of 650 feet, and an elevation of 617.3 feet. The dam is 129 feet in height. The dam has a designed freeboard of 9.7 feet, and is 20 feet wide at the top and 650 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. The dam also features a functional curb, which was constructed when the freeboard was restored in 1972. It originally contained 612,000 cubic yards of fill. The dam features a 42-inch diameter sluice gate intake valve and a 30-inch diameter butterfly outlet valve. Its outlet provides for release of a maximum of 235 cfs through a 720-foot long, 36-inch diameter steel pipe. A side channel spillway is located on the south side of the dam, and has a capacity of 6,000 cfs. The spillway weir has a length of 80 feet. Behind the dam, the Guadalupe Reservoir has a capacity of 3,228 acre-feet.

There are two buildings associated with this dam. Along the upstream face of the dam is a single rectangular, concrete, instrument storage structure. Small metal doors provide access to the instruments inside. The dam's plaque memorializing its construction was originally located on the side of this building, but has been removed. The second structure is located at the upstream (west) side of the dam and contains outlet pipe instruments. It is a one-story, concrete masonry block building with a rectangular footprint and topped by a flat roof with parapet walls. Two sides feature screened openings. This building is accessed through a flush, metal single-leaf door.

Photograph 8. Guadalupe Dam. April 17, 2006.

Photograph 9. Guadalupe Dam spillway. April 17, 2006

Photograph 10. Guadalupe Dam concrete block control building. April 17, 2006.

Calero Dam: Calero Dam and its Auxiliary Dam were constructed in 1935. Together they create the 10,050 acre-feet Calero Reservoir. Calero Dam is an earth dam, with a crest length of 840 feet, and spillway elevation of 483.5 feet. It is 98 feet in height over all. The dam has a freeboard of six and a half feet, and is 20 feet wide at the top and 495 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 722,000 cubic yards of fill. The dam features a 42-inch diameter sluice inlet valve and a 30-inch diameter butterfly outlet valve. Its outlet provides for release of a maximum of 185 cfs through a 481-foot long, 36-inch diameter steel pipe. The ogee chute style spillway is located on the east side of the dam, and has a capacity of 5,260 cfs. The spillway weir is 82 feet in length. The Auxiliary Dam is an earth filled saddle dam standing 40 feet high with a crest length of approximately 500 feet. Constructed at the same time and with the same design and methods as Calero Dam, the Auxiliary Dam is located 1,167 yards east of Calero Dam. The dam has a freeboard of six and a half feet, and is 20 feet wide at the top.

Photograph 11. Concrete block valve control housing on Calero Dam, camera facing west. April 17, 2006.

Fellows Dike serves to protect a ranch established prior to the main Calero Dam's constructions from flooding from the reservoir. (See **Photograph 15**)

Photograph 12. Calero Spillway, camera facing northeast. April 17, 2006.

Photograph 13. Calero Dam valve control buildings, camera facing southeast. April 17, 2006.

Photograph 14. Calero Auxiliary Dam, camera facing west. April 17, 2006.

Photograph 15. Fellows Dike, camera facing north. April 17, 2006.

Stevens Creek Dam: Stevens Creek Dam was constructed in 1935. It is a rolled earth filled dam, with a crest length of 1,000 feet. Its spillway elevation is 534.9 feet, and it stands 129 feet in height over all. The dam has a freeboard of 19.2 feet, and is 20 feet wide at the top and 750 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. The dam originally contained 567,000 cubic yards of fill. It features two 42-inch in diameter sluice intake valves and two 30-inch butterfly outlet valves. Its outlet provides for release of a maximum of 410 cfs through an 890-foot long, 50-inch diameter steel pipe. A side channel spillway is located on the south side of the dam, and has a capacity of 15,715 cfs. The spillway weir has a length of 172 feet. Behind the dam, the Stevens Creek Reservoir has a capacity of 3,465 acre-feet.

There are several structures at the dam site. An instrument storage box, adjacent to a shed, is located on the dam's upstream (north) side. The instrument box is sided in concrete masonry block, rests on a concrete foundation, and is the location of the dam's bronze plaque memorializing its construction. A building adjacent to it also rests on a concrete foundation, is topped with a shed roof and is sided in concrete masonry block. One flush, metal, single-leaf door serves as the entrance to this building. At the dam's downstream side to the east is an outlet pipe structure. It is a small, rectangular, concrete masonry building with a flat roof and parapet walls. Two metal hatches are located on the roof. A flush, metal, single-leaf personnel door accesses the building. Another instrument storage box is located along the dam's upstream side, slightly further south than the instrument box described above. Two metal hatches at the structure's roof provide access to the instruments inside.

Photograph 15. Stevens Creek Dam, camera facing east. April 17, 2006.

Photograph 16. Stevens Creek Dam spillway, camera facing south. April 17, 2006.

Photograph 17. Stevens Creek Dam concrete block control building. April 17, 2006.

Vasona Dam: Vasona Dam, constructed in 1935, is a combination rolled earth and concrete buttress dam, with a crest length of 1,000 feet. Its spillway elevation is 294.8 feet, and is 30 feet in height over all. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 70,000 cubic yards of fill. The concrete buttress spillway is located on the west side of the dam, and has a capacity of 12,600 cfs. The dam has a freeboard of ten feet, and is 20 feet wide at the top and 153 feet wide at the base. Its side slope ratio is 2:1 on its upstream side and 3:1 at its downstream slope. Its outlet system consists of a 42-inch diameter slide gate and two 13-foot by 10-foot radial gates. The outlet system also provides for release of an estimated maximum of 125 cfs through a 20-foot long, 42-inch diameter pipe. Vasona Reservoir has a 400 acre-foot capacity.

Photograph 18. Vasona Dam, camera facing south. April 17, 2006.

Photograph 19. Vasona Dam, camera facing north. April 17, 2006.

Photograph 20. Vasona Dam outlet, camera facing north. April 17, 2006.

Almaden Dam: Almaden Dam is a rolled earth fill dam, constructed in 1935-1936. It was originally built with a crest length of 475 feet, and height from Almaden Creek's streambed to the spillway crest of 97 feet, and 100 feet in height over all. The dam has a freeboard of eight feet, and is 20 feet wide at the top and 545 feet wide at the base. Its side slope ratio is 2.5:1 on both the upstream and downstream sides. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 250,000 cubic yards of fill. The dam features a 42-inch diameter sluice gate intake valve and two 30-inch diameter butterfly outlet valves. Its outlet provides for release of a maximum of 250 cfs through a 696-foot long, 36-inch diameter steel pipe encased in concrete placed through the dam's foundation and connecting to the streambed, and Almaden – Calero Canal (after passing beneath the spillway). At the dam's crest is a small control housing structure. This structure has a shed roof, and is sided in concrete masonry block, with a single personnel door. A side channel spillway is located on the eastern side of the dam, with a capacity of 6,000 cfs. The spillway weir is 123 feet long. Behind the dam, Almaden Reservoir has a capacity of 1,586 acre-feet.

There are two sets of buildings at the outlet. The first, a single rectangular, concrete masonry block building approximately ten by ten with a single personnel door and flat roof with side parapets, is located in the stream bed and serves as the outlet for the dam into Almaden Creek for replenishment of groundwater downstream. The second set is comprised of two concrete block rectangular buildings (one flat roof and one shed) with personnel doors and vents, located at the end of the outlet controlling flows into the Almaden – Calero Canal. Also at this location are manually operated slide gates on the downhill side of the canal wall, to allow for drainage into Almaden Creek, and a large steel trash rack covering the opening of the short pipe/tunnel under the spillway that carries the canal. All are part of the original construction of the dam.

Photograph 21. Alameda Dam outlet control building in streambed. April 17, 2006.

Photograph 22. Outlet control building in Almaden-Calero Canal. April 17, 2006.

Photograph 23. Upper end of Alameda Dam spillway. April 17, 2006.

Photograph 24. Alameda Dam Outlet control building in stream bed with downstream face of Almaden Dam in background. April 17, 2006.

Photograph 25. Concrete block valve control housing on Alameda Dam crest, west of spillway. April 17, 2006.

D6. Significance (continued):

The following discussion presents an evaluation of Almaden, Vasona, Stevens Creek, Guadalupe, Coyote, Calero, and Coyote Percolation dams (hereafter referred to as the SCVWD 1930s dams) as a discontiguous district under National Register / California Register significance criteria A / 1 and C / 3; the dams also retain sufficient integrity to merit such a listing.

Criterion A or 1: The SCVWD 1930s dams are the original and integral units of the SCVWCD's system, which played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. The SCVWCD system was important in the economic development of the Santa Clara Valley, because it provided a steady, reliable, and consistent supply of water for municipal, industrial, and agricultural uses. While any dam might be considered important this way, the construction of the seven dams as a unified system provided for continued development on a scale that was larger and provided a supply more certain than that that might have been provided by any single such structure. The fact that later dams provided additional supplies, or that the area receives water from other systems, including (in more recent years) the State Water Project, does not diminish the importance of the original seven. While it is unlikely that construction and operation of the SCVWCD system, as a whole, was the sole driving force behind the economic development of the area, it did play a significant and lasting role in this context.

Criterion B or 2: Research did not suggest that the resources subject to this study have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore none of the properties appear eligible under this criterion. While the original system is closely associated with Fred H. Tibbetts, an influential hydraulic engineer, it is inappropriate to use its association with Tibbetts under Criterion B or 2 to evaluate the dam, as it would better be considered under Criterion C or 3, as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: do the SCVWD 1930s dams exhibit particular significant design or engineering characteristics, and is it the work of a master engineer? Each of these considerations will be addressed in turn.

First, the SCVWD 1930s dams are structures of common design that represented no particular engineering achievement at the time they were constructed. Earth fill dams were common in the 1930s. Of the 811 earth fill dams under the jurisdiction of the state, 197 have dates of construction prior to 1936, some dating to as early as 1850 and 1851. Interestingly, Harold I. Wood, the field-supervising engineer on the SCVWCD project had recently been involved in construction of the El Capitan Dam in San Diego County. That dam was described as the largest earth fill dam in the world in 1934.[1] Nothing in the accounts of district's dams' construction suggests that they were designed and built through anything other than a standard process.

Second, were the SCVWD 1930s dams an innovative system, as the San Francisco Section of the ASCE maintained? Certainly, the concept of using a dam to flood an aquifer had been done before in northern California; it was this idea that the Spring Valley Water Company used in building Sunol Dam on Alameda Creek to saturate the lands behind the structure.[2]

[1] DWR/DSD. *Dams Within the Jurisdiction of the State of California,* 1-52; *San Jose Mercury Herald,* December 5, 1934.
[2] Interestingly, the San Francisco Section called out the Sunol System as an historic civil engineering landmark as well. ASCE. *Historic Civil Engineering Landmarks*.

The SCVWCD's supporters acknowledged that the concept was not particularly innovative, noting in 1931 that "the plan has the unanimous approval of engineers here and elsewhere." They added, "it has been used successfully throughout Southern California for many years."[3] In addition, the History and Heritage Committee of the Los Angeles Section of the ASCE listed three landmarks in May of 1974 that were structures that served similar functions: the Deep Gallery Spreading Grounds of the City of Los Angeles (1904), Pecoles Canyon Submerged Dam (1886-87), and the Spreading Grounds of the Los Angeles County Flood Control Project (1917-32).[4] That being said, the significance of the SCVWD 1930s dams as a system is that water in the system's reservoirs was (and is) used to replenish downstream groundwater; as noted above, this fact was reported by the San Francisco Section, which stated "this system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin."

Third, was this dam the work of a master, in this case Frederick Horace Tibbetts (1882-1938), and if so, was it an important example of his work? Tibbetts was an influential hydraulic engineer of northern California, and with his partner Stephen Keiffer was responsible for many important projects. Tibbetts also served as an advisor to the State of California during development of the State Water Plan in the 1920s. It was Tibbetts and Keiffer who developed the original concept of the SCVWCD system, and it was Tibbetts who designed six of the seven dams of the system's original phase of construction between 1934 and 1936. He died in 1938, soon after the first phase of the system was completed. The ASCE prepared a biography of Tibbetts in 1940. In it they noted,

> Fred H. Tibbetts will probably be best remembered for his extensive flood-control, reclamation, and irrigation work in the Sacramento Valley and his highly successful water-conservation project in the Santa Clara Valley. However, his field of activity during a period of some thirty years of engineering practice extended well beyond the limits of the State of California, and embraced many of the varied branches of the profession. Few engineers in the history of California have contributed so extensively to the development of its agricultural lands and the control and conservation of its waters.
>
> … The second outstanding irrigation project [the other being for the Nevada Irrigation District] was one undertaken for the Santa Clara Valley Water Conservation District for the purpose of replenishing the underground water supply. The district, largely planted to orchards, was irrigated almost entirely by pumping from wells and, to 1934, the ground-water table had been dropping continuously at the rate of about 5 ft per yr until some of the pumping lifts were in excess of 200 ft. This condition was remedied by the construction of six detention reservoirs in the foothills and various regulating and distributing works in stream beds designed to retard runoff and induce percolation into the underground storage basin. A definite rise of the ground-water level has been experienced since completion of this work. The total cost of this project was about $3,000,000.[5]

Tibbetts was also placed in the Silicon Valley Engineering Hall of Fame, in recognition of his contributions to the Santa Clara Valley:

> Fred H. Tibbetts was the first Chief Engineer for the Santa Clara Valley Water Conservation District, the predecessor to the Santa Clara Valley Water District. In the early years of the twentieth century, he was a leader in the development and implementation of a master plan for local surface and groundwater development that still serves Santa Clara County's growing population. His vision of a system of dams,

[3] Tibbetts, *Report to the Honorable Board of Directors*, May 8, 1934. See "Statement by the General Water Advisory Committees."
[4] History and Heritage Committee of the Los Angeles Section of the ASCE, "Summary of Historic Civil Engineering Landmarks." Dated May 1974, updated to July 1980.
[5] American Society of Civil Engineers, *Transactions*, vol. 105 (New York: author, 1940), 1924-1928.

reservoirs, canal, and percolation facilities directly contributed to making available adequate water supplies and to the curtailment, in later years, of rapidly-advancing ground surface subsidence and saltwater intrusion.

Mr. Tibbetts was a practicing civil engineer who lived in Campbell, California and performed his engineering studies of Santa Clara Country water resources in the 1920s and 1930s. Water historians agree that Mr. Tibbetts' contributions to the development of Santa Clara County place him among the true visionary engineering leaders of his time. His ingenious blueprint for water conservation dramatically influenced the development of the Valley and has provided opportunities for generations of people and industries that have made Santa Clara Valley their home.

In 1976, the American Society of Civil Engineers recognized as a historic landmark the system of dams and reservoirs constructed in Santa Clara County under Mr. Tibbetts' guidance. The project was cited as "the first and only instance of a major water supply being developed in a single" groundwater basin involving the control of numerous independent tributaries to effectuate almost optimal conservation of practically all the resources of water flowing into the basin." Mr. Tibbetts' contributions are recorded in the book "Water in the Santa Clara Valley: a History" published in 1981 by the California History Center of De Anza College.[6]

These factors indicate that the SCVWD 1930s dams and their associated features can be considered the work of a master, Fred H. Tibbetts, and thus appear to meet the criteria for listing in the National Register of Historic Places under Criterion C and the California Register of Historical Resources under Criterion 3. Interestingly, Tibbetts' ashes are interred in a concrete addition to the original control structure on Coyote Dam.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important.

Integrity

As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. The SCVWD 1930s dams have retained a very good level of integrity in all seven measures. They remain, obviously, in their original location, the settings of which are largely unchanged from its original construction beyond the growth of trees and construction of scattered residences in the surrounding areas. They have not, over-all, been substantially altered, although Coyote Dam has received a new outlet tunnel, Coyote Percolation Dam has received a new fishway, and several of the dams have had minor changes to intake structures (typically located beneath the water surface) and minor changes around the outlet structures. The result is that the dams retain integrity of design, workmanship, and materials. They remain part of the SCVWD's system, so its association also has been retained. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while at or while viewing the site. All of the dams have a strong sense of time and place.

Period of Significance for the SCVWD 1930s Dams

The period of significance for the SCVWD 1930s dams would start in 1932, with construction of the Coyote Percolation Dam, through 1950, when construction of the second generation of dams began.

[6] Silicon Valley Engineering Hall of Fame website, available on line: http://www.svec.org/hof/1992.html, accessed July 25, 2006.

Discontiguous District Boundaries

The dams are widely separated by distance, located in different streamsheds. It is therefore logical to consider them as a discontiguous district in which the dams and their appurtenant features are considered contributing elements. For the purposes of this evaluation, the SCVWD 1930s dams' discontiguous district boundaries are the footprint of the individual dams themselves.

Contributors in the Proposed Original Dams of the Santa Clara Valley Water District Discontiguous District:

Dam	*Date of construction*	*NR Status*	*Associated Resources*	*Individual Eligibility*
Coyote Percolation Dam	1932; alterations	Contributor to discontiguous district	Spillway, modern fish ladder	No
Coyote Dam	1935-1936	Contributor to discontiguous district	Spillway, associated control structures	No
Guadalupe Dam	1935	Contributor to discontiguous district	Spillway, two structures	No
Calero and Auxiliary Dam, Fellows Dike	1935	Contributor to discontiguous district	Spillway, auxiliary dam, control buildings, Fellows Dike, canal from Almaden Dam	No
Stevens Creek Dam	1935	Contributor to discontiguous district	Spillway, outlet pipe structures, instrument structures	No
Vasona Dam	1935	Contributor to discontiguous district	Integrated Spillway	No
Almaden Dam	1935-1936	Contributor to discontiguous district	Spillway, instrument structures; canal to Calero Dam	No

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Maps

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Tiffany Hernandez, SCVWD, October 31, 2003

FINDING OF EFFECT

for the

Coyote Percolation Dam Replacement Project
Santa Clara County, California

Prepared For:

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TABLE OF CONTENTS

APPENDICES

1 INTRODUCTION

Valley Water (formerly Santa Clara Valley Water District) is conducting the Federal Energy Regulatory Commission (FERC) Order Compliance Project (FOCP) in advance of the Anderson Dam Seismic Retrofit Project (ADSRP), and the FOCP includes replacement of the existing Coyote Percolation Dam. Citing a need to imminently reduce risk to the public, FERC's Director of Dam Safety and Inspections provided dam safety directives on February 20, 2020, mandating implementation of the FOCP. The FOCP is being conducted as an undertaking separate from the ADSRP, with FERC acting as the federal lead agency responsible for compliance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA). The FOCP requires compliance with Section 106 and its implementing regulation under Title 36, Code of Federal Regulations, Part 800 (36 CFR 800). The U.S. Army Corps of Engineers (Army Corps) will rely on FERC's NEPA and NHPA documentation to the extent possible, but will also need to make determinations under NEPA and NHPA as part of the project's Section 404 permitting process. A Programmatic Agreement (PA) for the FOCP was executed on September 9, 2020, between FERC and the California State Historic Preservation Officer (SHPO), with Valley Water, Army Corps, the County of Santa Clara Parks and Recreation Department, and local Native American tribes as concurring and consulting parties. The Coyote Percolation Dam Replacement Project is one of six FOCP components.[1]

The Coyote Percolation Dam is located in the southern portion of the City of San Jose in Santa Clara County, California. It is situated southeast of the junction of US Highway 101 (US 101) and State Route 85, adjacent to Metcalf Park between Monterey Road and US 101 about 11 miles downstream of Anderson Dam. Coyote Percolation Dam impounds the waters of Coyote Percolation Pond, an in-stream reservoir in Coyote Creek, a tributary to San Francisco Bay, northwest of Metcalf Road. The Area of Potential Effects (APE) for this report is a portion of the larger FOCP APE. The portion of the APE relevant for this study is an area on the northeast bank of Coyote Percolation Pond encompassing Coyote Percolation Dam, three staging areas, and an access route extending northwest from Metcalf Road. See **Appendix A** for the Project Vicinity, Project Location, and FOCP APE maps, and **Appendix B** for a Project Activity map.

Coyote Percolation Dam is the sole built environment historic property in the APE. This structure was found eligible for listing in the National Register of Historic Places (NRHP). It is also eligible for the California Register of Historical Resources (CRHR). JRP Historical Consulting, LLC (JRP) recorded and evaluated the dam in 2006 for Valley Water in a report titled "Historic Resources Report: Santa Clara Valley Water District Dams." The 2006 evaluation concluded that the dam was eligible for listing in the NRHP and CRHR as a contributing resource to the Santa Clara Valley Water District Dams Historic District (P-43-003559), a discontiguous district consisting of the dams and appurtenant structures constructed in the 1930s that comprised the original and integral

[1] *Programmatic Agreement Between the Federal Energy Regulatory Commission and the California State Historic Preservation Officer Regarding the Activities Associated with the Anderson Dam at the Anderson Dam Hydroelectric Project (FERC Project No. 5737-007), Santa Clara County, California.*

components of the Santa Clara Valley Water Conservation District's system. The historic district was found eligible for listing in the NRHP / CRHR because it "played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels" (NRHP Criterion A / CRHR Criterion 1); and as an innovative water system and representative work of master hydraulic engineer, Fred H. Tibbets (NRHP Criterion C / CRHR Criterion 3).[2] The Santa Clara Valley Water District Dams Historic District was assigned a Primary Number (P-43-003559), but it does not appear that this conclusion ever received SHPO concurrence. For the present study, JRP conducted a field survey of Coyote Percolation Dam and updated the 2006 evaluation of the dam (previously included on a DPR 523 District Record). JRP affirmed the conclusion of the previous evaluation, although subsequent research in dam records at the Valley Water Library indicates the dam was constructed in 1934, not 1932 as previously reported. See **Appendix C** for JRP's letter report regarding re-evaluation of the dam, accompanied by the 2021 Coyote Percolation Dam Update DPR 523 form and the 2006 Santa Clara Valley Water District Dams DPR 523 form.

For the Coyote Percolation Dam Replacement Project, JRP prepared this Finding of Effect (FOE) report to assist Valley Water in complying with Section 106 by applying the Criteria of Adverse Effect set forth in 36 CFR 800.5., and to satisfy Stipulation I.A. of the PA. ***This FOE provides analysis regarding project impacts to Coyote Percolation Dam and concludes that the undertaking will have an adverse effect on the dam.***

[2] JRP Historical Consulting, LLC, "Historic Resources Report: Santa Clara Valley Water District Dams," prepared for Santa Clara Valley Water District (July 2006), 47-51.

2 DESCRIPTION OF THE UNDERTAKING[3]

2.1 Background

The Coyote Percolation Facility (Facility) is located on Coyote Creek, Santa Clara County, California, approximately 11 miles downstream of Anderson Dam and is used by Valley Water to impound water for the purpose of groundwater recharge. The channel-spanning Facility consists of a flashboard dam (composed of removable steel plates atop a reinforced concrete foundation), rock slope protection, fish ladder, radial gates, and 30-acre impoundment (the Coyote Percolation Pond). Valley Water has operated and maintained the Facility's dam pursuant to the California Department of Fish and Wildlife (CDFW) Lake and Streambed Alteration Agreement (LSAA) Number 1600-2009-0411-R3. As part of the FOCP and ADSRP, Valley Water proposes to replace the existing flashboard dam with an inflatable bladder dam and foundation in a manner that provides safe, effective, and timely upstream and downstream anadromous salmonid passage over the deflated bladder, to the maximum extent feasible. Valley Water also proposes modifications to the existing fish ladder to improve, to the maximum extent feasible, the ability for the ladder to provide safe, effective, and timely upstream and downstream anadromous salmonid passage when the dam is inflated.

2.2 Project Description

Design, construction, and operation will occur in two phases, with Phase 1 occurring in 2023 during the FOCP, and Phase 2 completed separately prior to 2027. Phase 1 will replace the existing flashboard dam with an inflatable dam and improve the fish ladder to increase operational flexibility over a greater range of flows. Based on initial discussions, Valley Water anticipates that Phase 2 will include a roughened ramp fishway to allow for passage over the deflated bladder. The Phase 2 fishway will be designed and constructed in a manner consistent with the National Marine Fisheries Service (NMFS) Anadromous Salmonid Passage Facility Design Guidelines (NMFS 2011) and CDFW California Salmonid Stream Habitat Restoration Manual.[4]

Facility operations during the period of FOCP are described in the FOCP Reservoir Drawdown and Operations Plan that was provided to the agencies for review on June 5, 2020, and filed with FERC on July 27, 2020. Future operations of this facility will be evaluated as a part of the ADSRP permitting efforts and implemented after ADSRP is completed and reservoir storage has been reestablished (i.e., 2031). At this time, Valley Water is only applying for permits to construct Phase 1; however, Phase 1 is being developed in consideration of Phase 2 goals. Phase 2 is still in the design stage, and it would be completed as a separate undertaking; it is not the subject of the FOCP permits, therefore, it is not discussed herein. All work conducted on or to the Coyote Percolation Dam will be performed during Phase 1. Descriptions and milestones for Phase 1 of the project are provided below.

[3] Most recent project description (April 9, 2021) provided by Valley Water in coordination with the NMFS.
[4] CDFW California Salmonid Stream Restoration Manual describes roughened channels for fish passage in Part XII, Fish Passage Design and Implementation, pages XII-57 to XII-80.

Phase 1. Phase 1 will be constructed during the FOCP and will consist of the bladder dam and its foundation (including modifications to the downstream rock slope protection) as well as replacing the existing weir panels of the existing fish ladder with adjustable weirs to enhance passage of anadromous salmonids. The bladder dam foundation and downstream rock slope protection will be constructed in a manner to facilitate the objectives of Phase 2. Phase 1 project components will include:

- Lowering the elevation of the dam foundation approximately three feet so that the elevation of at the top of the deflated bladder dam will be approximately 222.5 feet (NAVD88). This will further enhance anadromous salmonid passage objectives by reducing the elevation difference between the downstream channel and the foundation, as well as minimize the elevation change across the dam foundation.
- Reconstructing some, or all, of the grouted rock slope protection downstream of the dam to reduce the longitudinal slope between the dam structure and natural creek bottom and minimize abrupt slope breaks or drops. Rock slope protection installed during construction of Phase 1 will be placed in a manner that reduces the slope from the dam foundation to the downstream channel invert, which is consistent with developing downstream fish passage enhancements that may be undertaken as part of Phase 2.
- Replacement of the three existing adjustable fish ladder weirs and installation of additional adjustable weirs within the fish ladder to improve operations and increase the range of flows that the ladder is passable to salmonids. To improve anadromous passage in the fish ladder, the existing wooden stationary panels and sluice gates/weirs at the top three pools will be removed and replaced with double adjustable panels. Existing wooden stationary panels at five downstream pools will be removed and replaced with double adjustable panels.

Construction of Phase 1 is expected to begin late-spring 2023 and will be completed by December 2023 (although all in-channel work will be completed by mid-October). Construction methods and equipment will include construction of upstream and downstream cofferdams to bypass water around the construction site, removal and replacement of the dam foundation and downstream concrete apron, and removal and replacement of the grouted rock slope protection using a variety of heavy equipment, excavators, haul trucks, concrete trucks and pumps, and similar construction equipment. Flows to the fish ladder entrance will be temporarily diverted to remove the existing fish ladder panels and replace them with adjustable gates/weirs. A stop-block device will be installed at the entrance to the fish ladder to dewater it and allow completion of the modification work in a safe manner.

Measures to minimize effects to anadromous salmonids and habitat during construction will include biological monitoring and fish relocation during project site dewatering, monitoring of water quality during construction, and screening of water diversion pump inlets and outlets. Additionally, refueling and maintenance of heavy equipment will occur in an upland site.

Measures to minimize effects to anadromous salmonids and habitat during the period between Phase 1 construction completion and Phase 2 construction will be accomplished by maintaining bypass flows through the fish ladder per the LSAA requirements.

Monitoring will also be implemented to assess efficacy of Phase 1 anadromous salmonid passage improvements and to inform the design of Phase 2. This monitoring will include: 1) measuring depth of flow and velocity at points within the dam and downstream grouted rock slope protection at a range of flows when the bladder dam is deflated, as safety allows, and 2) monitoring of anadromous salmonid passage through the fish ladder through continuing use of a Vaki Riverwatcher installed seasonally within the ladder.

Considering the above, the key milestones for Phase 1 are as follows:

- 30, 60, and 90 percent design submitted to agencies through the Technical Work Group (TWG) with a 30-day agency review period.
- Final Designs will also be provided to the TWG with 15 days to provide comments to Valley Water.
- Site Specific Construction Plans will be developed (Water Quality Certification- Condition 6) by Valley Water and submitted to the TWG for review by June 15, 2021
- Geotechnical Investigations to be completed by October 31, 2021
- Construction begins May 1, 2023.
- Construction ends by December 2023
- Phase monitoring 1 begins post-construction in December 2023

Upon completion of both phases, the Facility will provide safe, effective, and timely upstream and downstream passage of anadromous salmonids regardless of whether the bladder is either inflated or deflated. The increased operational flexibility of a bladder dam will also benefit native aquatic species, including anadromous salmonids, by reducing available habitat for non-native fish species in the Coyote Percolation Pond when the bladder is deflated and allow for the downstream movement of sediment and debris.

A map illustrating project activities is in **Appendix B**.

2.3 Description of the APE

The Coyote Percolation Dam Replacement Project is a component of the FOCP, and the Coyote Percolation Dam Replacement Project APE is within the larger FOCP APE. The portion of the FOCP APE relevant for this study is an area on the northeast bank of Coyote Percolation Pond encompassing Coyote Percolation Dam, three staging areas, and an access route extending northwest from Metcalf Road. Coyote Percolation Pond and Dam are located between freeway US 101 and suburban residential development in the south end of the City of San Jose. Metcalf Park is located immediately south of the dam. The APE is **Figure 3** in **Appendix A**.

3 IDENTIFICATION OF HISTORIC PROPERTIES

Resource identification efforts for the present study included review of a records search from the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University on January 27, 2021 (NWIC No. 20-1331), conducted at the request of Far Western Anthropological Research Group, Inc. (Far Western) and shared with JRP. In addition, JRP reviewed the NRHP Database; California Historical Resources list curated by the California Office of Historic Preservation (OHP), which includes resources in the NRHP; OHP Built Environment Resource Directory (BERD), a list containing all resources reviewed for eligibility to the NRHP and the California Historical Landmarks programs through federal and state environmental compliance laws, and resources nominated under federal and state registration programs; and the Santa Clara County Historic Resources list.[5] Additionally, JRP conducted research in dam records at the Valley Water Library and online databases to determine dates of construction of built environment resources in the Coyote Percolation Dam Replacement Project APE, finding that the Coyote Percolation Dam, constructed in 1934, is the only built environment resource at least 45 years old in the APE. It was originally found eligible for listing in the NRHP through survey evaluation in 2006, and the evaluation was updated for this study. Far Western conducted studies to address archaeological resources.

JRP identified potential local interested parties for this project and sent notification letters to them on September 1, 2021. The letters were sent via U.S. Mail to: History San José; Preservation Action Council of San Jose; Santa Clara County Historical & Genealogical Society; and City of San Jose Historical Heritage Commission. The letter was sent via email to these organizations on September 16, 2021, and Nancy Moffett, President of the Santa Clara County Historical & Genealogical Society, sent an email response explaining that providing feedback regarding construction projects is outside the purview of her organization. Additional follow-up telephone calls were made to all but one of the remaining organizations on October 4, 2021. No telephone number is listed for the City of San Jose Historical Heritage Commission. Nicholas Jimenez, History San Jose Administration & Marketing Associate, responded via email, stating that "this is the first we are hearing about this Coyote Creek project. We are not directly impacted by it from what you described in the voicemail." The original letter was resent to Mr. Jimenez. No further responses were received. Copies of the letters to interested parties, follow-up communications, and a communications log are in **Appendix D**.

[5] National Park Service, National Register Research Database, accessed October 2020 at https://www.nps.gov/subjects/nationalregister/database-research.htm; California OHP, Built Environment Resources Directory, Santa Clara County, accessed October 2020 at https://ohp.parks.ca.gov/?page_id=30338; California OHP, California Historical Resources, Santa Clara County, accessed October 2020 at https://ohp.parks.ca.gov/listedresources/; Northwest Information Center, Sonoma State University, conducted by Far Western, Information Center File Number 20-1331, January 27, 2021; Santa Clara County Department of Planning, Historic Preservation Office, Historic Resources Inventory and South County Heritage Resource List.

4 DESCRIPTION OF RESOURCES

4.1 Coyote Percolation Dam

Coyote Percolation Dam is a low concrete and steel structure situated in Coyote Creek downstream from the Metcalf Road bridge (**Photograph 1, Photograph 2**, **Photograph 3**, and **Photograph 4**). The main part of the dam is 110 feet long and consists of steel-panel flashboards mounted on a concrete foundation. Other elements are concrete abutments on each side, a concrete fish ladder, and a concrete spillway with two large steel radial gates. The ten-foot-tall steel flashboard panels can be removed as necessary to control water flow. The radial gates at the south end also are used to control water passage through the dam. The dam creates a percolation reservoir known as Coyote Percolation Pond that percolates natural flow and storage flow from Anderson Dam for groundwater recharge. The reservoir has an area of 32 acres and a 22,925 acre-feet capacity. See **Appendix C** for the 2021 Coyote Percolation Dam Update DPR 523 form and the 2006 Santa Clara Valley Water District Dams DPR 523 form.

Photograph 1. Downstream face of Coyote Percolation Dam; camera facing north, June 15, 2021.

Photograph 2: Upstream side of Coyote Percolation Dam; camera facing southwest, June 15, 2021.

Photograph 3. Modern fish attractant pool and fish ladder on downstream side of Coyote Percolation Dam; camera facing west, June 15, 2021.

Photograph 4: Modern fish ladder, concrete catwalk, and floating debris barrier on upstream side of Coyote Percolation Dam; camera facing north, June 15, 2021.

5 APPLICATION OF THE CRITERIA OF ADVERSE EFFECT

5.1 Criteria of Adverse Effect

The NHPA Section 106 regulations state that if there are historic properties in the APE which may be affected by a federal undertaking, the agency official shall assess adverse effects, if any, in accordance with the Criteria of Adverse Effect defined in 36 CFR 800.5. These regulations state an “adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.” Application of the criteria of adverse effect is used to assess how an undertaking will affect those features of a historic property that contribute to its inclusion in the NRHP or eligibility for listing in the NRHP, specifically examining an undertaking’s impacts on a historic property’s historic integrity, i.e., location, design, setting, materials, workmanship, feeling, and association. Effects can be direct, indirect, and cumulative. The following assesses the effects of the undertaking on the NRHP-eligible Coyote Percolation Dam.

5.2 Application of Criteria of Adverse Effect

The project will cause an adverse effect to the Coyote Percolation Dam, the sole built environment historic property in the APE, because the project will physically remove much of the extant historic property and alter the structure in a manner that does not comply with the Secretary of the Interior’s Standards for the Treatment of Historic Properties (36 CFR 68).

The project’s adverse effect is not related to other types of possible impacts such as removal of the historic property from its historic location, changing the character of the historic property’s use or of physical features within its setting that contributes to its historic significance, introduction of visual, atmospheric, or audible elements that diminish the integrity of the historic property's significant features, and cause neglect of the historic property which would cause deterioration. Furthermore, the historic property will not be sold, leased, or transferred out of Federal ownership as it is not currently owned by the Federal government.

The Coyote Percolation Dam Replacement Project will demolish and replace the existing flashboard dam and its foundation with an inflatable bladder dam. Additionally, the project will replace the existing fish ladder stationary weir panels with adjustable weirs, and some or all of the grouted rock slope protection downstream of the dam will be reconstructed. Construction activities include removing the existing metal flashboards, demolishing the existing concrete foundation and sill, removing the existing fish ladder stationary panels, constructing a new concrete foundation and sill, installing the new inflatable bladder dam, and installing new adjustable weir panels in the existing fish ladder channel. The work described above will be conducted during Phase 1 of the project.

The extant dam was modified in 2014 by the installation of removable metal flashboard panels; however, the Coyote Percolation Dam nonetheless retains its essential historic flashboard design, performing as it was originally built. Replacing the flashboard dam with an inflatable bladder dam will fundamentally change the engineering design of the dam, one of the structure's essential character-defining features that make it historically significant. Replacement of the dam will substantially diminish the dam's historic integrity of design, materials, workmanship, and feeling, resulting in a loss of overall integrity and the inability of the structure to convey its significance. The proposed modifications to the fish ladder and rock-slope protection, however, are not an adverse effect to the property because the ladder and rip-rap protection are modern additions to the structure and are not considered character-defining features of the historic property.

This FOE concludes that the undertaking will have an adverse effect on the Coyote Percolation Dam.

6 PREPARERS' QUALIFICATIONS

This study was conducted under the general direction of Christopher D. McMorris (M.S., Historic Preservation, Columbia University, New York), a Principal at JRP with more than 24 years of experience conducting these types of studies. Mr. McMorris provided overall project direction and guidance and reviewed and edited this report (and the materials in the appendices). Based on his level of experience and education, Mr. McMorris meets and exceeds the Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

JRP Staff Architectural Historian Samuel Skow (M.A., History – Public History, California State University, Sacramento) has six years of experience as a historian / architectural historian working on a variety of research and cultural resource management projects throughout California. Mr. Skow authored this report (as well as the appended DPR 523 form), conducted research, and carried out fieldwork. Mr. Skow also meets and exceeds the Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

JRP Research Assistant Andrew Young (B.A., History, University of California, Davis) assisted in research, fieldwork, and preparation of the appended DPR 523 form.

APPENDIX A

Figures

Figure 1. Project Vicinity Map

Figure 2. Project Location Map

Figure 3. CPDR APE Map

APPENDIX B

Project Activity Map

From Anderson Dam Reservoir FOCP Permit Application
1602 Supplemental Information
August 12, 2020

APPENDIX C

Letter Report,
Coyote Percolation Dam
DPR 523 Form Update (2021),
and
Santa Clara Valley Water District Dams (P-43-003559)
DPR 523 Form (2006)

2850 Spafford Street, Davis, CA 95618 | 530-757-2521 | jrphistorical.com

LETTER REPORT

September 7, 2021

TO: Sarah Piramoon, Water Resources Specialist
Valley Water
5750 Almaden Expressway
San Jose, CA 95118

FROM: Christopher McMorris, Principal
JRP Historical Consulting, LLC
2850 Spafford Street, Davis, CA 95618

SUBJECT: Coyote Percolation Dam Replacement Project, Santa Clara County, California

Project Description

Valley Water is conducting the Federal Energy Regulatory Commission (FERC) Order Compliance Project (FOCP) to replace the existing Coyote Percolation Dam in advance of Anderson Dam Seismic Retrofit Project (ADSRP) implementation. Citing a need to imminently reduce risk to the public, FERC's Director of Dam Safety and Inspections provided dam safety directives on February 20, 2020, mandating implementation of the FOCP. The FOCP is being conducted as an undertaking separate from the ADSRP, with FERC acting as the federal lead agency responsible for compliance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA). The FOCP requires compliance with Section 106 of the NHPA (Section 106) and its implementing regulation under Title 36, Code of Federal Regulations, Part 800 (36 CFR Part 800). The U.S. Army Corps of Engineers (Army Corps) will rely on FERC's NEPA and NHPA documentation to the extent possible, but will also need to make determinations under NEPA and NHPA as part of the Section 404 permitting process. A Programmatic Agreement (PA) for the FOCP was executed on September 9, 2020, between FERC and the California State Historic Preservation Officer (SHPO), with Valley Water, Army Corps, the County of Santa Clara Parks and Recreation Department, and local Native American tribes as concurring and consulting parties. The Coyote Percolation Dam Replacement Project is one of six FOCP components.

As part of the FOCP, Valley Water proposes to replace the existing flashboard dam with an inflatable bladder dam and foundation in a manner that provides safe, effective, and timely upstream and downstream anadromous salmonid passage over the deflated bladder, to the maximum extent feasible. Valley Water also proposes modifications to the existing fish ladder to improve, to the maximum extent feasible, the ability for the ladder to provide safe, effective, and timely upstream and downstream anadromous salmonid passage when the dam is inflated.

Design, construction, and operation will occur in two phases, with Phase 1 occurring during the FOCP, and Phase 2 completed prior to 2027. Phase 1 will replace the existing flashboard dam with an inflatable dam and improve the fish ladder to increase operational flexibility over a greater range of flows. Based on initial discussions, Valley Water anticipates that Phase 2 will include a roughened ramp fishway to allow for passage over the deflated bladder. The Phase 2 fishway will be designed and constructed in a manner consistent with National Marine Fisheries Service (NMFS) Anadromous Salmonid Passage Facility Design Guidelines (NMFS 2011) and California department of Fish and Wildlife (CDFW) California Salmonid Stream Habitat Restoration Manual.

Summary of Findings

As part of Valley Water's Section 106 compliance for the Undertaking, JRP Historical Consulting, LLC (JRP) conducted a study of historic architectural / built environment resources within the project Area of Potential Effects (APE). JRP conducted research to identify known historic resources and to determine dates of construction of built environment resources in the APE, finding that the Coyote Percolation Dam, constructed in 1934, is the only built environment resource that is at least 45 years old. JRP previously recorded and evaluated Coyote Percolation Dam for Valley Water in 2006 in a report titled "Historic Resources Report: Santa Clara Valley Water District Dams." The 2006 evaluation concluded that the dam was eligible for listing in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) as a contributing resource to the Santa Clara Valley Water District Dams Historic District, a discontiguous district that consists of the 1930s dams and their appurtenant structures that comprised of the original and integral units of the Santa Clara Valley Water Conservation District's system. The 2006 documentation of the Santa Clara Valley Water District Dams Historic District does not appear to have been sent to SHPO for concurrence.

The present study affirms the conclusions of the previous evaluation, although subsequent research in dam records at the Valley Water Library indicates a later year of construction than previously reported. This conclusion is in accordance with Section 106 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800). Please refer to the attached Update California Department of Parks and Recreation (DPR) 523 Form for a full NRHP eligibility analysis, historic context, property history, physical description of the resource, and photographs. A copy of the 2006 DPR 523 form is attached to the Update DPR 523 form.

Fieldwork and Research Methodology

JRP Staff Historian Samuel Skow and JRP Research Assistant Andrew Young conducted a site visit of the APE and to the Coyote Percolation Dam on June 15, 2021. This included recordation of the dam, noting changes to the structure since the previous evaluation. Documentation included digital photography and written descriptive notes of all features of the Coyote Percolation Dam system. Photographs and written descriptions from the site visit are included in the Update DPR 523 Form of Coyote Percolation Dam.

For the historic context in the DPR 523 form, JRP largely excerpted the historic context from the 2006 report, updating as necessary.

Preparers' Qualifications

This study was conducted under the general direction of Christopher D. McMorris (M.S., Historic Preservation, Columbia University, New York), a Principal at JRP with more than 23 years of experience conducting these types of studies. Mr. McMorris provided overall project direction and guidance, and reviewed and edited this report (and the attached DPR 523 form). Based on his level of experience and education, Mr. McMorris meets and exceeds the Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

JRP Staff Architectural Historian Samuel Skow (M.A., History – Public History, California State University, Sacramento) has six years of experience as a historian/architectural historian working on a variety of research and cultural resource management projects throughout California. Mr. Skow authored the DPR 523 form, conducted research, and carried out fieldwork. Mr. Skow also meets and exceeds the Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

JRP Research Assistant Andrew Young (B.A., History, University of California, Davis) assisted in research, fieldwork, and preparation of the DPR 523 form.

ATTACHMENT:

Update Department of Parks and Recreation (DPR) 523 Form:

Coyote Percolation Dam (2021)

&

DPR 523 Form: Santa Clara Valley Water District Dams (2006)

P1. Other Identifier: Coyote Percolation Dam
***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara
***b. USGS 7.5′ Quad**: Santa Teresa Hills **Date**: 1953 (photorevised 1980) **T**: 8S ; **R**: 2E ; **Sec**: n/a ; Mount Diablo Meridian
***P3b. Resource Attributes:** (List attributes and codes) HP21—Dam
***P6. Date Constructed:** 1934
***P8. Recorded by:** Samuel Skow, JRP Historical Consulting, LLC, 2850 Spafford Street, Davis, CA 95618
***P9. Date Recorded:** June 15, 2021
***P11. Report Citation:** None.

JRP Historical Consulting, LLC (JRP) recorded and evaluated Coyote Percolation Dam in 2006 in a report titled "Historic Resources Report: Santa Clara Valley Water District Dams," prepared for the Santa Clara Valley Water District. The 2006 evaluation concluded that the dam was eligible for listing in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) as a contributing resource to the Santa Clara Valley Water District Dams Historic District, a discontiguous district that consists of the 1930s dams and their appurtenant structures that comprised the original and integral units of the Santa Clara Valley Water Conservation District's system. The historic district was found eligible for listing in the NRHP / CRHR because it "played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels" (Criterion A / 1); and as an innovative water system and representative work of master hydraulic engineer, Fred H. Tibbets (Criterion C / 3). The district's period of significance spans from 1934, with the construction of Coyote Percolation Dam—the oldest dam in the district and the subject of this DPR 523 Update Sheet—until 1950, "when construction of the second generation of dams began." The discontiguous district boundaries include the footprints of the individual dams. As a contributing resource, Coyote Percolation Dam's character-defining features include those elements that date and retain integrity to the period of significance, which—as noted in the 2006 evaluation—would exclude the modern fish ladder on the Coyote Percolation Dam. The Coyote Percolation Dam is not individually eligible for listing in either the NRHP or CRHR.[1]

The 2006 documentation of the Santa Clara Valley Water District Dams Historic District does not appear to have been sent to the State Historic Preservation Officer (SHPO) for concurrence. For the present study, JRP has conducted a field survey of Coyote Percolation Dam and updated the 2006 evaluation. This evaluation affirms the conclusions of the previous evaluation, although subsequent research in dam records at the Valley Water Library indicates a later year of construction than previously reported. A copy of the 2006 DPR 523 form is attached to this Update DPR 523 form, and the historic context presented herein is excerpted and based on the context from the 2006 Historic Resources Report. For the present study, JRP revisited Coyote Percolation Dam on June 15, 2021, and conducted a field survey to update the 2006 recordation. Since the prior study in 2006, the flashboard panels of the dam have been replaced, and the downstream concrete apron was demolished and replaced with a larger concrete apron buttressed with riprap. See Continuation Sheets for photographs of the dam and appurtenant structures taken by JRP on June 15, 2021.

Historic Context[2]

Valley Water (formerly Santa Clara Valley Water District) owns and controls a municipal water supply comprising of multiple dams (with their associated outlet structures and other control buildings), groundwater wells and pumps, water-treatment facilities, miles of pipeline, administrative and shop buildings, and other resources. As listed in the table below, the Santa Clara Valley Water Conservation District (SCVWCD; later Santa Clara Valley Water District and now Valley Water) built seven dams in the 1930s, built two dams in the 1950s, and annexed two more dams in the 1980s that had been built in the 1950s. The SCVWCD system was established to provide water to meet the growing demand of its service area, an objective met in part by replenishing the aquifers of the Santa Clara Valley.

[1] JRP Historical Consulting, LLC (JRP), "Historic Resources Report: Santa Clara Valley Water District Dams," prepared for Santa Clara Valley Water District (July 2006), 47-51.
[2] The following historic context is largely excerpted from the 2006 report (with original footnotes); JRP, "Historic Resources Report: Santa Clara Valley Water District Dams," 3-7.

Name	Construction Date
Coyote Percolation Dam	1934
Coyote Dam	1935-36
Almaden Dam	1935
Calero Dam	1935
Vasona Dam	1935
Guadalupe Dam	1935
Stevens Creek Dam	1935
Anderson Dam	1950
Lenihan Dam (Lexington Reservoir)	1952
Chesbro Dam	1955 (annexed in 1987)
Uvas Dam	1957 (annexed in 1987)

The Santa Clara Valley and the Pueblo of San Jose represent some of the longest-settled areas in California. The Pueblo of San Jose was one of a small number of *pueblos* established by the Spanish in the eighteenth century; the others included Los Angeles, San Francisco, and San Diego. The Santa Clara Valley was divided into large mission and rancho grants that appear to have survived intact through the Mexican period, and many of the valley lands grants made under the Spanish and Mexican governments survived into the American period. The city of San Jose briefly served as the state capitol, and, after 1860, it was the center of a rich agricultural area consisting of abundant fields and orchards, many of which were irrigated via well water and diversions from local creeks.

At the turn of the twentieth century, the Santa Clara Valley remained a predominately agricultural area with a small urban center concentrated in San Jose and a network of small towns functioning as tributaries. Groundwater levels were sufficiently high at this time so that wells often flowed under artesian pressure. However, by the mid-1910s a combination of severe drought conditions and an increase in pumping brought on by improved technology caused groundwater levels to drop to perilously low levels. During the same period, farmers had brought approximately 67 percent of the valley's agricultural area under irrigation and populations continued to grow within the urban centers. By the end of the 1920s, the groundwater table had dropped about 50 feet in four years, increasing pumping costs and causing ground subsidence. These factors led valley leaders and local engineers to seek means to replenish the depleted groundwater table.[3]

During the 1920s, hydraulic engineer Fred H. Tibbetts and his partner, Stephen Kieffer, studied the Santa Clara Valley's water problems and proposed a system of dams and conservation facilities to aid in recharging valley groundwater. The plan called for the establishment of a water conservation district, with reservoirs and flood control channels to retain the highly variable flows in the valley's tributary streams for the purpose of groundwater recharge. The political effort to support the plan was led by Leroy Anderson and other prominent citizens of the valley, who formed the Santa Clara Valley Water Conservation Committee. Voters initially defeated the measure to form the water conservation district in 1927 and 1928, but when groundwater levels in local wells fell below 100 feet from surface in 1929, they roundly approved establishment of the SCVWCD.[4]

[3] Fred H. Tibbetts, *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I*, no pagination, Project Report 17, May 8, 1934; American Society of Civil Engineers (ASCE), San Francisco Section, *Historic Civil Engineering Landmarks of San Francisco and Northern California* (San Francisco: Pacific Gas and Electric Company, October 1977), 25.
[4] ASCE, *Historic Civil Engineering Landmarks of San Francisco and Northern California*, 28; Santa Clara Valley Water District, "About Valley Water" (2021), https://www.valleywater.org/how-we-operate-about-valley-water (accessed June 2021); Fred H. Tibbetts, "Water Conservation Project in Santa Clara County: Outline of Discussion by Mr. Fred H. Tibbetts, Chief Engineer, Santa Clara Valley Water Conservation District" (January 31, 1936), 6-10, Water Resources Collections and Archives (WRCA), University of California (UC), Riverside.

Coyote Percolation Dam was among the initial structures SCVWCD built. Designed by Fred Tibbetts in 1932 and constructed two years later by Macco Construction Co., this dam was built with removable flashboards which, when installed, created a pond holding the natural flow of Coyote Creek at medium river stages to allow for water to percolate into the aquafer. Once Anderson Dam was built in 1950 upstream and east of Morgan Hill, Coyote Percolation Dam also served as storage for flow from Anderson Dam when natural flow is low or decreased. The two structures are now operated as a system.

By 1934, the SCVWCD settled on plans for constructing its major dams, along with streambed improvements and small instream structures to enhance groundwater recharge. The main storage dams built as part of the original system were Calero, Almaden, Guadalupe, Vasona, and Stevens Creek (1935), and Coyote (1936). Almaden and Calero dams were connected by the Almaden-Calero Canal, which shunted water from the relatively wet Almaden basin into the comparably larger storage capacity afforded by Calero Reservoir.[5] In November 1934, the *San Jose Mercury Herald* described the district's dams as a unified system that were the "'first line of defense' in the valley's plan to conserve its run-off each year," adding that, "In them is stored the excess rainfall, the flow of which is regulated to run down the respective creeks at a rate that will give maximum absorption in the gravel percolation areas farther down."[6] Following the passage of a bond by district voters and the receipt of federal funding under the Public Works Administration, the SCVWCD awarded construction contracts for the dams to several companies. [7]

SCVWCD completed the original storage dams by 1936. Four of these dams were rolled earth-fill structures and two were rolled earth and rock fill. With the completion of the storage dams, as well as the downstream creek bed percolation-improvement features, including the Coyote Creek Percolation Dam, groundwater conditions soon improved. Whereas in 1937, when the district system was initially in operation, groundwater levels were 131 feet below the surface, compared with 56 feet twenty years earlier, six years later in 1943, Santa Clara Valley groundwater levels returned to their 1920s average, 50 feet below the surface. However, during this period increased urbanization and industrial requirements, along with year-round irrigation, taxed the new system and adversely affected the water table. In response, the SCVWCD began planning for two additional dams. These were Anderson Dam, completed in 1950 with 91,280-acre-foot storage capacity and Lenihan Dam (creating Lexington Reservoir), completed in 1952 with a 20,210-acre-foot capacity.[8]

Witnessing the success of the SCVWCD reservoir system, Santa Clara Valley voters south of San Jose established the South Santa Clara Valley Water Conservation District in 1938. Managed by elected citizens and members of the Santa Clara County Board of Supervisors, the new district explicitly sought to prevent land subsidence, increase groundwater yields, and reduce flooding among the Pajaro River's tributary streams and creeks south of San Jose. To meet these objectives, the new district began constructing percolation facilities on area creeks. By the 1950s, the South Santa Clara Valley Water Conservation District began plans for a coordinated system of two dams and reservoirs on Llagas and Uvas creeks, Chesbro Dam and Uvas Dam respectively, which would function as a single unit. Chesbro Dam was completed in 1955 and Uvas Dam was completed in 1957.[9]

By 1968, most of the smaller local water conservation districts in the region had merged with SCVWCD; however, the people served by the South Santa Clara Valley Water Conservation District voted to remain independent until it was ultimately

[5] ASCE, *Historic Civil Engineering Landmarks of San Francisco and Northern California*, 28; Santa Clara Valley Water District (Valley Water), "History of the Santa Clara Valley Water District," available at https://web.archive.org/web/20060819201557/http://www.valleywater.org/About_Us/History/1900s_to_1940s.shtm (accessed June 2021); *San Jose Mercury Herald*, November 17, 1934, December 15, 1934.
[6] *San Jose Mercury Herald*, November 17, 1934.
[7] *San Jose Mercury Herald*, December 15, 1934.
[8] ASCE, *Historic Civil Engineering Landmarks of San Francisco and Northern California*, 28.
[9] Harold Wood, Blackie & Wood, "Report to the Honorable Board of Directors of the South Santa Clara Valley Water Conservation District on Uvas Creek Dam, Reservoir, Conduit and Well Replenishment Project Proposed to be Constructed Jointly with Santa Clara Valley Water Conservation District and on Proposed Llagas Creek Dam, Reservoir and Well Replenishment Project: Project Report No. 15" (March 1953), 2-3; California History Center, *Water in Santa Clara Valley*, passim.

annexed by the Santa Clara Valley Water District in 1987. At that time, the district assumed control of Chesbro and Uvas dams.[10]

Overall, the original water network's design elements have remained intact since the completion of construction in the 1930s, except for basic maintenance, such as routine improvements to intake structures and outlet gates, and concrete crack repair following earthquakes. The SCVWCD continued to grow and adopt new functions, ultimately becoming the Santa Clara Valley Water District in the 1970s and more recently renamed Valley Water. During this period, the district built an additional dam adjacent to the Rinconada Reservoir (State Dam No. 72-010) alongside a water treatment plant. Valley Water likewise began to supplement regional water stores with water from the State Water Project through the South Bay Aqueduct.[11]

Evaluation

Following field survey of the dam for the current recordation, JRP affirms the 2006 findings and conclusions, that the Coyote Percolation Dam is eligible for listing in the NRHP and CRHR as a contributing resource to the Santa Clara Valley Water District Dams Historic District. The district is significant under NRHP Criterion A / CRHR Criterion 1 because it "played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels," and under NRHP Criterion C / CRHR Criterion 3 as an innovative water system representative of master hydraulic engineer Fred H. Tibbets. The district is significant at the state level, with a revised period of significance spanning from 1934—when construction of the Coyote Percolation Dam, the oldest dam in the system, was completed—through 1950, "when construction of the second generation of dams began." The district boundaries comprise each contributing dam's individual footprint, and the character-defining features include those elements that date and retain integrity to the period of significance. See attached DPR 523 form set "Santa Clara Valley Water District Dams" for the 2006 evaluation of the discontiguous district.[12]

Historic Integrity

Coyote Percolation Dam retains sufficient integrity to convey its period of significance as a contributor to the Santa Clara Valley Water District Dams Historic District. While the structure has been altered after the period of significance, including the addition of a fish ladder, the replacement of the original flashboards with metal panels, and the demolition and replacement of the original concrete apron with a larger apron with riprap buttressing, these modifications do not significantly detract from the resource's overall integrity, as the dam continues to operate as a flashboard dam as it had during the historic period. While the Coyote Percolation Dam's integrity of materials and workmanship is somewhat diminished, its design integrity remains relatively intact. It also retains integrity of location, association, setting, and feeling because it has never been moved, it continues to function as a water-storage dam, the surrounding Coyote Creek riparian zone remains largely as it was during the period of significance, and the structure as a whole conveys the feeling of a 1930s dam.

Character-defining Features

The character-defining features of the Coyote Percolation Dam are its concrete abutments, flashboard design, and the concrete spillway with metal radial gates.

[10] Valley Water, "History of the Santa Clara Valley Water District."
[11] Valley Water, "History of the Santa Clara Valley Water District."
[12] JRP, "Historic Resources Report: Santa Clara Valley Water District Dams," 47-51.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #
HRI #
Trinomial

***Resource Name or #** (Assigned by recorder): Coyote Percolation Dam

***Recorded by**: S. Skow & A. Young *__Date__: June 15, 2021 ☒ Continuation ☐ Update

Photographs:

Photograph 1. Downstream face of Coyote Percolation Dam, camera facing north, June 15, 2021.

Photograph 2. Downstream face of Coyote Percolation Dam, camera facing south / southeast, June 15, 2021.

***Resource Name or #** (Assigned by recorder): Coyote Percolation Dam

***Recorded by**: S. Skow & A. Young *__Date__: June 15, 2021 ☒ Continuation ☐ Update

Photograph 3. Coyote Percolation Dam modern fish ladder, camera facing west / northwest, June 15, 2021.

Photograph 4. Coyote Percolation Dam radial gates, camera facing east / northeast, June 15, 2021.

***Resource Name or #** (Assigned by recorder): Coyote Percolation Dam

***Recorded by**: S. Skow & A. Young   ***Date**: June 15, 2021   ☒ Continuation ☐ Update

Photograph 5. Upstream side of Coyote Percolation Dam, camera facing southwest, June 15, 2021.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-43-003559
HRI #
Trinomial
NRHP Status Code 3

Other Listings
Review Code ___ Reviewer ___ Date ___

Page 1 of 24 ***Resource Name or #** (Assigned by recorder) Santa Clara Valley Water District Dams

P1. Other Identifier: Santa Clara Valley Water District Dams of the Original 1930s-Era Construction

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** ___ **Date** ___ **T** ___; **R** ___; ___ ¼ **of Sec** ___; ___ **B.M.**

c. Address ___ City___ Zip ___

d. UTM: (give more than one for large and/or linear resources) Zone ___; ___mE/ ___mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form documents the original seven dams constructed by the Santa Clara Valley Water Conservation District between 1934 and 1936. This group of resources is the original system of dams developed to collect and store water to augment ground water supplies. The features of this system are Coyote Dam, Coyote Percolation Dam, Almaden Dam, Guadalupe Dam, Vasona Dam, Stevens Creek Dam, and Calero Dam. (See Continuation Sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP21 (Dam) HP11 (Engineering Structure)

***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☒ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Coyote Percolation Dam, camera facing north. April 17, 2006.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1934-1935, Santa Clara Valley Water District

***P7. Owner and Address:**
Santa Clara Valley Water District
5750 Almaden Expressway,
San Jose, CA 95118

***P8. Recorded by:** (Name, affiliation, address)
R. Herbert/J. Cheney
JRP Historical Consulting LLC
1490 Drew Ave, Suite 110
Davis, CA 95618

***P9. Date Recorded:** April 17, 2006

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting LLC, "Historical Resources Report: Santa Clara Valley Water District Dams" (2006).

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record Artifact Record ☐ Photograph Record ☐ Other (list) ___

NRHP Status Code: 3

***Resource Name or #** (Assigned by recorder) Santa Clara Valley Water District Dams

D1. Historic Name: Santa Clara Valley Water Conservation District Original System Dams

D2. Common Name: Same as D1.

D3. Detailed Description (Discuss overall coherence of the district, its setting, visual characteristics, and minor features. List all elements of district.):

Descriptions of the seven individual dams that are elements of this District appear below. Each is considered a contributing feature or element within this district. Together these dams formed the Santa Clara Valley Water Conservation District's original water conservation system.

Coyote Dam: Coyote Dam was constructed in 1935-1936. It is a rolled earth filled dam, with a crest length of 970 feet, and height of the spillway crest elevation 779.9 feet. The dam has a freeboard of 25 feet, and is 100 feet wide at the top and 945 feet wide at the base. Its slopes have ratios of 4:1 below an elevation of 718 feet, and 3.5:1 from elevations 718 to 758 feet, and 3:1 above an elevation of 758 feet.

It originally contained 1.2 million cubic yards of fill. The intake valves consist of slide gates. A modern concrete outlet tunnel features 48-inch diameter fixed cone and six-inch diameter ball valves. In 1990, the Anderson Pacific Company installed a new 702-foot long concrete lined outlet tunnel with a 96-inch diameter. Anderson Pacific sealed the original outlet closed with grout. The new outlet provides for release of a maximum of 450 cfs. In 1984/1985 the entire spillway was replaced due to severe deterioration; the new spillway is in the location of the original structure. An ogee section spillway is located on the north side of the dam, and has a capacity of 33,000 cfs. The spillway leads to the modern outlet chute. The spillway weir is 110 feet in length. Behind the dam, the Coyote Reservoir has a 22,925 acre-feet capacity. Coyote Dams is operated as a coordinated system in conjunction with Anderson Dam, located downstream. (See Continuation Sheet.)

***D4. Boundary Description** (Describe limits of district and attach map showing boundary and district elements.):

The Santa Clara Valley Water District Dams constructed in the 1930s comprise a discontiguous historic district of seven discrete elements. Each dam is in a different location on streams in the San Jose area. The boundaries that make up this district are formed by the dams and their appurtenant structures owned by the SCVWD. They are shown on the accompanying maps.

***D5. Boundary Justification:**

The Office of Historic Preservation offers guidance concerning the determination of district boundaries: "Boundaries should encompass, but not exceed, the extent of the significant resources and land area that contribute to the importance of the district." For this evaluation, the Santa Clara Valley Water District dams constructed in the 1930s encompass the acreage and associated structures that make up these dams' structure; the full shoreline and reservoir surface area fluctuates seasonally and is not included in the boundary.

***D6. Significance: Theme:** Engineering **Area:** California

Period of Significance: 1934-1936 **Applicable Criteria:** A and C

(Discuss district's importance in terms of its historical context as defined by theme, period of significance, and geographic scope. Also address the integrity of the district as a whole.)

See Continuation Sheet.

***D7. References** (Give full citations including the names and addresses of any informants, where possible.):

See Continuation Sheet.

***D8. Evaluator:** R. Herbert/J.Cheney **Date:** August 2006

Affiliation and Address: JRP Historical Consulting LLC, 1490 Drew Ave., Suite 110, Davis, CA 95618

D3. Detailed Description (Continued)

Coyote Dam (Continued)

At the crest of the dam is a building that is used to house outlet controls. It is topped with a shed roof and sided in smooth stucco. Set in the north wall are metal louvered vents and several metal pipes. The building is accessed by two flush, metal, single-leaf doors.

Photograph 2. Coyote Dam, camera facing west. February 8, 2006.

Photograph 3. Coyote Dam Spillway. February 8, 2006.

Photograph 4. Coyote Dam outlet control building. February 8, 2006.

Coyote Percolation Dam. Coyote Percolation Dam was constructed in 1932, making it one of the oldest structures on the system. It forms a relatively low concrete weir located in the streambed of Coyote Creek at Metcalf Road. Its small reservoir is formed by an 8-foot high removable flashboard dam, with a reinforced concrete floor and concrete abutments. The reservoir covers 32 acres and percolates natural flow at medium river stages and also storage flow from Anderson Dam when the natural flow is low or decreased. The weir can be flashed up to the approximate height of the channel banks, approximately 20 feet above the streambed. This structure is located on Coyote Creek, and rests on clay and gravel banks of the stream channel.

Photograph 5. Coyote Percolation Dam, camera facing north. February 8, 2006.

Photograph 6. Coyote Percolation Dam, camera facing east. April 17, 2006.

Photograph 7. Coyote Percolation Dam, camera facing west. April 17, 2006.

Guadalupe Dam: Guadalupe Dam, constructed in 1935, is a rolled earth filled dam, with a crest length of 650 feet, and an elevation of 617.3 feet. The dam is 129 feet in height. The dam has a designed freeboard of 9.7 feet, and is 20 feet wide at the top and 650 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. The dam also features a functional curb, which was constructed when the freeboard was restored in 1972. It originally contained 612,000 cubic yards of fill. The dam features a 42-inch diameter sluice gate intake valve and a 30-inch diameter butterfly outlet valve. Its outlet provides for release of a maximum of 235 cfs through a 720-foot long, 36-inch diameter steel pipe. A side channel spillway is located on the south side of the dam, and has a capacity of 6,000 cfs. The spillway weir has a length of 80 feet. Behind the dam, the Guadalupe Reservoir has a capacity of 3,228 acre-feet.

There are two buildings associated with this dam. Along the upstream face of the dam is a single rectangular, concrete, instrument storage structure. Small metal doors provide access to the instruments inside. The dam's plaque memorializing its construction was originally located on the side of this building, but has been removed. The second structure is located at the upstream (west) side of the dam and contains outlet pipe instruments. It is a one-story, concrete masonry block building with a rectangular footprint and topped by a flat roof with parapet walls. Two sides feature screened openings. This building is accessed through a flush, metal single-leaf door.

Photograph 8. Guadalupe Dam. April 17, 2006.

Photograph 9. Guadalupe Dam spillway. April 17, 2006

Photograph 10. Guadalupe Dam concrete block control building. April 17, 2006.

Calero Dam: Calero Dam and its Auxiliary Dam were constructed in 1935. Together they create the 10,050 acre-feet Calero Reservoir. Calero Dam is an earth dam, with a crest length of 840 feet, and spillway elevation of 483.5 feet. It is 98 feet in height over all. The dam has a freeboard of six and a half feet, and is 20 feet wide at the top and 495 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 722,000 cubic yards of fill. The dam features a 42-inch diameter sluice inlet valve and a 30-inch diameter butterfly outlet valve. Its outlet provides for release of a maximum of 185 cfs through a 481-foot long, 36-inch diameter steel pipe. The ogee chute style spillway is located on the east side of the dam, and has a capacity of 5,260 cfs. The spillway weir is 82 feet in length. The Auxiliary Dam is an earth filled saddle dam standing 40 feet high with a crest length of approximately 500 feet. Constructed at the same time and with the same design and methods as Calero Dam, the Auxiliary Dam is located 1,167 yards east of Calero Dam. The dam has a freeboard of six and a half feet, and is 20 feet wide at the top.

Photograph 11. Concrete block valve control housing on Calero Dam, camera facing west. April 17, 2006.

Fellows Dike serves to protect a ranch established prior to the main Calero Dam's constructions from flooding from the reservoir. (See **Photograph 15**)

Photograph 12. Calero Spillway, camera facing northeast. April 17, 2006.

Photograph 13. Calero Dam valve control buildings, camera facing southeast. April 17, 2006.

Photograph 14. Calero Auxiliary Dam, camera facing west. April 17, 2006.

Photograph 15. Fellows Dike, camera facing north. April 17, 2006.

NRHP Status Code: 3

***Resource Name or #** (Assigned by recorder) Santa Clara Valley Water District Dams

Stevens Creek Dam: Stevens Creek Dam was constructed in 1935. It is a rolled earth filled dam, with a crest length of 1,000 feet. Its spillway elevation is 534.9 feet, and it stands 129 feet in height over all. The dam has a freeboard of 19.2 feet, and is 20 feet wide at the top and 750 feet wide at the base. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. The dam originally contained 567,000 cubic yards of fill. It features two 42-inch in diameter sluice intake valves and two 30-inch butterfly outlet valves. Its outlet provides for release of a maximum of 410 cfs through an 890-foot long, 50-inch diameter steel pipe. A side channel spillway is located on the south side of the dam, and has a capacity of 15,715 cfs. The spillway weir has a length of 172 feet. Behind the dam, the Stevens Creek Reservoir has a capacity of 3,465 acre-feet.

There are several structures at the dam site. An instrument storage box, adjacent to a shed, is located on the dam's upstream (north) side. The instrument box is sided in concrete masonry block, rests on a concrete foundation, and is the location of the dam's bronze plaque memorializing its construction. A building adjacent to it also rests on a concrete foundation, is topped with a shed roof and is sided in concrete masonry block. One flush, metal, single-leaf door serves as the entrance to this building. At the dam's downstream side to the east is an outlet pipe structure. It is a small, rectangular, concrete masonry building with a flat roof and parapet walls. Two metal hatches are located on the roof. A flush, metal, single-leaf personnel door accesses the building. Another instrument storage box is located along the dam's upstream side, slightly further south than the instrument box described above. Two metal hatches at the structure's roof provide access to the instruments inside.

Photograph 15. Stevens Creek Dam, camera facing east. April 17, 2006.

Photograph 16. Stevens Creek Dam spillway, camera facing south. April 17, 2006.

Photograph 17. Stevens Creek Dam concrete block control building. April 17, 2006.

Vasona Dam: Vasona Dam, constructed in 1935, is a combination rolled earth and concrete buttress dam, with a crest length of 1,000 feet. Its spillway elevation is 294.8 feet, and is 30 feet in height over all. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 70,000 cubic yards of fill. The concrete buttress spillway is located on the west side of the dam, and has a capacity of 12,600 cfs. The dam has a freeboard of ten feet, and is 20 feet wide at the top and 153 feet wide at the base. Its side slope ratio is 2:1 on its upstream side and 3:1 at its downstream slope. Its outlet system consists of a 42-inch diameter slide gate and two 13-foot by 10-foot radial gates. The outlet system also provides for release of an estimated maximum of 125 cfs through a 20-foot long, 42-inch diameter pipe. Vasona Reservoir has a 400 acre-foot capacity.

Photograph 18. Vasona Dam, camera facing south. April 17, 2006.

Photograph 19. Vasona Dam, camera facing north. April 17, 2006.

Photograph 20. Vasona Dam outlet, camera facing north. April 17, 2006.

Almaden Dam: Almaden Dam is a rolled earth fill dam, constructed in 1935-1936. It was originally built with a crest length of 475 feet, and height from Almaden Creek's streambed to the spillway crest of 97 feet, and 100 feet in height over all. The dam has a freeboard of eight feet, and is 20 feet wide at the top and 545 feet wide at the base. Its side slope ratio is 2.5:1 on both the upstream and downstream sides. It is faced on the upstream side with a concrete layer to help keep the dam from becoming saturated and to control erosion. It originally contained 250,000 cubic yards of fill. The dam features a 42-inch diameter sluice gate intake valve and two 30-inch diameter butterfly outlet valves. Its outlet provides for release of a maximum of 250 cfs through a 696-foot long, 36-inch diameter steel pipe encased in concrete placed through the dam's foundation and connecting to the streambed, and Almaden – Calero Canal (after passing beneath the spillway). At the dam's crest is a small control housing structure. This structure has a shed roof, and is sided in concrete masonry block, with a single personnel door. A side channel spillway is located on the eastern side of the dam, with a capacity of 6,000 cfs. The spillway weir is 123 feet long. Behind the dam, Almaden Reservoir has a capacity of 1,586 acre-feet.

There are two sets of buildings at the outlet. The first, a single rectangular, concrete masonry block building approximately ten by ten with a single personnel door and flat roof with side parapets, is located in the stream bed and serves as the outlet for the dam into Almaden Creek for replenishment of groundwater downstream. The second set is comprised of two concrete block rectangular buildings (one flat roof and one shed) with personnel doors and vents, located at the end of the outlet controlling flows into the Almaden – Calero Canal. Also at this location are manually operated slide gates on the downhill side of the canal wall, to allow for drainage into Almaden Creek, and a large steel trash rack covering the opening of the short pipe/tunnel under the spillway that carries the canal. All are part of the original construction of the dam.

Photograph 21. Alameda Dam outlet control building in streambed. April 17, 2006.

Photograph 22. Outlet control building in Almaden-Calero Canal. April 17, 2006.

Photograph 23. Upper end of Alameda Dam spillway. April 17, 2006.

Photograph 24. Alameda Dam Outlet control building in stream bed with downstream face of Almaden Dam in background. April 17, 2006.

Photograph 25. Concrete block valve control housing on Alameda Dam crest, west of spillway. April 17, 2006.

D6. Significance (continued):

The following discussion presents an evaluation of Almaden, Vasona, Stevens Creek, Guadalupe, Coyote, Calero, and Coyote Percolation dams (hereafter referred to as the SCVWD 1930s dams) as a discontiguous district under National Register / California Register significance criteria A / 1 and C / 3; the dams also retain sufficient integrity to merit such a listing.

Criterion A or 1: The SCVWD 1930s dams are the original and integral units of the SCVWCD's system, which played a significant role in providing water to the Santa Clara Valley and maintaining higher groundwater levels. The SCVWCD system was important in the economic development of the Santa Clara Valley, because it provided a steady, reliable, and consistent supply of water for municipal, industrial, and agricultural uses. While any dam might be considered important this way, the construction of the seven dams as a unified system provided for continued development on a scale that was larger and provided a supply more certain than that that might have been provided by any single such structure. The fact that later dams provided additional supplies, or that the area receives water from other systems, including (in more recent years) the State Water Project, does not diminish the importance of the original seven. While it is unlikely that construction and operation of the SCVWCD system, as a whole, was the sole driving force behind the economic development of the area, it did play a significant and lasting role in this context.

Criterion B or 2: Research did not suggest that the resources subject to this study have associations with persons who gained prominence in their professions or made significant contributions in local, state, or national history, therefore none of the properties appear eligible under this criterion. While the original system is closely associated with Fred H. Tibbetts, an influential hydraulic engineer, it is inappropriate to use its association with Tibbetts under Criterion B or 2 to evaluate the dam, as it would better be considered under Criterion C or 3, as the work of a master. Thus it would not appear to meet the criteria for listing in the National Register or California Register under this criterion.

Criterion C or 3: Criterion C or 3 relates, in this instance, to two central questions: do the SCVWD 1930s dams exhibit particular significant design or engineering characteristics, and is it the work of a master engineer? Each of these considerations will be addressed in turn.

First, the SCVWD 1930s dams are structures of common design that represented no particular engineering achievement at the time they were constructed. Earth fill dams were common in the 1930s. Of the 811 earth fill dams under the jurisdiction of the state, 197 have dates of construction prior to 1936, some dating to as early as 1850 and 1851. Interestingly, Harold I. Wood, the field-supervising engineer on the SCVWCD project had recently been involved in construction of the El Capitan Dam in San Diego County. That dam was described as the largest earth fill dam in the world in 1934.[1] Nothing in the accounts of district's dams' construction suggests that they were designed and built through anything other than a standard process.

Second, were the SCVWD 1930s dams an innovative system, as the San Francisco Section of the ASCE maintained? Certainly, the concept of using a dam to flood an aquifer had been done before in northern California; it was this idea that the Spring Valley Water Company used in building Sunol Dam on Alameda Creek to saturate the lands behind the structure.[2]

[1] DWR/DSD. *Dams Within the Jurisdiction of the State of California,* 1-52; *San Jose Mercury Herald*, December 5, 1934.
[2] Interestingly, the San Francisco Section called out the Sunol System as an historic civil engineering landmark as well. ASCE. *Historic Civil Engineering Landmarks*.

The SCVWCD's supporters acknowledged that the concept was not particularly innovative, noting in 1931 that "the plan has the unanimous approval of engineers here and elsewhere." They added, "it has been used successfully throughout Southern California for many years."[3] In addition, the History and Heritage Committee of the Los Angeles Section of the ASCE listed three landmarks in May of 1974 that were structures that served similar functions: the Deep Gallery Spreading Grounds of the City of Los Angeles (1904), Pecoles Canyon Submerged Dam (1886-87), and the Spreading Grounds of the Los Angeles County Flood Control Project (1917-32).[4] That being said, the significance of the SCVWD 1930s dams as a system is that water in the system's reservoirs was (and is) used to replenish downstream groundwater; as noted above, this fact was reported by the San Francisco Section, which stated "this system is the first, and only major, instance of a major water supply being developed in a single groundwater basin involving the control of numerous independent tributaries to obtain virtually optimal conservation of essentially all of the sources of water flowing into the basin."

Third, was this dam the work of a master, in this case Frederick Horace Tibbetts (1882-1938), and if so, was it an important example of his work? Tibbetts was an influential hydraulic engineer of northern California, and with his partner Stephen Keiffer was responsible for many important projects. Tibbetts also served as an advisor to the State of California during development of the State Water Plan in the 1920s. It was Tibbetts and Keiffer who developed the original concept of the SCVWCD system, and it was Tibbetts who designed six of the seven dams of the system's original phase of construction between 1934 and 1936. He died in 1938, soon after the first phase of the system was completed. The ASCE prepared a biography of Tibbetts in 1940. In it they noted,

> Fred H. Tibbetts will probably be best remembered for his extensive flood-control, reclamation, and irrigation work in the Sacramento Valley and his highly successful water-conservation project in the Santa Clara Valley. However, his field of activity during a period of some thirty years of engineering practice extended well beyond the limits of the State of California, and embraced many of the varied branches of the profession. Few engineers in the history of California have contributed so extensively to the development of its agricultural lands and the control and conservation of its waters.
>
> … The second outstanding irrigation project [the other being for the Nevada Irrigation District] was one undertaken for the Santa Clara Valley Water Conservation District for the purpose of replenishing the underground water supply. The district, largely planted to orchards, was irrigated almost entirely by pumping from wells and, to 1934, the ground-water table had been dropping continuously at the rate of about 5 ft per yr until some of the pumping lifts were in excess of 200 ft. This condition was remedied by the construction of six detention reservoirs in the foothills and various regulating and distributing works in stream beds designed to retard runoff and induce percolation into the underground storage basin. A definite rise of the ground-water level has been experienced since completion of this work. The total cost of this project was about $3,000,000.[5]

Tibbetts was also placed in the Silicon Valley Engineering Hall of Fame, in recognition of his contributions to the Santa Clara Valley:

> Fred H. Tibbetts was the first Chief Engineer for the Santa Clara Valley Water Conservation District, the predecessor to the Santa Clara Valley Water District. In the early years of the twentieth century, he was a leader in the development and implementation of a master plan for local surface and groundwater development that still serves Santa Clara County's growing population. His vision of a system of dams,

[3] Tibbetts, *Report to the Honorable Board of Directors*, May 8, 1934. See "Statement by the General Water Advisory Committees."
[4] History and Heritage Committee of the Los Angeles Section of the ASCE, "Summary of Historic Civil Engineering Landmarks." Dated May 1974, updated to July 1980.
[5] American Society of Civil Engineers, *Transactions*, vol. 105 (New York: author, 1940), 1924-1928.

reservoirs, canal, and percolation facilities directly contributed to making available adequate water supplies and to the curtailment, in later years, of rapidly-advancing ground surface subsidence and saltwater intrusion.

Mr. Tibbetts was a practicing civil engineer who lived in Campbell, California and performed his engineering studies of Santa Clara Country water resources in the 1920s and 1930s. Water historians agree that Mr. Tibbetts' contributions to the development of Santa Clara County place him among the true visionary engineering leaders of his time. His ingenious blueprint for water conservation dramatically influenced the development of the Valley and has provided opportunities for generations of people and industries that have made Santa Clara Valley their home.

In 1976, the American Society of Civil Engineers recognized as a historic landmark the system of dams and reservoirs constructed in Santa Clara County under Mr. Tibbetts' guidance. The project was cited as "the first and only instance of a major water supply being developed in a single" groundwater basin involving the control of numerous independent tributaries to effectuate almost optimal conservation of practically all the resources of water flowing into the basin." Mr. Tibbetts' contributions are recorded in the book "Water in the Santa Clara Valley: a History" published in 1981 by the California History Center of De Anza College.[6]

These factors indicate that the SCVWD 1930s dams and their associated features can be considered the work of a master, Fred H. Tibbetts, and thus appear to meet the criteria for listing in the National Register of Historic Places under Criterion C and the California Register of Historical Resources under Criterion 3. Interestingly, Tibbetts' ashes are interred in a concrete addition to the original control structure on Coyote Dam.

Criterion D or 4: This criterion is usually reserved for archeological sites if they have yielded, or may likely yield, information important in pre-history or history. The property must have, or have had, information to contribute to our understanding of history, and the information must be considered important.

Integrity

As noted above, integrity of an historic resource is measured by application of seven factors: location, design, setting, workmanship, materials, feeling, and association. The SCVWD 1930s dams have retained a very good level of integrity in all seven measures. They remain, obviously, in their original location, the settings of which are largely unchanged from its original construction beyond the growth of trees and construction of scattered residences in the surrounding areas. They have not, over-all, been substantially altered, although Coyote Dam has received a new outlet tunnel, Coyote Percolation Dam has received a new fishway, and several of the dams have had minor changes to intake structures (typically located beneath the water surface) and minor changes around the outlet structures. The result is that the dams retain integrity of design, workmanship, and materials. They remain part of the SCVWD's system, so its association also has been retained. Finally, feeling, perhaps the most subjective of integrity considerations, refers to the sense of time and place a visitor receives while at or while viewing the site. All of the dams have a strong sense of time and place.

Period of Significance for the SCVWD 1930s Dams

The period of significance for the SCVWD 1930s dams would start in 1932, with construction of the Coyote Percolation Dam, through 1950, when construction of the second generation of dams began.

[6] Silicon Valley Engineering Hall of Fame website, available on line: http://www.svec.org/hof/1992.html, accessed July 25, 2006.

Discontiguous District Boundaries

The dams are widely separated by distance, located in different streamsheds. It is therefore logical to consider them as a discontiguous district in which the dams and their appurtenant features are considered contributing elements. For the purposes of this evaluation, the SCVWD 1930s dams' discontiguous district boundaries are the footprint of the individual dams themselves.

Contributors in the Proposed Original Dams of the Santa Clara Valley Water District Discontiguous District:

Dam	*Date of construction*	*NR Status*	*Associated Resources*	*Individual Eligibility*
Coyote Percolation Dam	1932; alterations	Contributor to discontiguous district	Spillway, modern fish ladder	No
Coyote Dam	1935-1936	Contributor to discontiguous district	Spillway, associated control structures	No
Guadalupe Dam	1935	Contributor to discontiguous district	Spillway, two structures	No
Calero and Auxiliary Dam, Fellows Dike	1935	Contributor to discontiguous district	Spillway, auxiliary dam, control buildings, Fellows Dike, canal from Almaden Dam	No
Stevens Creek Dam	1935	Contributor to discontiguous district	Spillway, outlet pipe structures, instrument structures	No
Vasona Dam	1935	Contributor to discontiguous district	Integrated Spillway	No
Almaden Dam	1935-1936	Contributor to discontiguous district	Spillway, instrument structures; canal to Calero Dam	No

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____________. *Report to the Honorable Board of Directors of the Santa Clara Valley Water Conservation District on 1934 Well Replenishment Project, Including 1931 Waste Water Salvage Report, Appendix I.* n.p., Project Report 17, May 8, 1934.

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http:// www.asce.org/history/hp_resguide2.html

http://www.scvwd.dst.ca.us/wtrsuply/reservoir/rs1.htm, accessed October 20, 2003

http://www.valleywater.org/About_Us/History/, accessed October 20, 2003

http://www.fobbf.org/roots_dam.html, accessed October 20, 2003

Maps

USGS. *Santa Teresa Hills, California.* 7.5 Minute Quadrangle, 1953, 1968.

Personal Communications

Tiffany Hernandez, SCVWD, October 31, 2003

APPENDIX D

Outreach to Interested Parties

Communications Log

2850 Spafford Street, Davis, CA 95618
(530) 757-2521 | jrphistorical.com

Project	Coyote Percolation Dam Replacement Project
Subject	Communications to interested parties re: historic resources
Notes Prepared By	Samuel Skow, JRP Historical Consulting, LLC

Notes:

Interested Party	Communication Date	Notes
History San José 1650 Senter Road San Jose, CA 95112 (408) 287-2290 William P. Schroh, Jr., President & CEO bschroh@historysanjose.org	September 1, 2021	Letter sent via US Mail. No response received.
	September 16, 2021	Sent follow-up email to William P. Schroh, Jr., President & CEO, History San Jose. No response received.
	October 4, 2021	Samuel Skow called and left a voicemail message. Within an hour, Nicholas Jimenez, History San Jose Administration & Marketing Associate, responded via email, informing Mr. Skow that "this is the first we are hearing about this Coyote Creek project. We are not directly impacted by it from what you described in the voicemail." Mr. Skow responded back via email, apologized for any miscommunications, and reattached the initial LIP.
Preservation Action Council of San Jose 1650 Senter Road San Jose, CA 95112 (408) 998-8105 info@preservation.org	September 1, 2021	Letter sent via US Mail. No response received.
	September 16, 2021	Sent follow-up email. No response received.
	October 4, 2021	Called and left a voicemail message.

Communications Log

2850 Spafford Street, Davis, CA 95618
(530) 757-2521 | jrphistorical.com

Interested Party	Communication Date	Notes
Santa Clara County Historical & Genealogical Society c/o Central Park Library 2635 Homestead Road Santa Clara, CA 95051 (408) 615-2986 Nancy Moffett, President president@scchgs.org	September 1, 2021	Letter sent via US Mail. No response received.
	September 16, 2021	Samuel Skow sent a follow-up email to Nancy Moffett, President of the Santa Clara County Historical & Genealogical Society (SCCHGS). Ms. Moffett responded within an hour that "Providing feedback about construction projects is outside the scope of [the SCCHGS]," but offered to review research materials for an hourly fee. Mr. Skow thanked Ms. Moffett for her prompt response and politely declined her offer to conduct research on our behalf (for the time being).
Historical Heritage Commission City of San Jose 70 West Hedding Street, 10th Floor, East Wing San Jose, CA 95110 ---- bnc@cob.sccgov.org	September 1, 2021	Letter sent via US Mail. No response received.
	September 16, 2021	Sent follow-up email. No response received.
	October 4, 2021	No phone number listed for HHC.

Historical Heritage Commission
70 West Hedding Street, 10th Floor, East Wing
San Jose, CA 95110

September 1, 2021

RE: Coyote Percolation Dam Replacement Project

To Whom It May Concern:

Valley Water is proposing to modify the existing Coyote Percolation Dam, which is located southeast of the junction of US Highway 101 (US 101) and California State Route 85, adjacent to Metcalf Park between Monterey Road and US 101 in south San Jose. The project proposes to replace the existing flashboard dam with a temporary inflatable bladder dam and to replace the existing fish ladder stationary panels with adjustable panels to improve fish passage.

JRP Historical Consulting, LLC (JRP) has been retained by Valley Water to conduct a study to survey and evaluate built environment resources that might be affected by the proposed project. The study will assess their eligibility for listing in the National Register of Historic Places and/or the California Register of Historical Resources and will analyze project impacts to significant properties. This study is being prepared in compliance with the National Environmental Policy Act, Section 106 of the National Historic Preservation Act, and California Environmental Quality Act.

If you or your organization has any information or concerns regarding historic resources in the area that could be affected by this project, please respond via email to JRP Historian Samuel Skow at sskow@jrphistorical.com, or via mail at 2850 Spafford Street, Davis, CA 95618, within the next thirty (30) days. Please note, this is not a request for research, just for information. Thank you for any assistance you can provide.

Sincerely,

Christopher McMorris
Principal

Copy:
Sarah Piramoon
Water Resources Specialist, Valley Water
SPiramoon@valleywater.org

Enclosures

1. Project Vicinity Map
2. List of Recipients

Figure 1. Coyote Percolation Dam Replacement Project Map

List of Recipients

History San José
1650 Senter Road
San Jose, CA 95112

Preservation Action Council of San Jose
1650 Senter Road
San Jose, 95112

Santa Clara County Historical & Genealogical Society
c/o Central Park Library
2635 Homestead Road
Santa Clara, CA 95051

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Historical Heritage Commission
70 West Hedding Street, 10th Floor, East Wing
San Jose, CA 95110

Coyote Percolation Dam Replacement Project

Samuel Skow <SSkow@jrphistorical.com>

Thu 9/16/2021 8:42 AM

To: bnc@cob.sccgov.org <bnc@cob.sccgov.org>

1 attachments (915 KB)

CPDR_LIP_09-01-2021 signed_HHC.pdf;

To Whom it May Concern at the Historical Heritage Commission of Santa Clara County,

This email serves as a follow-up to a letter (see attachment) sent via US postal Service by JRP Historical Consulting, LLC (JRP) on behalf of Valley Water on September 1, 2021, regarding historic resources that may be located within the vicinity of the Coyote Percolation Dam Replacement Project in Coyote, Santa Clara County. This communication is to confirm that your organization received that letter and to inquire if you have any information or concerns about historic resources in the project area. If you have any questions or concerns, please reply to this email or contact me via phone (see contact information below) as soon as possible.

Thank you,

Samuel Skow M.A. Historian
(530) 757-2521 ext. 114 sskow@jrphistorical.com

I'm working remotely until further notice. The best way to reach me is by email or voicemail at the number and extension listed. I will get back to you as soon as I can.

Coyote Percolation Dam Replacement Project

Samuel Skow <SSkow@jrphistorical.com>

Thu 9/16/2021 8:26 AM

To: bschroh@historysanjose.org <bschroh@historysanjose.org>

1 attachments (915 KB)

CPDR_LIP_09-01-2021 signed_HSJ.pdf;

To William P. Schroh, Jr., President & CEO, History San Jose,

This email serves as a follow-up to a letter (see attachment) sent via US postal Service by JRP Historical Consulting, LLC (JRP) on behalf of Valley Water on September 1, 2021, regarding historic resources that may be located within the vicinity of the Coyote Percolation Dam Replacement Project in Coyote, Santa Clara County. This communication is to confirm that your organization received that letter and to inquire if you have any information or concerns about historic resources in the project area. If you have any questions or concerns, please reply to this email or contact me via phone (see contact information below) as soon as possible.

Thank you,

Samuel Skow M.A. Historian
(530) 757-2521 ext. 114 sskow@jrphistorical.com

I'm working remotely until further notice. The best way to reach me is by email or voicemail at the number and extension listed. I will get back to you as soon as I can.

Re: Coyote Percolation Dam Replacement Project

Samuel Skow <SSkow@jrphistorical.com>

Mon 10/4/2021 10:02 AM

To: NIcholas Jimenez <njimenez@historysanjose.org>

Cc: Bill Schroh <bschroh@historysanjose.org>; kmiddlebrook@historysanjose.org <kmiddlebrook@historysanjose.org>

1 attachments (915 KB)

CPDR_LIP_09-01-2021 signed_HSJ.pdf;

Hi Nicholas,

I apologize for any mix ups. I mailed the initial letter (see attached) on September 1 to 1650 Senter Road, San Jose, CA 95112, and I sent my follow-up email to Bill Schroh on September 16. Please review the letter and let me know if your organization has any questions, comments, or concerns.

Thanks,

Sam Skow

From: NIcholas Jimenez <njimenez@historysanjose.org>
Sent: Monday, October 4, 2021 9:43 AM
To: Samuel Skow <SSkow@jrphistorical.com>
Subject: Greetings

Hi Sam,

I doubled checked with our staff and this is the first we are hearing about this Coyote Creek project. We are not directly impacted by it from what you described in the voicemail. However, if you would like to forward said letter and email we would be glad to be of assistance to you.

Please CC:
Preseident & CEO, Bill Schroh: bschroh@historysanjose.org
Curator of Collections, Ken Middlebrook: kmiddlebrook@historysanjose.org

--
Nicholas Jimenez,
Administration & Marketing Associate
History San Jose
1650 Senter Road
San Jose, CA 95112
(408) 918-1041
www.historysanjose.org

Coyote Percolation Dam Replacement Project

Samuel Skow <SSkow@jrphistorical.com>

Thu 9/16/2021 8:30 AM

To: info@preservation.org <info@preservation.org>

1 attachments (915 KB)

CPDR_LIP_09-01-2021 signed_PACSJ.pdf;

To Whom it May Concern at the Preservation Action Council of San Jose,

This email serves as a follow-up to a letter (see attachment) sent via US postal Service by JRP Historical Consulting, LLC (JRP) on behalf of Valley Water on September 1, 2021, regarding historic resources that may be located within the vicinity of the Coyote Percolation Dam Replacement Project in Coyote, Santa Clara County. This communication is to confirm that your organization received that letter and to inquire if you have any information or concerns about historic resources in the project area. If you have any questions or concerns, please reply to this email or contact me via phone (see contact information below) as soon as possible.

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Samuel Skow M.A. Historian
(530) 757-2521 ext. 114 sskow@jrphistorical.com

I'm working remotely until further notice. The best way to reach me is by email or voicemail at the number and extension listed. I will get back to you as soon as I can.

Re: Coyote Percolation Dam Replacement Project

Samuel Skow <SSkow@jrphistorical.com>
Thu 9/16/2021 9:11 AM
To: Nancy Moffett <nancymoffett@gmail.com>

Hello Nancy,

Thank you for your prompt response. We will not be requiring any research at this time, but I will keep your organization in mind should the need arise. We were simply notifying local historical societies and other organizations with a potential interest in historical resources of the project to allow them an opportunity to raise questions and/or voice concerns.

Thanks again,

Samuel Skow

From: Nancy Moffett <nancymoffett@gmail.com>
Sent: Thursday, September 16, 2021 9:05 AM
To: Samuel Skow <SSkow@jrphistorical.com>
Subject: RE: Coyote Percolation Dam Replacement Project

Hello Samuel,

Providing feedback about construction projects is outside the scope of our organization.

However, we can look through our materials (Historical Society and Santa Clara City Library) for historical resources in your project area for an hourly fee. Please let me know if you would like further information on this service.

Nancy Moffett
President, SCCHGS

From: Samuel Skow <SSkow@jrphistorical.com>
Sent: Thursday, September 16, 2021 8:37 AM
To: president@scchgs.org
Subject: Coyote Percolation Dam Replacement Project

To Nancy Moffett, President, Santa Clara County Historical & Genealogical Society,

This email serves as a follow-up to a letter (see attachment) sent via US postal Service by JRP Historical Consulting, LLC (JRP) on behalf of Valley Water on September 1, 2021, regarding historic resources that may be located within the vicinity of the Coyote Percolation Dam Replacement Project in Coyote, Santa Clara County. This communication is to confirm that your organization received that letter and to inquire if you have any information or concerns about historic resources in the project area. If you have any questions or concerns, please reply to this email or contact me via phone (see contact information below) as soon as possible.

Thank you,

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(530) 757-2521 ext. 114 sskow@jrphistorical.com

I'm working remotely until further notice. The best way to reach me is by email or voicemail at the number and extension listed. I will get back to you as soon as I can.

DRAFT

HISTORIC RESOURCES REPORT

for the

Anderson Dam Seismic Retrofit Conservation Measures Project - Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project, Santa Clara County, California

Prepared For:

Valley Water
5750 Almaden Expressway
San José, CA 95118

Prepared By:

Christopher McMorris, Principal
Samuel Skow, Historian/Architectural Historian
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

March 2023

SUMMARY OF FINDINGS

Valley Water (formerly Santa Clara Valley Water District) is conducting the Federal Energy Regulatory Commission (FERC) Order Compliance Project (FOCP) in advance of the Anderson Dam Seismic Retrofit Project (ADSRP), and the FOCP requires the development and implementation of at least three conservation measures, including the Ogier Ponds Geomorphic and Habitation Restoration Project (Ogier Ponds Project). Citing a need to immediately reduce risk to the public, FERC's Director of Dam Safety and Inspections provided dam safety directives on February 20, 2020, mandating implementation of the FOCP. The FOCP is being conducted as an undertaking separate from the ADSRP, with the FERC acting as the federal lead agency responsible for compliance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA). The FOCP requires compliance with Section 106 of the NHPA (54 United States Code 306108) and its implementing regulation under Title 36, Code of Federal Regulations, Part 800 (36 CFR 800). The U.S. Army Corps of Engineers (Army Corps) will rely on the FERC's NEPA and NHPA documentation to the extent possible, but will also need to make determinations under NEPA and NHPA as part of its Section 404 permitting process. As part of the project's Section 106 compliance, a Programmatic Agreement (PA) for FOCP was executed on September 9, 2020, between the FERC and the California State Historic Preservation Officer (SHPO), with Valley Water, Army Corps, the County of Santa Clara Parks and Recreation Department (SCC Parks), and local Native American tribes as concurring and consulting parties.[1]

The FOCP conservation measures have been designed so that the ADSRP would avoid and minimize adverse environmental impacts, and in some cases provide environmental benefits. These conservation measure projects would be implemented throughout ADSRP construction and/or operation phases. These measures would reduce construction-related impacts and allow for managed aquifer recharge to support water supply requirements, while maintaining wetted habitat for fish, wildlife, and other groundwater dependent habitats. Many of these project components align with the Fish and Habitat Collective Effort Phase 1 non-flow measures, as described in the Fish Habitat Restoration Program, and would provide improved fish passage, steelhead spawning and rearing habitat, and restored hydrologic functions within the Coyote Creek watershed.

The Ogier Ponds are comprised of six-perennial to semi-perennial instream ponds that are former quarry pits located along Coyote Creek in the unincorporated community of Coyote near the southern outskirts of San Jose's incorporated city limits, approximately two miles downstream of Anderson Reservoir within Coyote Valley. SCC Parks owns and manages the site, which consists of approximately 591 acres of land and water, along with recreation infrastructure including multi-use pedestrian, bicycle, and equestrian trails and a radio-controlled model airplane field.

[1] *Programmatic Agreement Between the Federal Energy Regulatory Commission and the California State Historic Preservation Officer Regarding the Activities Associated with the Anderson Dam at the Anderson Dam Hydroelectric Project (FERC Project No. 5737-007), Santa Clara County, California.*

Mining of construction aggregate materials, including soil and gravels, occurred at the site under the name of Polak Quarry from 1958 to 1993. The land was privately owned until May 1973, when Santa Clara County acquired the property containing the Ogier Ponds by eminent domain. The quarry continued to operate at the site under County permits until 1993 when the quarry became idle. At the end of quarry operations, approximately 3.4 million cubic yards of alluvial materials were mined leaving 145 acres of gravel pits ranging up to 35 feet deep. The mining pits were not originally within the Coyote Creek channel, but high creek flows when Anderson Dam spilled in 1997 removed a section of the earthen berm separating Coyote Creek from Pond 1. As a result, Coyote Creek currently flows into Pond 1 and through inter-pond connections through Ponds 2, 3, and 4. Since the cessation of mining at the property, SCC Parks has managed the property for recreational uses.

The Ogier Ponds Project's area of direct impact encompasses 431 acres contained in two dis-contiguous areas adjacent to Coyote Creek. The primary project area contains all six ponds in an area generally bound between Coyote Creek, U.S. 101, the Coyote Creek Golf Club, and the Santa Clara County Model Aircraft Skypark. The smaller secondary area is sited approximately one mile upstream along the south bank of Coyote Creek in a staging area bound between the creek, U.S. 101, and Burnett Avenue. See Figure 1 and Figure 2 in **Appendix A** for the project location and project vicinity maps. The focus of the current study, the Ogier Ponds Project Architectural Area of Potential Effects (APE) encompasses built environment resources that may be directly or indirectly affected by the Ogier Ponds Project. See Section 1.1 for a discussion of the APE, and the APE map, which includes Map Reference numbers of the resources evaluated herein, is Figure 3 in **Appendix A**.

JRP Historical Consulting, LLC (JRP) prepared this Historic Resources Report for Valley Water under subcontract with Far Western Anthropological Research Group, Inc. (Far Western). This report identifies six properties with built environment resources in the APE that are more than 45 years old. These properties include five farmsteads developed between the late nineteenth and the mid-twentieth centuries, along with a transmission corridor containing high-voltage electrical transmission circuits constructed in 1929 and 1950. **Appendix B** contains the DPR 523 forms for the six built environment resources in the Ogier Ponds Project APE.

This report concludes that the historic-period built environment resources in the Ogier Ponds Project APE are not eligible for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR).

TABLE OF CONTENTS

APPENDICES

1 PROJECT DESCRIPTION[2]

1.1 Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project

This conservation measure would remedy adverse conditions by restoring creek flows to approximately 3,800 linear feet of the pre-1997 creek channel along the southwest side of the pond complex. This project component would involve filling a pond with approximately 400,000 cubic yards of soil to raise the pond bottom to a suitable elevation for creek channel/floodplain construction. Additionally, approximately 100,000 cubic yards of fill would be placed to create berms that would separate the creek from other ponds and about 1,500 linear feet of new low flow channel would be created crossing the filled pond.

The restored/new creek channel and adjoining floodplain would be planted with native vegetation to support riparian and wetland habitats. The restored/new creek channel would contain features (e.g., overhanging banks, large woody debris jams, stream barbs) to enhance aquatic habitat. The total length of new and restored creek channel/floodplain would be about 5,500 linear feet. Open water habitat in ponds would be removed by completely filling a pond and partially filling two ponds. The total area of open water habitat at the site would be reduced from the existing 145 acres to about 125 acres.

1.2 Ogier Ponds Project's Area of Potential Effects (APE)

The Ogier Ponds Project's area of direct impact encompasses 431 acres contained in two dis-contiguous areas adjacent to Coyote Creek. The primary project area contains all six ponds in an area generally bound between Coyote Creek, U.S. 101, the Coyote Creek Golf Club, and the Santa Clara County Model Aircraft Skypark. The smaller secondary area is sited approximately one mile upstream along the south bank of Coyote Creek in a staging area bound between the creek, U.S. 101, and Burnett Avenue. The focus of the current study, the Ogier Ponds Project Architectural APE encompasses built environment resources that may be directly or indirectly affected by the project. The Architectural APE (**Figure 3, Appendix A**) encompasses parcels locate west of Coyote Creek that could be affected, in part, by one or more project alternatives, including possible Valley Water land acquisition and/or potential visual impacts caused by construction of the proposed berm.

[2] Project Description provided by Far Western Anthropological Research Group, Inc., "Archaeological Resources Inventory for the Anderson Dam Seismic Retrofit Conservation Measures Project, Santa Clara County, California" (prepared for Santa Clara Valley Water District, November 2022), 1-3.

2 RESEARCH AND SURVEY METHODS

Resource identification efforts for the Ogier Ponds Project included reviews of numerous records searches conducted for the ADSRP between 2013 and 2021 from the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University: NWIC File No. 13-0537 (November 5, 2013); NWIC File No. 17-0218 (August 1, 2017); NWIC File No. 19-0141 (July 22, 2019); NWIC File No. 19-1183 (February 6, 2020); NWIC File No. 19-1888 (May 5, 2020); and NWIC File No. 20-1331 (January 27, 2021). Far Western additionally received supplemental records search results specific to the Ogier Ponds Project APE on August 31, 2022 (NWIC File No. 22-0347), all of which were shared with JRP. JRP also reviewed the NRHP Database; California Historical Resources list curated by the California Office of Historic Preservation (OHP), which includes resources in the NRHP; OHP Built Environment Resources Directory (BERD), a list containing all resources reviewed for eligibility to the NRHP and the California Historical Landmarks programs through federal and state environmental compliance laws, and resources nominated under federal and state registration programs; and the Santa Clara County Historic Resources list.[3] JRP additionally conducted research at the Santa Clara County Clerk-Recorder's Office in San Jose, the Morgan Hill branch of the Santa Clara Public Library, various online repositories, and its extensive in-house project library and archives.

For the present project, identification efforts included a review of previously prepared studies documenting built environment resources in or near the Ogier Ponds Project APE and conducting research to determine dates of construction of built environment resources in the APE. While the NWIC records searches identified two previously recorded archaeological sites within the Ogier Ponds Project APE, no built environment resources were identified by this effort or in the other historical inventories named above. Based on the result of a preliminary historic built environment field survey conducted for Valley Water's Cross Valley Pipeline Extension Project in 2021, JRP did not survey or evaluate the former quarrying pits, as the only extant remains of these operations are the pits themselves—since filled with floodwaters and acting as ponds—and various pieces of industrial detritus scattered throughout the area. JRP conducted a field survey of the APE on February 15, 2023. This included an intensive level survey of the five farmstead properties and high-voltage electrical transmission corridor.

[3] National Park Service, National Register Research Database, accessed January 2023 at https://www.nps.gov/subjects/nationalregister/database-research.htm; California OHP, Built Environment Resources Directory, Santa Clara County, accessed January 2023 at https://ohp.parks.ca.gov/?page_id=30338; California OHP, California Historical Resources, Santa Clara County, accessed January 2023 at https://ohp.parks.ca.gov/listedresources/; Northwest Information Center (NWIC), Sonoma State University, conducted by Far Western, NWIC File No. 13-0537 (November 5, 2013), NWIC File No. 17-0218 (August 1, 2017), NWIC File No. 19-0141 (July 22, 2019), NWIC File No. 19-1183 (February 6, 2020), NWIC File No. 19-1888 (May 5, 2020), and NWIC File No. 20-1331 (January 27, 2021); Santa Clara County Department of Planning, Historic Preservation Office, Historic Resources Inventory and South County Heritage Resource List.

3 HISTORICAL OVERVIEW

The Ogier Ponds Project APE includes the Ogier Ponds, adjacent agricultural parcels, and a dis-contiguous staging area sited upstream along Coyote Creek in an unincorporated part of the southern Santa Clara Valley between the community of Coyote and the city of Morgan Hill. The built environment resources in the Ogier Ponds Project APE include five multi-component farmsteads developed between the late nineteenth and mid-twentieth centuries and a high voltage electrical transmission corridor containing structures constructed in 1929 and 1950. Themes relevant to the built resources in the Ogier Ponds Project APE are presented herein.

3.1 Southern Santa Clara Valley, ca. 1830 – 1910

The earliest Euro-American settlements in the vicinity of the Ogier Ponds Project APE occurred in the 1830s, when the Mexican government granted to Juan Alvires the 20,052-acre *Rancho Refugio de la Laguna Seca* (Laguna Seca Rancho) and the 8,927-acre *Rancho Ojo de Agua de la Coche* to Juan Maria Hernandez the following year. The APE is contained entirely within the boundaries of the Laguna Seca Rancho, which was traversed north-south by *El Camino Real*—the main thoroughfare connecting the Spanish mission system in Alta California. In the APE, this primary transportation artery was located in the general vicinity of present-day Monterey Road. As with most other Mexican-era rancho grant holders, Alvires raised cattle on his land, but he also cultivated wheat and operated a flourmill and resided in a no-longer-extant adobe house built along the bank of Coyote Creek near the present-day community of Coyote (about three miles north of the APE).[4]

The rancho period's pastoral way of life continued into the early 1850s, as Anglo Americans and other non-Latino settlers began to arrive in the area, including William Fisher, an English-born tallow trader who migrated from Massachusetts to California in the 1830s and acquired the Laguna Seca Rancho at auction in 1845. Fisher died five years later, and the land—containing the APE—passed to his wife, Liberata Fisher née Ceseña, who originally hailed from Baja California, Mexico. Following the Mexican-American War (1846-1848) and California statehood (1850), and as required under the federal Land Act of 1851, Fisher's heirs filed a claim with the Public Land Commission to validate their ownership of the Laguna Seca Rancho, which was confirmed by the federal government in 1865. By 1876, Fisher's heirs and successors-in-interest had subdivided the former Laguna Seca Rancho into more than 20 parcels ranging in size from 10 acres to upwards of 4,200 acres, many of which they had sold to a steady influx of migrant farmers (**Plate 1**). Among these early settlers was Irish-Canadian farmer, Walter

[4] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill" (prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.

Fitzgerald, who further subdivided a 1,000-acre tract between his sons, including Gregory Fitzgerald who may have constructed the extant residence on Santa Clara County Assessor Parcel Number (APN) 725-04-002 (Map Reference # 6).[5]

Plate 1. Excerpt of 1876 map of Santa Clara County showing portion of Rancho Laguna Seca, with boundaries of APE outlined in red. Annotation by JRP.

The southern Santa Clara Valley underwent a dramatic agricultural transformation during the early period of American settlement. While large landowners like the Fishers continued to graze

[5] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill" (prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.

cattle, wheat farming surpassed this practice along with sheep ranching, dairying, and general farming as the region's main agricultural endeavors by the 1860s. While sheep ranches and dairies were particularly prevalent in southern Santa Clara County, the drought of 1864 severely depleted herds and caused financial ruin to many ranchers. As a result, stock raising began to wane in the region, with many former ranchers adopting wheat cultivation. Owing to the easy cultivation and high fertility of the Santa Clara Valley soil, farmers realized high yields with little capital investment, contributing to the steady annual rise of acreage dedicated to wheat. Despite this general cultivation trend, some large stock ranches continued to operate in the outlying areas of the valley, such as in the eastern foothills and near Gilroy, outside of the APE.[6] By 1880, wheat's popularity in the Santa Clara Valley succumbed to poor yields and low prices, begetting a profound shift toward the establishment of orchards and vineyards in the region. As early as 1856, the first experimental commercial orchards were planted in the Willow Glen area, just southwest of present-day downtown San José roughly 15 miles north of the APE. They were generally successful and led to regional farmers planting more orchards in the 1860s.[7] In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop (**Plate 2**). This particular variety of plum had a low moisture content making it ideal for drying and hence ideal for shipping (as refrigerated rail cars had yet to be invented). In addition to prunes, Santa Clara Valley farmers also planted other stone fruit orchards such as apricots, peaches, and cherries.[8]

In addition to orchards, many farmers in the Santa Clara Valley planted grapes. In the early 1860s, José Maria Malaguerra developed one of the earliest vineyards in the county on a 211-acre tract along Coyote Creek on acreage previously contained in the Laguna Seca Rancho southeast of and adjacent to the Ogier Ponds Project APE (near the staging area). Here, Malaguerra established the Malaguerra Winery, a still-standing stone and stucco building (outside of the APE) erected in 1869 and listed on the NRHP in 1980 (NPS # 80000858). Other early wineries in the Morgan Hill area included that of Joel W. Ransome, a Connecticut-born farmer who owned 402 acres along Monterey Road in present-day Morgan Hill, located about one mile southeast of the APE. Here, Ransome planted French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes and built a no-longer-extant winery by the 1880s. Around this same time and south of the Coyote Valley, the community of San Martin and its surrounding area developed into regional centers of viticulture, with multiple farms raising wine grapes and building small wineries and brandy distilleries. Occupying considerably less acreage than orchard crops, viticulture remained a common practice through the twentieth century, where in 1925 Italian immigrant Emilio Guglielmo established a still active vineyard and commercial

[6] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, "County of Santa Clara Historic Context Statement," 37, 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 12, 13.
[7] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41, 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 14.
[8] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

winery roughly 2.5 miles southeast of the APE in Morgan Hill. In the APE, the San Martin Vineyards Company, incorporated in 1938 by another family of Italian vintners, the Filices, established vineyards on the former Fitzgerald property (Map Reference # 6), which had been previously planted in no-longer-extant prune and apricot orchards in 1918.[9]

Plate 2. Prune orchards near Morgan Hill ca. 1910.[10]

Expanded transportation networks and population centers emerged alongside and further drove agricultural development in the southern Santa Clara Valley. *El Camino Real* (mentioned above) was originally comprised of a north-southerly meandering dirt trail travelled by foot, horseback, and ox carts during the era of Spanish colonial settlement in the late eighteenth and early nineteenth centuries. In the 1850s, the Santa Clara County Board of Supervisors elected to incorporate the thoroughfare into the county road system, where it served as the primary link between San José and Gilroy. During this period, numerous settlements were established along this main transportation artery as way stations, where settlers constructed inns, stables, and blacksmith shops to serve the Butterfield Overland Mail Company—a national stagecoach company that operated in the valley in the late 1850s and early 1860s. These settlements were originally named for their distances from central San José, including Twelve Mile House at present-day Coyote, Fifteen Mile House at the no-longer-extant Perry Station adjacent to the APE, and Eighteen Mile House at the former community of Madrone (now incorporated into

[9] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2; Herrmann Bros., *Official Map of the County of Santa Clara, California* (San Jose, California: Britton & Rey, 1890); Candace Reed, National Register of Historic Places Inventory—Nomination Form: Malaguerra Winery (NPS # 80000858) (prepared November 1977, listed October 1980), National Register Research Database; H. S. Foote, *Pen Pictures from the Garden of the World or Santa Clara County, Illustrated* (Chicago: The Lewis Publishing Company, 1888), 385-386; Guglielmo Winery, "History," https://guglielmowinery.com/history/ (accessed January 2023).
[10] [Postcard of prune orchards at Morgan Hill, California], ca. 1910, Historic Postcard Collection, San José Public Library, California Room.

present-day Morgan Hill) (**Plate 3**). Around this same time, the short-lived Santa Clara & Pajaro Valley Railroad Company (1868-1870) laid 30 miles of track between San José and Gilroy alongside the Monterey Road alignment before the company was fully absorbed into the Southern Pacific Railroad Company. As with the overland way stations, numerous train depots were established along the route, including those at Coyote, Madrone, and Gilroy, which further spurred regional development. At Coyote, about three miles north of the APE, settlers established an inn with restaurant, saloon, and general store in the 1850s (Twelve Mile House, also called "Laguna House"), a post office in 1882, and by the 1890s, a public hall and school. Near the APE, Perry Station functioned as a shipping and receiving point for neighboring agricultural producers and included warehouses and an inn with saloon (Fifteen Mile House), but never developed as a townsite with diverse commercial or social resources. In the early twentieth century, Monterey Road was incorporated into the U.S. 101 Bayshore Highway, with various businesses in the adjoining towns emerging to serve California's nascent automobile culture, such as stores, hotels, gas stations, and restaurants with "drive-thrus" and large parking lots. However, in the early 1980s, U.S. 101 was realigned and built as a freeway east of the historic route to bypass Coyote, Morgan Hill, San Martin, and Gilroy.[11]

In addition to expanded transportation networks, a variety of technological advances also drove the rise of regional horticulture. Fruit farming was boosted in the late 1860s with the simultaneous completion of the transcontinental railroad as well as the Santa Clara & Pajaro Valley Railroad (discussed above), which provided access to large eastern U.S. markets to Santa Clara Valley fruit farmers. With the development of ice-cooled refrigerated rail cars in the 1880s, fresh fruit shipments only furthered the popularity of the valley's orchard crops throughout the country, incentivizing higher production in the region. By 1890, this horticultural transition had spread to most parts of the Santa Clara Valley where irrigation water from streams or wells was available.[12] Advancements in irrigation technology also facilitated the development of intensive horticulture in the Santa Clara Valley. The first type of irrigation pump used on farms was the centrifugal-type pump, the use of which grew prevalent among regional farms by the late 1880s. The main limitation of the design, however, was that it could not lift water a great vertical distance, and therefore, was best applied to pumping surface water, such as out of creeks or canals rather than from wells.[13] The other most common pump type in the Santa Clara Valley was the vertical turbine pump, first developed in the early twentieth century with enough power

[11] Basin Research Associates, "Cultural Resources Technical Report," 5-10; Derek Whaley, "Railroads: Southern Pacific Railroad Subsidiaries" (May 6, 2016), https://www.santacruztrains.com/2016/05/southern-pacific-railroad-subsidiaries.html (accessed January 2023); Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 307; Circa, "Historic Context Statement for the City of Morgan Hill," 38.

[12] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[13] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3; "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.

to lift water from deep wells. Vertical turbine pumps came into popular usage on farms in the Santa Clara Valley around 1915 and had a profound effect on the valley as farmers no longer needed access to surface streams to irrigate their crops, thus facilitating an expansion of orchards and vineyards. However, increased groundwater pumping subsequently caused a rapid and substantial drop in groundwater levels, leading to the creation of the Santa Clara Valley Water Conservation District (now Valley Water) in 1929 to restore the regional aquifer and to control groundwater levels.[14]

Plate 3. Excerpt of 1917 Morgan Hill Quadrangle topographical map with APE outlined in red. Annotation by JRP.

3.2 Southern Santa Clara Valley, 1910 - 1990

Groundwater pumping emerged concurrent with the widespread electrification of the southern Santa Clara Valley, which began around the turn of the twentieth century. Beginning in 1911, the Santa Clara County Board of Supervisors awarded franchises to various companies to install and operate electrical systems along various public roads throughout the county. One such company, the Coast Counties Gas & Electric Company (CCG&E) provided electrical service to

[14] Etcheverry, *Irrigation Practice and Engineering,* 179-191; Greene, *Pumping Machinery,* 44-46, 110-112; Lundy, "A History of the Deep Well Turbine Pump Industry," 1-3.

Gilroy, Morgan Hill, and the surrounding areas, as well as parts of San Benito and Santa Cruz counties. CCG&E distributed its own generated power as well as that purchased from the Pacific Gas & Electric Company (PG&E) along 22,000- and 60,000-volt (60kV) lines throughout its service area, emanating from various substations—including the Morgan Hill substation, which provided power to farms in and around the APE. In 1929, PG&E constructed the 110kV Newark-Salinas transmission circuit, which traversed the APE and substantially augmented the regional power system as part of its campaign of utilities acquisition, systems expansion, and transmission standardization throughout the northern and central parts of California in the 1920s. The regional system was further enhanced about 20 years later when, in 1950, PG&E established the 230kV Moss Landing-Sunol line through the same alignment as part of its $800 million expansion program between 1946 and 1951. The transmission corridor containing the 110kV Newark-Salinas and 230kV Moss Landing-Sunol transmission circuits (Map Reference #5) was ultimately rerouted in 1955 to the recently constructed Metcalf substation about three miles north of the APE. The present-day 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits currently occupy the corridor.[15]

The change from grain cultivation to diversified horticulture with an emphasis on orcharding in the late nineteenth century also triggered changing land ownership patterns. The trend toward subdivision, begun on the former Laguna Seca Rancho in the 1860s, spread throughout the southern Santa Clara Valley as the emergence of highly profitable fruit crops prompted large ranch owners to subdivide their massive holdings and sell their land for small orchards plots encompassing between five and 50 acres, with 20-acre orchards generating sufficient income to support a single family. In the APE, orchardist and dairy farmer John B. Ogier acquired that 320-acre tract previously owned by John Fitzgerald, son of Walter Fitzgerald (discussed above), in 1914. That year, Ogier subdivided the property into 21 lots ranging in size from about six acres to 54.5 acres (**Plate 4**). The subdivision additionally laid out Ogier and Barnhart avenues. Ogier's agent, James A. Clayton & Company—an influential real estate and development firm established in San Jose in 1867—initially sold off lots at $125 to $150 per acre, which were ultimately priced up to $300 per acre by 1916. Development was slow over the next few decades and largely confined to the west bank of the creek in those lots abutting Monterey Road, which included: Lots 1 and 2 containing the residence at 10000 Monterey Road constructed circa 1916 (Map Reference #2); and Lots 19, 20, and 21 containing a residence constructed sometime between 1917 and 1931 (Map Reference #3). The majority acreage on both tracts was dedicated to prune orchards, with similar cultivations likewise present on adjacent tracts containing

[15] Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of the County Archives of California: No. 44 – Santa Clara County (San Jose)* (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143;

present-day APNs 725-06-006 and -007 (Map Reference #1) and 725-04-002 (Map Reference #6).[16]

Plate 4. 1914 Map of the Ogier Subdivision containing a portion of the APE, with Lots 1 and 2 containing Map Reference #2 and Lots 19, 20, and 21 containing Map Reference #3 and Map Reference #4.

Orchard fruit production continued to grow into the twentieth century and remained the dominant agricultural activity in the Santa Clara Valley. In the early twentieth century, prunes were the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts.

[16] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15; F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023).

Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post-World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District that ensured sufficient water for irrigation (**Plate 5**).[17]

Plate 5. Excerpt of 1955 Morgan Hill Quadrangle topographical map, with APE outlined in red. Annotation by JRP. Note the prevalence of orchards (depicted in green).

In the decades after World War II ended in 1945, orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, but Morgan Hill and the adjacent unincorporated area containing the APE, owing to its distance from San José, retained its rural character for a longer period (**Plate 6**). Development during this period was predominately limited to the construction of farmhouses, agricultural outbuildings, and other industrial facilities on existing orchard properties, such as various buildings and structures in the APE. These include the residence and two outbuildings erected between the 1940s and the late 1960s on APNs 725-05-006 and -007 (Map Reference #1), which contained prune, pear, apricot, and walnut orchards through the late 1990s; an agricultural outbuilding, barn, and commercial

[17] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, “Historic Context Statement for the City of Morgan Hill,” 51-54, 70; Archives and Architecture, LLC, “County of Santa Clara Historic Context Statement,” 40-41.

building all constructed sometime between 1968 and 1980 on APNs 725-05-005 and -006 (Map Reference #2), which had been converted from orchards to rangeland during this same period; an agricultural outbuilding constructed sometime between 1968 and 1980 on APN 725-05-011 (Map Reference #3), where orchards had likewise been removed by 1980; and a multi-component fruit-processing facility where various industrial warehouse buildings had been constructed at various times between 1956 and 1980 (Map Reference #4).

Plate 6. Excerpt of 1955 Morgan Hill Quadrangle topographical map (photorevised 1980), with APE outlined in red. Annotation by JRP. Note the removal of orchards and the development of quarrying operations at the location of present-day Ogier Ponds.

Agriculture continued to be the backbone of the Morgan Hill area economy until the late 1970s, when high-tech firms began locating in the city and the California Department of Transportation realigned and expanded the U.S. 101 freeway, facilitating an easier commute to San José and transforming Morgan Hill into a bedroom community. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread north of Morgan Hill towards the vicinity of the Ogier Ponds, further altering the once rural and agricultural character of the area. The Ogier Ponds Project APE is just outside of the Morgan

Hill city limits and generally retains its rural character; however, several notable changes have occurred since the 1970s. Orchards were removed at various times from all but one parcel in the APE, APN 725-04-002 (Map Reference #6); former orchard lands were converted to rangeland on two properties, APNs 725-06-006 and -007 (Map Reference #1) and APNs 725-05-005 and -006 (Map Reference #2); one parcel, APN 725-05-011 (Map Reference #3), was converted from agricultural land to a mobile home community in the 1980s; and the former fruit-processing facilities on one parcel, APN 725-05-014 (Map Reference #4), were repurposed for multi-industrial use.[18]

[18] USGS, *Morgan Hill Quadrangle,* 15-minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1968, 1973, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.

4 DESCRIPTION OF RESOURCES

This section provides a brief written description and photographs of the built environment resources in the Ogier Ponds Project APE. See **Appendix B** for full descriptions and additional photographs of these resources.

Map Reference #1: 559 Monterey Road (APNs 725-06-006 and 725-06-007)

This two-parcel property encompasses 8.72 acres primarily comprised of grassland with a small complex consisting of a house, three outbuildings, and a barn on APN 725-06-006, and numerous modern horse stalls sited on APN 725-06-007. The oldest building on the property is the residence, built sometime between 1940 and 1948, with two outbuildings constructed at various times between 1940 and 1968, one outbuilding constructed sometime between 1987 and 1998, and the remaining built environment resources constructed or moved onto the property between about 2019 and 2021 (**Photograph 1**).

Photograph 1. Residence at 559 Monterey Road; camera facing northeast, February 15, 2023.

Map Reference #2: 10000 Monterey Road (APNs 725-05-005 and 725-05-006)

This two-parcel property encompasses 11.99 acres comprised of grassland in the northwest parcel, APN 725-05-006, and a residence, outbuildings, barn, and commercial building in the southeast parcel, APN 725-05-005. The oldest building on the property is the residence, portions of which were built circa 1916, with one outbuilding, the barn, and the commercial building built sometime between 1968 and 1980 (**Photograph 2**). All other built environment resources on the property were constructed or moved onto the property between 2014 and 2020.

Photograph 2. Residence at 10000 Monterey Road; camera facing southwest, February 15, 2023.

Map Reference #3: 100-550 Ogier Avenue (APN 725-05-011)

This 14.2-acre parcel contains a primary residence, outbuilding, secondary residence, a mobile home community, prefabricated ancillary sheds, and multiple prefabricated residences and mobile buildings. The oldest building on the property is the primary residence, built sometime between 1917 and 1931, with the outbuilding constructed sometime between 1968 and 1980, and all other built environment resources constructed or moved onto the property at various times between 1982 and the present (**Photograph 3**).

Photograph 3. Primary residence at 550 Ogier Avenue; camera facing northeast, February 2023.

Map Reference #4: 550 Monterey Road (APN 725-05-014)

This 11.5-acre parcel contains an industrial complex comprised of six buildings—five warehouses and one residence—occupied by various tenants. The oldest warehouse on the property was built sometime between 1956 and 1963, with four additional warehouses and the residence constructed at different times between 1963 and 1982, and all other built environment resources constructed or moved onto the parcel at various times between 1998 and 2009 (**Photograph 4**).

Photograph 4. Oldest warehouse at 550 Monterey Road; camera facing west, February 2023.

Map Reference #5: Segments of 230kV Moss Landing-Metcalf Nos. 1 and 2 and 115kV Metcalf-Morgan Hill Transmission Corridor

In the APE, this transmission corridor traverses the Ogier Ponds and extends the length of Barnhart Avenue before crossing Monterey Road and the Caltrain (formerly Southern Pacific Railroad) alignment (outside of the APE). The transmission corridor contains two transmission circuits built, owned, and operated by PG&E: the 115kV Metcalf-Morgan Hill line, originally constructed between Newark and Salinas in 1929; and the 230kV Moss Landing-Metcalf No. 1 and 2 lines, originally constructed between Moss Landing and Sunol in 1950 (**Photograph 5**). All the three-phase circuits are carried on parallel vertical planes by double-circuit, lattice metal towers with top cages, cross arms, and concrete stub footings.

Photograph 5. 115kV Metcalf-Morgan Hill (right) and 230kV Moss Landing-Metcalf Nos. 1 and 2 (left) along Barnhart Avenue; camera facing southwest, February 15, 2023.

Map Reference #6: APN 725-04-002

This 103.97-acre parcel contains a cherry orchard with a small building complex consisting of a residence, a barn, at least one metal shipping container, and several ancillary buildings and structures. The oldest building on the property is the residence, constructed sometime before 1917—with portions potentially built earlier than 1876—with the barn built circa 1981 and all other built environment resources constructed or moved onto the property between 2018 and the present (**Photograph 6**).

Photograph 6. Residence on APN 725-04-002; camera facing southeast, February 15, 2023.

5 FINDINGS AND CONCLUSIONS

The Ogier Ponds Projects is one of three conservation measure projects that is part of the FOCP, which is being conducted as an undertaking with the FERC acting as the federal lead agency responsible for compliance with the NEPA and NHPA Section 106. The FOCP requires compliance with Section 106, and a PA for the FOCP was executed on September 9, 2020, between the FERC and SHPO, with Valley Water, Army Corps, SCC Parks, and local Native American tribes as concurring and consulting parties.[19]

For the Ogier Ponds Project, JRP prepared this Historic Resources Report to assist with project compliance with NHPA Section 106 and the implementing regulations under 36 CFR 800, as these pertain to federally funded undertakings and their impacts on historic properties.

The APE includes six historic-era built environment resources that required evaluation. JRP has concluded that none of the six resources evaluated herein are eligible for listing in the NRHP or CRHR because they do not have historic significance (i.e., they are not significant for associations with important historic events, lives of persons important to history, or for their architecture / design) or they lack historic integrity to any potential period of significance. These resources have been evaluated in accordance with Section 106 and its implementing regulations in 36 CFR Part 800, as well as CEQA Guidelines Section 15064.5(a)(2)-(3), using the criteria outlined in Section 5024.1 of the California Public Resources Code. These resources are listed in the table below, along with a Map Reference number used on the APE map in Figure 3. No built environment resources in the APE are currently listed in or previously determined eligible for the NRHP or CRHR, and none have been previously determined ineligible for the NRHP or CRHR. None of these properties are historical resources under CEQA.

Table: Summary Findings

Name	APN	Address	Community	OHP Status Code	Map Reference	Eligibility
N/A	725-06-006 and 725-06-007	559 Monterey Rd.	Morgan Hill (vic.)	6Z	1	Not NRHP / CRHR Eligible
N/A	725-05-005 and 725-05-006	10000 Monterey Hwy.	Morgan Hill (vic.)	6Z	2	Not NRHP / CRHR Eligible

[19] *Programmatic Agreement Between the Federal Energy Regulatory Commission and the California State Historic Preservation Officer Regarding the Activities Associated with the Anderson Dam at the Anderson Dam Hydroelectric Project (FERC Project No. 5737-007), Santa Clara County, California.*

Name	**APN**	**Address**	**Community**	**OHP Status Code**	**Map Reference**	**Eligibility**
N/A	725-05-011	100-550 Ogier Ave.	Morgan Hill (vic.)	6Z	3	Not NRHP / CRHR Eligible
Battaglia Packing Co. fruit-processing plant	725-05-014	550 Monterey Rd.	Morgan Hill (vic.)	6Z	4	Not NRHP / CRHR Eligible
230kV Moss Landing-Metcalf Nos. 1 and 2 / 115kV Metcalf-Morgan Hill transmission corridor	N/A	N/A	N/A	6Z	5	Not NRHP / CRHR Eligible
Fitzgerald Ranch; Rodeck Ranch	725-04-002	N/A	Morgan Hill (vic.)	6Z	6	Not NRHP / CRHR Eligible

6 PREPARERS' QUALIFICATIONS

JRP Principal Christopher McMorris (M.S., Historic Preservation, Columbia University) oversaw the preparation of this report. Mr. McMorris has more than 24 years of experience and specializes in conducting historic resource studies for compliance with Section 106 and CEQA, as well as other historic preservation projects. Based on his level of education and experience, Mr. McMorris meets and exceeds the United States Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

JRP Staff Architectural Historian Samuel Skow (M.A., Public History, California State University, Sacramento) was the lead historian for this project. Mr. Skow has eight years of experience as a historian/architectural historian preparing historic resource inventory and evaluation reports. He was the primary author of this report and conducted the fieldwork and research associated with the attached DPR 523 forms. Mr. Skow meets and exceeds the Secretary of the Interior's Professional Qualification Standards under History and Architectural History (as defined in 36 CFR Part 61).

JRP Research Assistant Andrew Young (B.A., History, University of California, Davis) assisted in fieldwork, research, and DPR 523 form preparation for this project.

Graphics Technician Rebecca Flores created the maps and graphics utilized in this report and the DPR 523 forms.

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APPENDIX A

FIGURES

Figure 1. Project Vicinity Map

Figure 2. Project Location Map

Figure 3. ***Draft*** **APE Map**

APPENDIX B

DPR 523 FORMS

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ______
Review Code ______ **Reviewer** ______ **Date** ______

***Resource Name or #** (Assigned by recorder): MR #1

P1. Other Identifier: 559 Monterey Road

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara County
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad**: Morgan Hill, CA **Date**: 1955 (1980 edition) **T**:__; **R**:__; **Sec**:___; Mount Diablo Meridian

c. Address: 559 Monterey Road City: Morgan Hill Zip: 95037

d. UTM: (give more than one for large and/or linear resources) Zone: _____; ____________mE/ ____________mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcel Number (APN): 725-06-006 & 725-06-007

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records two parcels with a combined acreage of 8.72 acres located on the east side of Monterey Road between the community of Coyote and the city of Morgan Hill in an unincorporated part of rural Santa Clara County. Much of the acreage is grassland with roughly one third dedicated to nine corrals containing numerous wood horse stalls and a residential complex along the southeast edge (**Photograph 1**) (see **Site Map** on Continuation Sheet). The complex contains a residence, three outbuildings, and a barn is accessed by a dirt driveway extending northeast from Monterey Highway. (See Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP33 – Farm/ranch

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** 559 Monterey Road; camera facing northeast from Monterey Road, February 15, 2023.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
See Continuation Sheet.

***P7. Owner and Address:**
Nasim Nehawandian
559 Monterey Road
Morgan Hill, CA 95037

***P8. Recorded by:** (Name, affiliation, address)
Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: February 15, 2023

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Historic Resources Report for the Anderson Dam Seismic Retrofit Conservation Measures Project – Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project, Santa Clara County, California," prepared for Valley Water, 2023.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): MR #1

B1. Historic Name: ______
B2. Common Name: ______
B3. Original Use: Agricultural B4. Present Use: Agricultural
***B5. Architectural Style**: Ranch; Utilitarian
***B6. Construction History**: (Construction date, alteration, and date of alterations) See Continuation Sheet.
***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**
***B8. Related Features:** _________
B9. Architect: unknown b. Builder: unknown
***B10. Significance: Theme**: N/A **Area**: N/A
Period of Significance: N/A **Property Type**: N/A **Applicable Criteria**: N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The subject property does not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). This property has been evaluated in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) as well as Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This property is not a historical resource under CEQA.

Historic Context

The oldest built environment resources recorded on this form were constructed in the early-to-mid-twentieth century along Coyote Creek in the southern Santa Clara Valley near the present-day Ogier Ponds. (See Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: Fairchild Aerial Surveys (FAS), Flight CIV-1940, Frame 343-2, 1:20,000, June 5, 1940, flown for U.S. Department of Agriculture – Agriculture Adjustment Administration (USDA-AAA), available at https://mil.library.ucsb.edu/ap_indexes/FrameFinder/ (UCSB; accessed January 2023); HistoricAerials.com, "559 Monterey Highway" (1948); "M. H. Rancher Dies at 78; Funeral Set," *San Jose Mercury* (October 2, 1956): 15.

B13. Remarks:

***B14. Evaluator**: Samuel Skow
***Date of Evaluation**: February 2023

(This space reserved for official comments.)

P3a. Description (continued):

Sited near the center of APN 725-06-006 is the approximately 2,150-square-foot, Ranch-style residence, which features an irregular L-shaped footprint with a multi-sectional roof comprised of gable roofs and a shed roof over the north-corner addition (**Photograph 2** and **Photograph 3**). The building is clad with a combination of brick veneer, horizontal-groove siding in the gable peaks, and vertical-groove siding on the northern addition. Fenestration consists of replacement vinyl sliding windows.

Photograph 2. Front (southwest) facade; camera facing northeast from Monterey Road, February 15, 2023.

Photograph 3. Northwest and southwest side of the residence; camera facing east from Monterey Road, February 15, 2023.

Immediately northeast of the residence is Outbuilding 1, an approximately 900-square-foot building with a rectangular footprint, front-gable roof, and horizontal board siding in the gable peak (**Photograph 4**). Limited visibility of the building was confined to the Coyote Creek riparian corridor, where views were obscured by modern fencing and other structures.

Immediately east of and adjacent to Outbuilding 1 is Outbuilding 2, an approximately 500-square-foot building with a rectangular footprint and a metal shed roof (**Photograph 5**).

Photograph 4. Northeast side of Outbuilding 1, with the residence in the background; camera facing west from Coyote Creek riparian corridor, February 15, 2023.

Photograph 5. Northeast side of Outbuilding 2; camera facing west from Coyote Creek riparian corridor, February 15, 2023.

Northwest of Outbuilding 2 is Outbuilding 3, an approximately 1,300-square-foot building with a generally square footprint, multi-sectional roof with gable and shed roof sections (**Photograph 6**).

Not visible from the public right of way is Outbuilding 4. It is sited further from the rest, approximately 60 feet from Outbuilding 2, and has an approximately 850-square-foot, rectangular footprint.

On the northwest half of the property (APN 725-06-007) are nine corrals that all have rectangular footprints and are wholly or partially enclosed by chain link fences (**Photograph 7**). Each contains between 5 and 10 horse stalls of wood-frame construction (**Photograph 8**). All have shed roofs that are covered in a variety of materials, including wood, tarpaulin, and asphalt rolls. Chain link fencing extends along the property's perimeter.

Photograph 6. Outbuilding 3 with Outbuilding 1 and Outbuilding 2 in the background; camera facing west from Coyote Creek riparian corridor, February 15, 2023.

Photograph 7. Corrals with horse stalls; camera facing north from Monterey Road, February 15, 2023.

Photograph 8. Horse stalls; camera facing west from Coyote Creek riparian corridor, February 15, 2023.

***Recorded by**: S. Skow & A. Young ***Date**: February 15, 2023 ☒ Continuation ☐ Update

P6. Date Constructed / Age and Sources; and B6. Construction History (continued):

Building Name*	Construction History	Sources
Residence	Built sometime between 1940-1948; north addition constructed ca. 2019; replacement vinyl windows installed pre-2014.	Fairchild Aerial Surveys (FAS), Flight CIV-1940, Frame 343-2, 1:20,000, June 5, 1940, flown for U.S. Department of Agriculture – Agriculture Adjustment Administration (USDA-AAA), available at https://mil.library.ucsb.edu/ap_indexes/FrameFinder/ (UCSB; accessed January 2023); HistoricAerials.com, "559 Monterey Highway" (1948); Google Earth, "559 Monterey Highway" (May 2018 and October 2019).
Outbuilding 1	Built sometime between 1940-1948.	FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB; HistoricAerials.com, "559 Monterey Highway" (1948).
Outbuilding 2	Built sometime between 1965-1968.	Cartwright Aerial Surveys (CAS), Flight CAS-65-130, SCL 23-144, 1:12,000, May 27, 1965, flown for California Division of Highways, UCSB; CAS, Flight CAS-2310, Frame 2310-3-161, 1:12,000, May 6, 1968, UCSB.
Outbuilding 3	Built sometime between 1987-1998.	HistoricAerials.com, "559 Monterey Highway" (1987); Google Earth, "559 Monterey Highway" (August 1998).
Barn	Built ca. 2019.	Google Earth, "559 Monterey Highway" (May 2018 and November 2019).
Corals and Horse Stalls	Built ca. 2021	Google Earth, "559 Monterey Highway" (September 2020 and September 2021).

*Building designations by JRP.

B10. Significance (continued):

The earliest Euro-American settlements in the vicinity of the Ogier Ponds Project occurred in the 1830s, when the Mexican government granted to Juan Alvires the 20,052-acre *Rancho Refugio de la Laguna Seca* (Laguna Seca Rancho) and the 8,927-acre *Rancho Ojo de Agua de la Coche* to Juan Maria Hernandez the following year. As with most other Mexican-era rancho grant holders, Alvires raised cattle on his land, but he also cultivated wheat, operated a flourmill, and resided in a no-longer-extant adobe house built along the bank of Coyote Creek.[1] The rancho period's pastoral way of life continued into the early 1850s, as Anglo Americans and other non-Latino settlers began to arrive in the area, including William Fisher, an English-born tallow trader who acquired the Laguna Seca Rancho at auction in 1845. Fisher died five years later, and the land passed to his wife, Liberata Fisher née Ceseña. Following the Mexican-American War (1846-1848) and California statehood (1850), and as required under the federal Land Act of 1851, Fisher's heirs filed a claim with the Public Land Commission to validate their ownership of the Laguna Seca Rancho, which was confirmed by the federal government in 1865. By 1876, Fisher's heirs

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill" (prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.

and successors-in-interest had subdivided the former Laguna Seca Rancho into more than 20 parcels ranging in size from 10 acres to upwards of 4,200 acres, many of which they had sold to a steady influx of migrant farmers.[2]

The southern Santa Clara Valley underwent a dramatic agricultural transformation during the early period of American settlement. While large landowners like the Fishers continued to graze cattle, wheat farming surpassed this practice along with sheep ranching, dairying, and general farming as the region's main agricultural endeavors by the 1860s. Owing to the easy cultivation and high fertility of the Santa Clara Valley soil, farmers realized high yields with little capital investment, contributing to the steady annual rise of acreage dedicated to wheat.[3] By 1880, wheat's popularity in the Santa Clara Valley succumbed to poor yields and low prices, begetting a profound shift toward the establishment of orchards and vineyards in the region.[4] In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. In addition to prunes, Santa Clara Valley farmers also planted other stone fruit orchards such as apricots, peaches, and cherries.[5] In addition to orchards, many farmers in the Santa Clara Valley planted grapes. In the early 1860s, José Maria Malaguerra developed one of the earliest vineyards in the county on a 211-acre tract along Coyote Creek on acreage previously contained in the Laguna Seca Rancho. Other early wineries in the Morgan Hill area included that of Joel W. Ransome, who planted French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes and built a no-longer-extant winery by the 1880s. Around this same time, the community of San Martin and its surrounding area developed into a regional center of viticulture, with multiple farms raising wine grapes and building small wineries and brandy distilleries. Occupying considerably less acreage than orchard crops, viticulture remained a common practice through the twentieth century, where in 1925 Italian immigrant Emilio Guglielmo established a still active vineyard and commercial winery in Morgan Hill.[6]

Expanded transportation networks and population centers emerged during the mid to late nineteenth century alongside and further drove agricultural development in the southern Santa Clara Valley. *El Camino Real* (mentioned above) was originally comprised of a north-southerly meandering dirt trail travelled by foot, horseback, and ox carts during the era of Spanish colonial settlement in the late eighteenth and early nineteenth centuries. In the 1850s, the Santa Clara County Board of Supervisors elected to incorporate the thoroughfare into the county road system, where it served as the primary link between San José and Gilroy. During this period, numerous settlements were established along this main transportation artery as way stations, where settlers constructed inns, stables, and blacksmith shops to serve the Butterfield Overland Mail Company—a national stagecoach company that operated in the valley in the late 1850s and early 1860s. These settlements were originally named for their distances from central San José, including Twelve Mile House at present-day Coyote, Fifteen Mile House at the no-longer-extant Perry Station, and Eighteen Mile House at the former community of Madrone (now incorporated into present-day Morgan Hill). Around this same time, the short-lived Santa Clara & Pajaro Valley Railroad Company (1868-1870) laid 30 miles of track between San José and Gilroy alongside the Monterey Road alignment before the company was fully absorbed into the Southern Pacific Railroad Company. As with the overland way stations, numerous train depots were established along the route, including those at Coyote, Madrone, and Gilroy, which further spurred regional development. In

[2] Archives and Architecture, "County of Santa Clara Historic Context Statement," 33; Circa, "Historic Context Statement for the City of Morgan Hill," 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 11-12; Basin, "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR)," 5-9.
[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, "County of Santa Clara Historic Context Statement," 37, 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 12, 13.
[4] Archives and Architecture, "County of Santa Clara Historic Context Statement," 40-41, 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 14.
[5] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.
[6] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2; Herrmann Bros., *Official Map of the County of Santa Clara, California* (San Jose, California: Britton & Rey, 1890); Candace Reed, National Register of Historic Places Inventory—Nomination Form: Malaguerra Winery (NPS # 80000858) (prepared November 1977, listed October 1980), National Register Research Database; H. S. Foote, *Pen Pictures from the Garden of the World or Santa Clara County, Illustrated* (Chicago: The Lewis Publishing Company, 1888), 385-386; Guglielmo Winery, "History," https://guglielmowinery.com/history/ (accessed January 2023).

the early twentieth century, Monterey Road was incorporated into the U.S. 101 Bayshore Highway, with various businesses in the adjoining towns emerging to serve California's nascent automobile culture, such as stores, hotels, gas stations, and restaurants with "drive-thrus" and large parking lots. However, in the early 1980s, U.S. 101 was realigned and built as a freeway east of the historic route to bypass Coyote, Morgan Hill, San Martin, and Gilroy.[7]

In addition to expanded transportation networks, a variety of technological advances also drove the rise of regional horticulture. Fruit farming was boosted in the late 1860s with the simultaneous completion of the transcontinental railroad as well as the Santa Clara & Pajaro Valley Railroad (discussed above), which provided access to large eastern U.S. markets to Santa Clara Valley fruit farmers. With the development of ice-cooled refrigerated rail cars in the 1880s, fresh fruit shipments only furthered the popularity of the valley's orchard crops throughout the country, incentivizing higher production in the region. By 1890, this horticultural transition had spread to most parts of the Santa Clara Valley where irrigation water from streams or wells was available.[8] Advancements in irrigation technology also facilitated the development of intensive horticulture in the Santa Clara Valley.[9] Vertical turbine pumps came into popular usage on farms in the Santa Clara Valley around 1915 and had a profound effect on the valley as farmers no longer needed access to surface streams to irrigate their crops, thus facilitating an expansion of orchards and vineyards. Groundwater pumping emerged concurrent with the widespread electrification of the southern Santa Clara Valley, which began around the turn of the twentieth century. Beginning in 1911, the Santa Clara County Board of Supervisors awarded franchises to various companies to install and operate electrical systems along various public roads throughout the county. One such company, the Coast Counties Gas & Electric Company (CCG&E) provided electrical service to Gilroy, Morgan Hill, and the surrounding areas, as well as parts of San Benito and Santa Cruz counties. However, increased groundwater pumping subsequently caused a rapid and substantial drop in groundwater levels, leading to the creation of the Santa Clara Valley Water Conservation District (now Valley Water) in 1929 to restore the regional aquifer and to control groundwater levels. Other similar water districts formed in the valley in the following decades.[10]

The change from grain cultivation to diversified horticulture with an emphasis on orcharding in the late nineteenth century also triggered changing land ownership patterns. The trend toward subdivision, begun on the former Laguna Seca Rancho in the 1860s, spread throughout the southern Santa Clara Valley as the emergence of highly profitable fruit crops prompted large ranch owners to subdivide their massive holdings and sell their land for small orchards plots encompassing between five and 50 acres, with 20-acre orchards generating sufficient income to support a single family.[11] Orchard fruit production continued

[7] Basin Research Associates, "Cultural Resources Technical Report," 5-10; Derek Whaley, "Railroads: Southern Pacific Railroad Subsidiaries" (May 6, 2016), https://www.santacruztrains.com/2016/05/southern-pacific-railroad-subsidiaries.html (accessed January 2023); Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 307; Circa, "Historic Context Statement for the City of Morgan Hill," 38.

[8] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3; "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.

[10] Etcheverry, *Irrigation Practice and Engineering,* 179-191; Greene, *Pumping Machinery,* 44-46, 110-112; Lundy, "A History of the Deep Well Turbine Pump Industry," 1-3; Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of the County Archives of California: No. 44 – Santa Clara County (San Jose)* (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143;

[11] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15; F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part),

to grow into the twentieth century and remained the dominant agricultural activity in the Santa Clara Valley. In the early twentieth century, prunes were the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post-World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District that ensured sufficient water for irrigation.[12] In the decades after World War II ended in 1945, orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, but Morgan Hill and the adjacent unincorporated area, owing to its distance from San José, retained its rural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the late 1970s, when high-tech firms began locating in the city and the California Department of Transportation realigned and expanded the U.S. 101 freeway, facilitating an easier commute to San José and transforming Morgan Hill into a bedroom community. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread north of Morgan Hill towards the vicinity of the Ogier Ponds, further altering the once rural and agricultural character of the area.[13]

The oldest built environment resources recorded on this form were constructed sometime in the 1940s on acreage historically contained within a tract subdivided via deed from the Laguna Seca Rancho sometime prior to 1876. Topographical mapping indicates that development did not occur within the boundaries of the study property until sometime between 1931 and 1939, although prune orchards had been planted by 1937 (**Plate 1**). The earliest built environment on the parcel consisted of what appeared to be a no-longer-extant rectangular outbuilding in the east corner, which may have been constructed during the property's ownership under Ralph C. Bohnett (alternately "Bonett"), a local fruit packer who had acquired the acreage contained within a larger, roughly 120-acre property sometime prior to 1929. Bohnett subsequently lost the property to foreclosure the following decade during the national economic downturn of the Great Depression. By 1937, the San Jose Abstract & Title Insurance Company owned the property, which it appears to have retained until 1945. That year, a company agent—one "Y. Archibald"—conveyed it and acreage in the adjacent tracts to the south, including lands contained in present-day APNs 725-05-005 and -006 (recorded and evaluated on a separate DPR 523 form appended to the report cited in *P11) to two brothers, Joseph L. and Victor C. Puppo, and their respective spouses, who likely constructed the residence and Outbuilding 1 recorded on this form, which were present by 1948 (**Plate 2**).[14]

Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023).

[12] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.

[13] USGS, *Morgan Hill Quadrangle,* 15-minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1968, 1973, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.

[14] Thompson & West, *Historical Atlas Map of Santa Clara County, California* (San Francisco: Thompson & West, 1876), Map No. 8; U.S. Geological Survey (USGS), *Morgan Hill Quadrangle*, 1:62,500 (Washington, D.C.: USGS, 1917, reprinted 1931); U.S. Army Corps of Engineers, *Morgan Hill Quadrangle*, 15-minute series, 1:62,500 (Washington, D.C.: U.S. Army, 1939); FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB; California Department of Transportation, "Right-of-Way Record Map No. R-504.9," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023); McMillan & McMillan, *Official Map of Santa Clara County, California* (San Jose, California: McMillan & McMillan, 1929); U.S. Census Bureau, Manuscript Population Schedule: 1930, California, Santa Clara County, Redwood Township, Enumeration District No. 43-33, sheet 5A, accessed via Ancestry.com; Joseph L. Puppo, Esther A. Puppo, and Victor C. Puppo to Pacific Telephone and Telegraph Company and Pacific Gas and Electric Company, Grant Right-of-Way Deed, March 1956 (recorded May 1956), 3488 O.R. 523, Santa Clara County Clerk-Recorder; Bill Gould, "'Y. Archibald'

Plate 1. Excerpt of 1940 aerial photograph with approximate boundaries of present-day study parcels outlined in red. Annotation by JRP. Note the no-longer-extant prune orchard and rectangular outbuilding in the east corner.[15]

Plate 2. Excerpt of 1956 aerial photograph with approximate boundaries of present-day study parcels outlined in red, with extant residence and Outbuilding 1 circled in yellow (left) and no-longer-extant outbuildings circled in green (right). Annotation by JRP.[16]

The Puppos and their heirs retained ownership of the subject property through the turn of the twenty-first century. Born and raised in the southern Santa Clara Valley, the Puppo brothers were active in the regional agricultural industry, with Joseph serving as chair of the Santa Clara County Agricultural Conservation and Stabilization Committee, a local committee that administered federal subsidies to farmers during the mid-twentieth century. On the Puppo Ranch, which at one time appears to have encompassed the acreage contained in the study parcels, adjacent APNs 725-05-005 and -006, and other adjacent lands east of the right bank of Coyote Creek, the Puppos continued to raise prune orchards, maintaining a workforce of at least 24 seasonal employees through the late 1950s, and Victor Puppo resided on the subject property where he raised prunes, pears, apricots, and walnuts through the late 1990s before the orchards were removed from the property by 2003 (**Plate 3**). Puppo appears to have remained at the property until his death in 2017.[17]

Identity Bared – Real Estate Buyer No Piker," *San Jose Mercury Herald and News* (February 4, 1945): 8; HistoricAerials.com, "559 Monterey Highway" (1948).

15 FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB.

16 Aeros Services Corporation, Flight CIV-1956, Frame CIV-7R-98, 1:20,000, June 12, 1956, flown for U.S. Department of Agriculture – Agricultural Stabilization and Conservation Service, UCSB.

17 Ruth & Going, "Record of Survey being a Portion of the Rancho la Laguna Seca, Santa Clara County, California," January 1963 (recorded February 14, 1963), 157 Maps 7, Santa Clara County Clerk-Recorder; Santa Clara County Surveyor, "Record of Survey of the Lands of the County of Santa Clara Being Situated in the Rancho La Laguna Seca," April 1979 (recorded June 21, 1979), 444 Maps 3-5, Santa Clara County Clerk-Recorder; "M. H. Rancher Dies at 78; Funeral Set," *San Jose Mercury* (October 2, 1956): 15; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Burnett Precinct, Enumeration District No. 121, sheet 6A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1930, California, Santa Clara County, Burnett Township, Enumeration District No. 43-3, sheet 8A (Ancestry.com); "Parish Heads ACP," *San Jose Mercury* (January 15, 1956): 23; "All Alviso is Under Water Now," *San Jose Mercury* (April 4, 1958): 2; U.S. Phone and Address Directories, 1993-2002 (Ancestry.com); "Victor Christine Puppo, July 24, 1920 – February 25, 2017," *Gilroy Dispatch* (March 9, 2017), available at https://gilroydispatch.com/victor-christine-puppo/ (accessed February 2023).

Plate 3. Excerpt of 1998 aerial photograph showing approximate boundary of subject property outlined in red, with extant residence and Outbuildings 1-3 circled in yellow (left) and no-longer-extant outbuildings circled in green (right). Annotations by JRP.[18]

The property recorded on this form underwent substantial changes after 2000. As mentioned above, the orchard was removed by 2003. Following Puppo's death in 2017, the barn and corrals with horse stalls were constructed, respectively, in 2019 and about 2021, and the property currently functions as a horse ranch.[19]

Evaluation

The residential complex at 559 Monterey Road (APNs 725-06-006 and 725-06-007) does not have important associations with significant historic events, patterns, or trends of development at the local, state, or national level (NRHP Criterion A / CRHR Criterion 1). The oldest extant built environment resources on the parcel date to the 1940s, about the time that Joseph and Victor Puppo acquired the property, where prune orchards had been planted by the 1930s—a common and ubiquitous developmental trend throughout the southern Santa Clara Valley that predated this period by over half a century. Historical evidence does not indicate that the property recorded on this form distinguished itself from the many other small farms that emerged in the region in the early to mid-twentieth century for playing a specifically or demonstrably vital role in the development of the southern Santa Clara Valley economy, nor for playing a role in any significant innovations to horticultural methods or technologies. Therefore, the residential parcel does not appear eligible for listing in either register under NRHP Criterion A or CRHR Criterion 1.

The subject property is not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). While development on the parcel appears to date to the early twentieth century, the oldest built environment dates to the 1940s, likely under the ownership of the Puppo family. While Joseph and Victor Puppo appeared to have attained some prominence as local agricultural businessmen, historical evidence does not indicate that they played a foundational role in any associated organizations, made significant contributions within their field of endeavor, nor within their community during their period of direct association with the property. Thus, the subject parcel does not appear eligible for listing in either register under NRHP Criterion B or CRHR Criterion 2.

The subject property does not possess distinctive characteristics of a type, period, or method of construction, nor is it the important work of a master architect or builder (NRHP Criterion C / CRHR Criterion 3). Collectively, this parcel is predominately occupied by utilitarian agricultural buildings and structures—many modern—that accompany the residence. As such, these buildings represent a ubiquitous design type that prioritized economy over architectural flourishes, does not exhibit high artistic qualities, and does not represent the work of a master architect or builder. The parcel contains an altered

[18] Google Earth Pro, "559 Monterey Highway" (August 1998).
[19] Google Earth, "559 Monterey Highway," (August 1998, July 2003);

Ranch-style residence. In addition to its extensive alterations (discussed below), this building is an unremarkable example of Ranch architecture—a style popular from the 1930s to the 1970s. And while it exhibits common elements of the style, including a broad one-story shape, low-pitched roof side-gable roof, off-center entryway sheltered beneath the main roof, and brick cladding, it does not embody important characteristics of the style that might make it significant under this criterion.[20] Furthermore, a master architect or builder was not associated with these buildings. Therefore, the subject property is not eligible for listing in either register under NRHP Criterion C / CRHR Criterion 3.

The subject property is not eligible under NRHP Criterion D / CRHR Criterion 3 because it has neither yielded nor is likely to yield important information about historic construction materials or technologies that otherwise would not be available through documentary evidence. Also, the resource's land use, the layout of the extant built environment resource, and the relationship the buildings have with the surrounding landscape, are typical for residential / agricultural properties of the period and do not appear to provide important information within the broader economic, social, and cultural setting of the region during its historic-period occupation. Potential archaeological resources on this parcel, if any, are not evaluated herein.

In addition to lacking significance under all NRHP and CRHR criteria, the subject property likewise has diminished integrity in several aspects. The residential complex recorded on this form was initially developed during the mid-twentieth century as part of a working orchard, and it was substantially altered during the early twenty-first century as part of the property's transition from an orchard to a horse ranch. Consequently, it has diminished integrity of setting, association, and feeling. The residence and historic-period outbuildings have likewise lost integrity through alterations such as additions and the replacement of windows. It retains only its integrity of location while the alterations have diminished integrity of design, workmanship, and materials.

The property is not eligible for listing in the NRHP or CRHR because it lack significance under all criteria.

[20] Virginia Savage McAlester, *A Field Guide to American Houses: The Definitive Guide to Identifying and Understanding America's Domestic Architecture* (New York: Alfred A. Knopf, 2015), 597-612.

Site Map:

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ____________________
Review Code ________ **Reviewer** ____________________ **Date** ________

***Resource Name or #** (Assigned by recorder): MR #2

P1. Other Identifier: Rancho Ghanma

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara County
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad**: Morgan Hill, CA **Date**: 2021 **T**:__; **R**:__; **Sec**:___; Mount Diablo Meridian

c. Address: 10000 Monterey Highway City: Morgan Hill Zip: 95037

d. UTM: (give more than one for large and/or linear resources) Zone: _____; ____________mE/ ____________mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcel Number (APN): 725-05-005 & 725-05-006

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records two parcels with a combined acreage of 11.99 acres located on the east side of Monterey Road between the community of Coyote and the city of Morgan Hill in an unincorporated part of rural Santa Clara County. Most of the westernmost parcel APN 725-05-006 is open grassland, while APN 725-05-005 contains a residence, barn, and commercial building sited along a gravel driveway that extends along the southeast parcel boundary from Monterey Road (**Photograph 1**) (see **Site Map** on Continuation Sheet). Several ancillary buildings are sited around the main buildings, and several shipping containers are sited throughout the parcel. (See Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP2 – Single family property; HP4 – Ancillary building

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Front (southwest) entrance; camera facing north from Monterey Road, February 15, 2023.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
See Continuation Sheet.

***P7. Owner and Address:**
Basic Element, Inc
1680 Nobil Avenue
Santa Clara, CA 95051

***P8. Recorded by:** (Name, affiliation, address)
Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: February 15, 2023

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Historic Resources Report for the Anderson Dam Seismic Retrofit Conservation Measures Project – Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project, Santa Clara County, California," prepared for Valley Water, 2023.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): MR #2

B1. Historic Name: ______
B2. Common Name: ______
B3. Original Use: Agricultural B4. Present Use: Residential
***B5. Architectural Style**: National Folk; Utilitarian
***B6. Construction History**: (Construction date, alteration, and date of alterations) See Continuation Sheet.
***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**
***B8. Related Features:** _________
B9. Architect: unknown b. Builder: unknown
***B10. Significance: Theme**: N/A **Area**: N/A
Period of Significance: N/A **Property Type**: N/A **Applicable Criteria**: N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The two subject parcels do not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). This property has been evaluated in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) as well as Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This property is not a historical resource under CEQA.

Historic Context

The oldest built environment resources recorded on this form were constructed in the early twentieth century along Coyote Creek in the southern Santa Clara Valley near the present-day Ogier Ponds. (See Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: U.S. Geological Survey (USGS), *Morgan Hill Quadrangle,* 1:62,500 (Washington, D.C.: USGS, 1917); HistoricAerials.com, “10000 Monterey Highway” (1980); John B. Ogier, et ux, to J.E. Weaver, et ux, Deed, June 7, 1915 (recorded June 9, 1915, 428 Deeds 548, Santa Clara County Clerk-Recorder’s Office, San Jose, California; “Former Local Merchant Dies,” *San Jose Evening News*, August 9, 1930, 15.

B13. Remarks:

***B14. Evaluator**: Samuel Skow
***Date of Evaluation**: February 2023

(This space reserved for official comments.)

P3a. Description (continued):

Located at the rear (northeast) end of APN 725-05-005, the approximately 2,250-square-foot residence has a generally rectangular footprint and a multi-sectional roof of composition shingles comprised of a hip roof covering the original, U-shaped section and a gable roof topping the rear (northeast) two-story addition (**Photograph 2-Photograph 4**). The walls are clad in replacement vertical board siding. The main entrance is located on the residence's southwest side and is accessed by a full-width, above-grade porch sheltered by a projecting gable roof flanked by projecting shed roofs supported by wood posts and metal balustrades. Additional entryways include a sliding glass door on the southeast side and French doors on the northeast side of the two-story addition that are accessed by an above-grade, wood-frame deck. Projecting above the deck is a wood-frame balcony with a metal balustrade accessed by a sliding door on the addition's second story. Fenestration consists of replacement vinyl sliding and sash windows.

Photograph 2. Southwest side of Residence; camera facing east from Monterey Road, February 15, 2023.

Photograph 3: Southeast and northeast sides of Residence; camera facing west from Coyote Creek riparian corridor, February 15, 2023.

Photograph 4. Northeast and northwest sides of Residence; camera facing southwest from Coyote Creek riparian corridor, February 15, 2023.

Located northwest of the residence is Outbuilding 1, an approximately 670-square-foot, utilitarian outbuilding with an L-shaped footprint and a flat metal roof that projects from the southwest corner of the L (**Photograph 5** and **Photograph 6**).

The southwest part of the L appears to be the original section, with horizontal lap board siding, while the northeast part is likely an addition with exposed concrete block. Fenestration is concealed behind plywood.

Photograph 5. Northeast side of Outbuilding 1 and one of the modern storage sheds; camera facing north; February 15, 2023.

Photograph 6. Southwest side of Outbuilding 1; camera facing northeast; February 15, 2023.

Located in the center of APN 725-05-005, the barn appears to have been converted to a multi-unit residence, encompassing approximately 4,900 square feet with a rectangular footprint, stucco siding, and a low-pitched gable roof with composition shingles (**Photograph 7**). Fenestration consists of multiple wood doors and vinyl sliding windows.

Sited along the southwestern parcel boundary is the roughly 2,900-square-foot commercial building, which has a rectangular footprint, a gable roof with composition shingles, stucco cladding, and a false front above the main entrance on the front (southwest) facade (**Photograph 8**). A full-width front porch is sheltered beneath an overhanging roof with clay Spanish tiles supported by square wood posts linked via metal balustrade. Fenestration consists of vinyl replacement windows, a flush wood front door, and a roll-up metal garage door on the southeast side (**Photograph 9**).

Sited to the rear (northeast) of APN 725-05-005 are Outbuildings 2 and 3, which both feature rectangular footprints, shed roofs, and vertical board siding (**Photograph 10** and **Photograph 11**).

Surrounding the two outbuildings are an array of modern metal storage sheds and shipping containers, with additional containers sited in the northernmost corner of APN 725-05-006—an approximately 0.5-acre area that appears to function as a junkyard (**Photograph 12**).

Near the center of the property are a metal water tank, what appear to be open wood-frame stalls, and a portable shade structure (**Photograph 13**).

A variety of modern fencing—wire, chain-link, metal-rail, and vertical wood board—line the perimeter of both parcels, encircle the main buildings, and enclose a garden sited adjacent to the commercial building. A network of modern gravel roads extends between the buildings.

Photograph 7. Southwest side of barn; camera facing northeast from Monterey Road, February 15, 2023.

Photograph 8. Front façade and northwest side of commercial building; camera facing east from Monterey Road, February 15, 2023.

Photograph 9. Front (southwest) façade and southeast side of commercial building; camera facing north from Monterey Road, February 15, 2023.

Photograph 10. Northeast side of Outbuilding 2; camera facing southwest from Coyote Creek riparian corridor, February 15, 2023.

***Resource Name or #** (Assigned by recorder): MR #2

***Recorded by**: S. Skow & A. Young
***Date**: February 15, 2023
☒ Continuation ☐ Update

Photograph 10. Northeast side of Outbuilding 3 and shipping containers; camera facing south from Coyote Creek riparian corridor, February 15, 2023.

Photograph 11. Shipping containers sited in the parcel's north corner; camera facing west from Coyote Creek riparian corridor, February 15, 2023.

Photograph 12. Shade structure and water tank near Residence 2; camera facing east from Monterey Road, February 15, 2023.

P6. Date Constructed / Age and Sources; and B6. Construction History (continued):

Building / Structure Name*	Construction History	Sources
Residence*	Built pre-1917; roof replaced and second-story addition constructed ca. 2017; vertical-groove plywood siding installed at unknown date.	U.S. Geological Survey (USGS), *Morgan Hill Quadrangle,* 1:62,500 (Washington, D.C.: USGS, 1917); Google Earth, "10000 Monterey Highway" (September 2017 and May 2018).
Outbuilding 1*	Built sometime between 1968-1980; concrete-block addition constructed at unknown date.	Cartwright Aerial Surveys, Flight CAS-2310, Frame 2-264, 1:12,000, May 6, 1968, available at https://mil.library.ucsb.edu/ap_indexes/FrameFinder/ (UCSB; accessed January 2023); HistoricAerials.com, "10000 Monterey Highway" (1980).
Barn*	Constructed sometime between 1968-1980; roof replaced ca. 2013.	CAS, Flight CAS-2310, Frame 2-264, 1968, UCSB; HistoricAerials.com, "10000 Monterey Highway" (1980); Google Earth, "10000 Monterey Highway" (June 2013 and February 2014).
Commercial Building*	Constructed sometime between 1968-1980; new roof and rear addition constructed ca. 2013.	CAS, Flight CAS-2310, Frame 2-264, 1968, UCSB; HistoricAerials.com, "10000 Monterey Highway" (1980); Google Earth, "10000 Monterey Highway" (June 2013 and February 2014).
Water Tank*	Moved onto APN 725-05-005 ca. 2014.	Google Earth, "10000 Monterey Highway" (February 2014 and March 2015).
Modern fencing*	Erected at present demarcations ca. 2014.	Google Earth, "10000 Monterey Highway" (February 2014 and March 2015).
Shipping containers*	Moved onto both parcels ca. 2017.	Google Earth, "10000 Monterey Highway" (November 2016 and September 2017).
Shade structure*	Erected ca. 2019.	Google Earth, "10000 Monterey Highway" (May 2018 and October 2019).
Outbuilding 2*	Built ca. 2020.	Google Earth, "10000 Monterey Highway" (October 2019 and August 2020).
Outbuilding 3*	Built ca. 2020.	Google Earth, "10000 Monterey Highway" (October 2019 and August 2020).

*Building designation by JRP.

B10. Significance (continued):

The earliest Euro-American settlements in the vicinity of the Ogier Ponds Project occurred in the 1830s, when the Mexican government granted to Juan Alvires the 20,052-acre *Rancho Refugio de la Laguna Seca* (Laguna Seca Rancho) and the 8,927-acre *Rancho Ojo de Agua de la Coche* to Juan Maria Hernandez the following year. As with most other Mexican-era rancho grant holders, Alvires raised cattle on his land, but he also cultivated wheat, operated a flourmill, and resided in a no-longer-extant adobe house built along the bank of Coyote Creek.[1] The rancho period's pastoral way of life continued into the early 1850s, as Anglo Americans and other non-Latino settlers began to arrive in the area, including William Fisher, an English-

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill" (prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.

born tallow trader who acquired the Laguna Seca Rancho at auction in 1845. Fisher died five years later, and the land passed to his wife, Liberata Fisher née Ceseña. Following the Mexican-American War (1846-1848) and California statehood (1850), and as required under the federal Land Act of 1851, Fisher's heirs filed a claim with the Public Land Commission to validate their ownership of the Laguna Seca Rancho, which was confirmed by the federal government in 1865. By 1876, Fisher's heirs and successors-in-interest had subdivided the former Laguna Seca Rancho into more than 20 parcels ranging in size from 10 acres to upwards of 4,200 acres, many of which they had sold to a steady influx of migrant farmers.[2]

The southern Santa Clara Valley underwent a dramatic agricultural transformation during the early period of American settlement. While large landowners like the Fishers continued to graze cattle, wheat farming surpassed this practice along with sheep ranching, dairying, and general farming as the region's main agricultural endeavors by the 1860s. Owing to the easy cultivation and high fertility of the Santa Clara Valley soil, farmers realized high yields with little capital investment, contributing to the steady annual rise of acreage dedicated to wheat.[3] By 1880, wheat's popularity in the Santa Clara Valley succumbed to poor yields and low prices, begetting a profound shift toward the establishment of orchards and vineyards in the region.[4] In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. In addition to prunes, Santa Clara Valley farmers also planted other stone fruit orchards such as apricots, peaches, and cherries.[5] In addition to orchards, many farmers in the Santa Clara Valley planted grapes. In the early 1860s, José Maria Malaguerra developed one of the earliest vineyards in the county on a 211-acre tract along Coyote Creek on acreage previously contained in the Laguna Seca Rancho. Other early wineries in the Morgan Hill area included that of Joel W. Ransome, who planted French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes and built a no-longer-extant winery by the 1880s. Around this same time, the community of San Martin and its surrounding area developed into a regional center of viticulture, with multiple farms raising wine grapes and building small wineries and brandy distilleries. Occupying considerably less acreage than orchard crops, viticulture remained a common practice through the twentieth century, where in 1925 Italian immigrant Emilio Guglielmo established a still active vineyard and commercial winery in Morgan Hill.[6]

Expanded transportation networks and population centers emerged during the mid to late nineteenth century alongside and further drove agricultural development in the southern Santa Clara Valley. *El Camino Real* (mentioned above) was originally comprised of a north-southerly meandering dirt trail travelled by foot, horseback, and ox carts during the era of Spanish colonial settlement in the late eighteenth and early nineteenth centuries. In the 1850s, the Santa Clara County Board of Supervisors elected to incorporate the thoroughfare into the county road system, where it served as the primary link between San José and Gilroy. During this period, numerous settlements were established along this main transportation artery as way stations, where settlers constructed inns, stables, and blacksmith shops to serve the Butterfield Overland Mail Company—a national stagecoach company that operated in the valley in the late 1850s and early 1860s. These settlements were originally named for their distances from central San José, including Twelve Mile House at present-day Coyote, Fifteen Mile House at the no-longer-extant Perry Station, and Eighteen Mile House at the former community of Madrone (now incorporated into

[2] Archives and Architecture, "County of Santa Clara Historic Context Statement," 33; Circa, "Historic Context Statement for the City of Morgan Hill," 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 11-12; Basin, "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR)," 5-9.

[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, "County of Santa Clara Historic Context Statement," 37, 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 12, 13.

[4] Archives and Architecture, "County of Santa Clara Historic Context Statement," 40-41, 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 14.

[5] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[6] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2; Herrmann Bros., *Official Map of the County of Santa Clara, California* (San Jose, California: Britton & Rey, 1890); Candace Reed, National Register of Historic Places Inventory—Nomination Form: Malaguerra Winery (NPS # 80000858) (prepared November 1977, listed October 1980), National Register Research Database; H. S. Foote, *Pen Pictures from the Garden of the World or Santa Clara County, Illustrated* (Chicago: The Lewis Publishing Company, 1888), 385-386; Guglielmo Winery, "History," https://guglielmowinery.com/history/ (accessed January 2023).

present-day Morgan Hill). Around this same time, the short-lived Santa Clara & Pajaro Valley Railroad Company (1868-1870) laid 30 miles of track between San José and Gilroy alongside the Monterey Road alignment before the company was fully absorbed into the Southern Pacific Railroad Company. As with the overland way stations, numerous train depots were established along the route, including those at Coyote, Madrone, and Gilroy, which further spurred regional development. In the early twentieth century, Monterey Road was incorporated into the U.S. 101 Bayshore Highway, with various businesses in the adjoining towns emerging to serve California's nascent automobile culture, such as stores, hotels, gas stations, and restaurants with "drive-thrus" and large parking lots. However, in the early 1980s, U.S. 101 was realigned and built as a freeway east of the historic route to bypass Coyote, Morgan Hill, San Martin, and Gilroy.[7]

In addition to expanded transportation networks, a variety of technological advances also drove the rise of regional horticulture. Fruit farming was boosted in the late 1860s with the simultaneous completion of the transcontinental railroad as well as the Santa Clara & Pajaro Valley Railroad (discussed above), which provided access to large eastern U.S. markets to Santa Clara Valley fruit farmers. With the development of ice-cooled refrigerated rail cars in the 1880s, fresh fruit shipments only furthered the popularity of the valley's orchard crops throughout the country, incentivizing higher production in the region. By 1890, this horticultural transition had spread to most parts of the Santa Clara Valley where irrigation water from streams or wells was available.[8] Advancements in irrigation technology also facilitated the development of intensive horticulture in the Santa Clara Valley.[9] Vertical turbine pumps came into popular usage on farms in the Santa Clara Valley around 1915 and had a profound effect on the valley as farmers no longer needed access to surface streams to irrigate their crops, thus facilitating an expansion of orchards and vineyards. Groundwater pumping emerged concurrent with the widespread electrification of the southern Santa Clara Valley, which began around the turn of the twentieth century. Beginning in 1911, the Santa Clara County Board of Supervisors awarded franchises to various companies to install and operate electrical systems along various public roads throughout the county. One such company, the Coast Counties Gas & Electric Company (CCG&E) provided electrical service to Gilroy, Morgan Hill, and the surrounding areas, as well as parts of San Benito and Santa Cruz counties. However, increased groundwater pumping subsequently caused a rapid and substantial drop in groundwater levels, leading to the creation of the Santa Clara Valley Water Conservation District (now Valley Water) in 1929 to restore the regional aquifer and to control groundwater levels. Other similar water districts formed in the valley in the following decades.[10]

The change from grain cultivation to diversified horticulture with an emphasis on orcharding in the late nineteenth century also triggered changing land ownership patterns. The trend toward subdivision, begun on the former Laguna Seca Rancho in the 1860s, spread throughout the southern Santa Clara Valley as the emergence of highly profitable fruit crops prompted large ranch owners to subdivide their massive holdings and sell their land for small orchards plots encompassing between five and

[7] Basin Research Associates, "Cultural Resources Technical Report," 5-10; Derek Whaley, "Railroads: Southern Pacific Railroad Subsidiaries" (May 6, 2016), https://www.santacruztrains.com/2016/05/southern-pacific-railroad-subsidiaries.html (accessed January 2023); Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 307; Circa, "Historic Context Statement for the City of Morgan Hill," 38.

[8] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3; "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.

[10] Etcheverry, *Irrigation Practice and Engineering,* 179-191; Greene, *Pumping Machinery,* 44-46, 110-112; Lundy, "A History of the Deep Well Turbine Pump Industry," 1-3; Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of the County Archives of California: No. 44 – Santa Clara County (San Jose)* (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143;

50 acres, with 20-acre orchards generating sufficient income to support a single family.[11] Orchard fruit production continued to grow into the twentieth century and remained the dominant agricultural activity in the Santa Clara Valley. In the early twentieth century, prunes were the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post-World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District that ensured sufficient water for irrigation.[12] In the decades after World War II ended in 1945, orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, but Morgan Hill and the adjacent unincorporated area, owing to its distance from San José, retained its rural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the late 1970s, when high-tech firms began locating in the city and the California Department of Transportation realigned and expanded the U.S. 101 freeway, facilitating an easier commute to San José and transforming Morgan Hill into a bedroom community. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread north of Morgan Hill towards the vicinity of the Ogier Ponds, further altering the once rural and agricultural character of the area.[13]

The residence recorded on this form was constructed sometime prior to 1917 on a tract comprising Lots 1 and 2 of the Ogier Subdivision—an early twentieth-century subdivision of a portion of the Laguna Seca Rancho first subdivided via deed in the 1860s. During this early period, prominent Santa Clara Valley landholder Daniel Murphy conveyed that acreage contained in the study parcels as a portion of a 1,000-acre property to fellow Irish-Canadian immigrant, Walter Fitzgerald, Sr., as payment for timber work performed in the mountains near Gilroy. By 1876, Walter Fitzgerald had subdivided the 1,000-acre tract, which was traversed by Coyote Creek, into four parcels, where his sons, Gregory, James, and John jointly ran agricultural operations (**Plate 1**). John Fitzgerald was assigned ownership of the 320-acre tract containing the present-day study property, where he established his no-longer-extant farmstead complex on the north side of Coyote Creek, outside the boundaries of the present-day study parcels. He retained possession of the property through 1900, with French-born dairy farmer Frank Labrucherie acquiring the tract by 1910.[14]

[11] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15; F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023).
[12] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.
[13] USGS, *Morgan Hill Quadrangle,* 15-minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1968, 1973, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.
[14] USGS, *Morgan Hill Quadrangle* (1917); F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; Thompson & West, "Historical Atlas Map of Santa Clara County, California" (San Francisco: Thompson & West, 1876), Map No. 7; Eugene T. Sawyer, *History of Santa Clara County*, California, with Biographical Sketches (Los Angeles: Historic Record Company, 1922), 586; U.S. Census Bureau, Manuscript Population Schedule: 1880, California, Santa Clara County, Burnett Township, Enumeration District No. 256, page 7C, accessed via Ancestry.com; Herrmann Brothers, Official Map of the County of Santa Clara, California (San Jose, California: Herrmann Bros., 1890); U.S. Census Bureau, Manuscript Agricultural Schedule: 1880, California, Santa Clara County, Burnett Township,

***Recorded by**: S. Skow & A. Young ***Date**: February 15, 2023 ☒ Continuation ☐ Update

In 1914, Labrucherie conveyed the former Fitzgerald tract to John B. Ogier, a lifelong resident of Santa Clara County alternately listed as a general farmer, dairy farmer, and orchardist. That same year, Ogier subdivided the property into 21 lots ranging in size from about six acres to 54.5 acres (**Plate 2**). The subdivision additionally laid out Ogier and Barnhart avenues. Ogier's agent, James A. Clayton & Company—an influential real estate and development firm established in San Jose in 1867—initially sold off lots at $125 to $150 per acre, which were ultimately priced up to $300 per acre by 1916. Development was slow over the next two decades and largely confined to the west bank of the creek in those lots abutting Monterey Road (including that tract comprising Lots 1 and 2, containing the present-day parcels recorded on this form).[15]

Plate 1. Excerpt of 1876 map of Santa Clara County with 1,000-acre Fitzgerald property outlined in red and tract containing present-day study parcel outlined within that boundary in green. Annotations by JRP. Note the no-longer-extant farmstead complex on the east side of Coyote Creek as depicted by a black square.[16]

Plate 2. Excerpt of 1914 map of Ogier Subdivision with approximate boundaries of subject property outlined in red. Annotation by JRP. Note that the property boundary calls to the center of the Coyote River.[17]

In 1915, Ogier conveyed Lots 1 and 2 containing the study property to John E. Weaver, a Connecticut-born fruit farmer based in San Jose, and his wife Margaret, who probably constructed the farmstead with no-longer-extant components sited in the general location of the extant residence as depicted in topographical mapping in 1917 (**Plate 3**). By 1924, ownership of the property had transferred to Jeremiah Roberts, an Irish-born merchant and land speculator based in San Jose, and his wife, Gertrude, who likely leased the property—dedicated to prune orchards by the late 1930s—to an unidentified tenant farmer (**Plate 4**). Following Jeremiah's death in 1930, Gertrude Roberts acquired sole interest in the property, which she retained through 1937. The San Jose Abstract & Title Insurance Company appears to have acquired the property at some point before 1945, the year that its agent—one "Y. Archibald"—conveyed it and acreage in the adjacent tracts to the north, including lands

Enumeration District No. 256, sheet 5A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1900, California, Santa Clara County, Burnett Township, Enumeration District No. 47, sheet 18 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, Burnett Township (part), Enumeration District No. 66, sheet 7 (Ancestry.com).

[15] Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," 1914, Santa Clara County Recorder; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6.

[16] Thompson & West, "Historical Atlas Map of Santa Clara County, California" (San Francisco: Thompson & West, 1876), Map No. 7.

[17] Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," 1914, Santa Clara County Recorder.

contained in APNs 725-06-006 and -007 (recorded and evaluated on a separate DPR 523 form appended to the report cited in *P11) to two brothers, Joseph L. and Victor C. Puppo, and their respective spouses. Born and raised in the southern Santa Clara Valley, the Puppo brothers were active in the regional agricultural industry, with Joseph serving as chair of the Santa Clara County Agricultural Conservation and Stabilization Committee, a local committee that administered federal subsidies to farmers during the mid-twentieth century. On the Puppo Ranch, which at one time appears to have encompassed the acreage contained in the study parcels, adjacent APNs 725-06-006 and -007, and other adjacent lands east of the right bank of Coyote Creek, the Puppos continued to raise prune orchards, maintaining a workforce of at least 24 seasonal employees through the late 1950s. By 1963, ownership of that portion of the former Puppo property containing the study parcels had transferred to Reed & Graham, Inc., a San Jose-based asphalt-manufacturing firm incorporated in 1955 by Charles E. Reed and Gerald R. Graham, Sr. In addition to Lots 1 and 2 containing the property recorded on this form, the company had likewise acquired acreage containing present-day APNs 725-06-004 and the southeast half of 725-06-008 (outside the study area) (**Plate 5)**. Here, the company conducted quarrying operations on the right bank of Coyote Creek while presumably leasing that acreage between the left bank and Monterey Road to tenant farmers, who continued to raise orchards on the study parcels (**Plate 6**).[18]

The study property underwent numerous fundamental changes after 1968. By 1980, the barn and commercial building had been constructed, the orchards had been removed, and the site hosted Tally-Ho Farms—a livery stable and store that also hosted horseback riding lessons and clubs. During this same period, Outbuilding 1 was erected at the site of a no-longer-extant utilitarian outbuilding. Around the turn of the twenty-first century, the Victory Outreach Church acquired ownership and constructed a church on the property, which was ultimately demolished in 2007. The current owner, Basic Element, Inc., acquired the study parcels in 2013, and they subsequently commenced on various upgrades: they replaced the barn roof in 2014, added a two-story addition to the residence in 2017, constructed outbuildings 2 and 3 in 2019, and erected the various shade structures, storage sheds, shipping containers, and fenced enclosures from 2013 to the present.[19]

[18] John B. Ogier, et ux, to J.E. Weaver, et ux, Deed, June 7, 1915 (recorded June 9, 1915, 428 Deeds 548, Santa Clara County Clerk-Recorder's Office, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Evergreen Precinct No. 1, San Jose, Enumeration District No. 144, sheet 12A, accessed via Ancestry.com; USGS, *Morgan Hill* Quadrangle (1917); Ralph C. Bohnett to Jeremiah B. Roberts, Deed of Trust, July 10, 1924 (recorded November 9, 1928), 94 O.R. 226, Santa Clara County Clerk-Recorder; Gertrude Roberts to Pacific Gas and Electric Company, Deed, post-1933 [date illegible], 1814 O.R. 452, Santa Clara County Clerk-Recorder; California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023); Fairchild Aerial Surveys (FAS), Flight CIV-1940, Frame 343-2, 1:20,000, June 5, 1940, flown for U.S. Department of Agriculture – Agriculture Adjustment Administration (USDA-AAA), UCSB; "Former Local Merchant Dies," *San Jose Evening News*, August 9, 1930, 15; Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose City and Santa Clara County Directory 1908-9* (San Jose, California: Polk-Husted Directory Co., 1908), 524; U.S. Census Bureau, Manuscript Population Schedule: 1930, California, Santa Clara County, Redwood Township, Enumeration District No. 43-36, sheet 3B (Ancestry.com); FindAGrave.com, "Gertrude Bell Mosman Roberts: Memorial ID 231972744," accessed via Findagrave.com; Joseph L. Puppo, Esther A. Puppo, and Victor C. Puppo to Pacific Telephone and Telegraph Company and Pacific Gas and Electric Company, Grant Right-of-Way Deed, March 1956 (recorded May 1956), 3488 O.R. 523, Santa Clara County Clerk-Recorder; Bill Gould, "'Y. Archibald' Identity Bared – Real Estate Buyer No Piker," *San Jose Mercury Herald and News* (February 4, 1945): 8; "M. H. Rancher Dies at 78; Funeral Set," *San Jose Mercury* (October 2, 1956): 15; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Burnett Precinct, Enumeration District No. 121, sheet 6A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1930, California, Santa Clara County, Burnett Township, Enumeration District No. 43-3, sheet 8A (Ancestry.com); "Parish Heads ACP," *San Jose Mercury* (January 15, 1956): 23; "All Alviso is Under Water Now," *San Jose Mercury* (April 4, 1958): 2; Ruth & Going, "Record of Survey being a Portion of the Rancho la Laguna Seca, Santa Clara County, California," January 1963 (recorded February 14, 1963), 157 Maps 7, Santa Clara County Clerk-Recorder; CAS, Flight CAS-65-130, SCL 23-144, 1:12,000, May 27, 1965, flown for California Division of Highways, UCSB.

[19] "Horseback Riding," *San Jose Mercury* (April 8, 1980): 10C; "Burglars Hit Western Shop," *San Jose Mercury* (January 22, 1982): B1; Ray H. Collishaw and Earlyn R. Collishaw to The Mountain Winery Inc, Deed, November 15, 1993 (recorded November 15, 1993), Document No. 12212606, Santa Clara County Clerk-Recorder; Mountain Winery, Inc., to Victory Outreach Church San Jose, Inc., Deed, January 19, 1999 (recorded January 22, 1999), Document No. 14611610, Santa Clara County Clerk-Recorder; "Former Valley Power Broker And Developer Dies – Ray Collishaw, 1934-2009," *San Jose Mercury* (May 23, 2009): 1B; Mary Anne Ostrom, "Winery Foreclosure Averted Collishaw Files For Chapter 11," *San Jose Mercury* (November 18, 1993): 1B; Santa Clara County Clerk-Recorder,

Plate 3. 1917 USGS topographical map, showing approximate location of subject property circled in red. Annotation by JRP. Note present built environment in the general location of the primary residence recorded on this form.[20]

Plate 4. Excerpt of 1940 aerial photograph with present-day boundaries outlined in red, showing Residence 1, the no-longer-extant orchard, and a no-longer-extant outbuilding circled in yellow. Annotation by JRP.[21]

Plate 5. Excerpt of recorded 1963 survey map of subdivided acreage owned by Reed & Graham, Inc., with approximate boundaries of subject property outlined in red. Annotation by JRP. Note how Lots 1 and 2 were combined as "Parcel 'C'" at this time.[22]

Deed, Victory Outreach Church San Jose Inc to Basic Element Inc, filed October 23, 2013, Document No. 22424139; CAS, Flight CAS-2310, Frame 2310-3-161, 1:12,000, May 6, 1968, UCSB; HistoricAerials.com, "10000 Monterey Highway," (1980); Google Earth.

[20] USGS, *Morgan Hill Quadrangle* (1917).

[21] FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB.

[22] Ruth & Going, "Record of Survey," 1963, 157 Maps 7, Santa Clara County Clerk-Recorder.

Plate 6. Excerpt of 1965 aerial photograph showing approximate boundaries of Reed & Graham property from **Plate 5** outlined in green and approximate boundaries of study property outlined within that boundary in red. Annotation by JRP. Note the presence of orchards between the left bank of Coyote Creek and Monterey Road, with quarrying operations on the right bank (beyond the boundaries of the study property).[23]

Evaluation

The built environment resources at 10000 Monterey Road do not have important associations with significant historic events, patterns, or trends of development at the local, state, or national level (NRHP Criterion A / CRHR Criterion 1). The residence recorded on this form was built circa 1916, when the Weaver family developed the recently subdivided acreage contained within the study parcels to orchards—a common and ubiquitous developmental trend throughout the southern Santa Clara Valley that predated this period by at least half a century. Historical evidence does not indicate that the property recorded on this form distinguished itself from the many other small farms that emerged in the region in the early twentieth century for playing a specifically or demonstrably vital role in the development of the southern Santa Clara Valley economy, nor for playing a role in any significant innovations to horticultural methods or technologies. Moreover, beginning in the 1970s, the property underwent a fundamental transformation from an orchard with accompanying farmstead to a commercial ranch with horseback-riding facilities. Therefore, the property does not appear eligible for listing in either register under NRHP Criterion A or CRHR Criterion 1.

The subject property is not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). The oldest built environment resource recorded on this form, the residence may be associated with John and Margaret Weaver, whose role as orchardists did not rise to the level of significance. Similarly, subsequent owners Jeremiah and Gertrude Roberts, who appear to have owned similar farmstead properties throughout the Santa Clara Valley, also do not appear to have achieved significance within their fields of endeavor nor within the community for any activities associated with the subject property, on which the couple does not appear to have resided. Additionally, while members of the Puppo family—particularly Joseph Puppo—were active in the regional agricultural industry, they do not appear to have played a foundational role in any associated organizations, did not attain significance within their field of endeavor, nor within the larger southern Santa Clara Valley region. While subsequent owner, Reed & Graham, Inc., attained success in the regional asphalt-manufacturing and construction industry, this association is not reflected by the study parcels, which remained

[23] CAS, Flight CAS-65-130, Frame SCL 23-144, 1965, UCSB.

dedicated to orchards during the company's tenure of ownership during the historic period. Thus, the subject parcel does not appear eligible for listing in either register under NRHP Criterion B or CRHR Criterion 2.

The built environment resources contained within the subject parcels do not possess distinctive characteristics of a type, period, or method of construction, nor are they the important works of a master architect or builder (NRHP Criterion C / CRHR Criterion 3). The parcel contains one confirmed historic-period built environment resource—the modified National Folk residence, originally constructed circa 1916 and expanded by a second-story addition in about 2017—and three possible historic-period buildings—Outbuilding 1, the barn, and commercial building, all constructed sometime between 1968 and 1980—with all other resources constructed or moved onto the parcel beginning in the 2010s. As such, the collective property does not clearly communicate a specific architectural style or definitive property type, but rather multiple periods of development. Individually, the residence recorded on this form represents an expanded expression of National Folk architecture as evidence by the U-shaped core of the building (which was evident as early as 1940 but may have been the result of additions). Houses in this style had flexible floor plans and were a popular option in rural areas from about 1850 through the 1930s due to their economical building structure and materials. This residence is a modest example of National Folk architecture with numerous alterations (discussed below) and does not embody important characteristics of the style that might make it significant under this criterion.[24] Other potentially historic-period buildings, specifically Outbuilding 1 and the barn, are utilitarian, the design of which prioritized economy over architectural flourishes. As such, they do not exhibit high artistic qualities and do not represent the work of a master architect or builder. The commercial building employs a false front parapet, which was common among early settlements in the nineteenth-century American West. False-front architecture allowed for greater ornamentation and prominent signage along commercial storefronts with limited financial expenditure, as the actual buildings and sometimes the community itself for that matter, possessed relatively short lives. As communities settled, construction became more permanent, and false fronts grew less common but not unheard of outside of movie sets.[25] The building recorded on this form was constructed sometime between 1968 and 1980, well outside the era of false-front architecture's popularity, and likely employed the referential architectural style for its associations with the Old West—an appropriate theme for the property's use as Tally-Ho Farms, a commercial horseback riding venture. As such, the building is not exemplary of the nineteenth-century architectural style, and it does not possess high artistic value. Therefore, the subject property is not eligible for listing in either register under NRHP Criterion C / CRHR Criterion 3.

The subject property is not eligible under NRHP Criterion D / CRHR Criterion 4 because it has neither yielded nor is likely to yield important information about historic construction materials or technologies that otherwise would not be available through documentary evidence. Also, the resource's land use, the layout of the extant built environment resources, and the relationship the buildings have with the surrounding landscape, are typical for agricultural properties of the period and do not appear to provide important information within the broader economic, social, and cultural setting of the region during its historic-period occupation. Potential archaeological resources on this parcel, if any, are not evaluated herein.

In addition to lacking significance under all NRHP and CRHR criteria, the subject property has diminished integrity in several aspects. The residence has been expanded by additions and altered by replacement vertical-groove siding and replacement vinyl windows, which have diminished its integrity of its design, materials, and workmanship. The later buildings, which represent the property's shift from a working orchard to a mixed-use residential and commercial property, generally retain their integrity of design, materials, workmanship, and setting, but the continued repurposing of the property as ownership exchanged hands has diminished their integrity of association. Finally, the property has reduced integrity of feeling, as it cannot clearly communicate any historic period of development to the observer.

The property is not eligible for listing in the NRHP or CRHR because it lacks significance under all criteria.

[24] Virginia Savage McAlester, *A Field Guide to American Houses: The Definitive Guide to Identifying and Understanding America's Domestic Architecture* (New York: Alfred A. Knopf, 2015), 134-147; Guerra & McBane, LLC, *City of Arcata Historic Context Statement*, prepared for City of Arcata Community Development Department, March 2012, Appendix D, 1-5.
[25] Sara E. Quay, *American Popular Culture Through History: Westward Expansion, 1849-1890* (Westport, Connecticut: Greenwood Press, 2002), 81-83.

Site Map:

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ______
Review Code ______ **Reviewer** ______ **Date** ______

***Resource Name or #** (Assigned by recorder): MR # 3

P1. Other Identifier: Parkway Lakes RV Park

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara County
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5′ Quad**: Morgan Hill, CA **Date**: 1955 (photorevised 1980) **T**:__; **R**:__; **Sec**:___; Mount Diablo Meridian

c. Address: 100-550 Ogier Avenue City: Morgan Hill Zip: 95037

d. UTM: (give more than one for large and/or linear resources) Zone: _____; ____________mE/ ____________mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcel Number (APN): 725-05-011

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records a 14.2-acre parcel located on the east side of Monterey Road between the community of Coyote and the city of Morgan Hill in an unincorporated part of rural Santa Clara County. The parcel contains a primary residence, outbuilding, secondary residence, the Parkway Lakes RV Park, prefabricated ancillary sheds, and multiple prefabricated residences and mobile buildings moved onto the parcel since 2021 (**Photograph 1**) (see **Site Map** on Continuation Sheet). A paved driveway extending southeast from Ogier Avenue provides access to the complex. Visibility from the public rights-of-way on Monterey Road, Ogier Avenue, and the Coyote Creek riparian corridor was obscured for much of the parcel by vegetation and other built environment. (See Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP2 – Single family property; HP39 – Other (RV Park)

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.**
Westernmost corner of the parcel; camera facing east from intersection of Ogier Avenue and Monterey Road; February 15, 2023.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
See Continuation Sheet.

***P7. Owner and Address:**
Morgan Hill RV Park Way Lakes, LP
3511 Del Paso Road, Suite 240
Sacramento, CA 95835

***P8. Recorded by:** (Name, affiliation, address)
Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: February 15, 2023

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Historic Resources Report for the Anderson Dam Seismic Retrofit Conservation Measures Project – Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project, Santa Clara County, California," prepared for Valley Water, 2023.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): MR # 3

B1. Historic Name: ______
B2. Common Name: Parkway Lakes RV Park
B3. Original Use: Agricultural B4. Present Use: Residential
***B5. Architectural Style**: Ranch
***B6. Construction History**: (Construction date, alteration, and date of alterations) See Continuation Sheet.
***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**
***B8. Related Features:** _________
B9. Architect: unknown b. Builder: unknown
***B10. Significance: Theme**: N/A **Area**: N/A
Period of Significance: N/A **Property Type**: N/A **Applicable Criteria**: N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The built resources on the subject parcel do not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). This property has been evaluated in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) as well as Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This property is not a historical resource under CEQA.

Historic Context

The oldest built environment resource recorded on this form was constructed in the early twentieth century along Coyote Creek in the southern Santa Clara Valley near the present-day Ogier Ponds. (See Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: USGS, *Morgan Hill Quadrangle*, 1:62,500 (Washington, D.C.: USGS, 1917, reprinted 1931); Margaret Battaglia et vir to Coast Counties Gas & Electric Co., Standard Grant of Right-of-Way for Electric Transmission Line, August 22, 1927 (recorded September 2, 1927), 343 O.R. 278, Santa Clara County Clerk-Recorder's Office, San Jose, California; "Large Orchard Changes Owners in $99,000 Deal," *San Jose Mercury Herald* (April 16, 1929): 11.

B13. Remarks:

***B14. Evaluator**: Samuel Skow
***Date of Evaluation**: February 2023

(This space reserved for official comments.)

P3a. Description (continued):

The oldest extant building on the study parcel is the primary residence—an approximately 4,900-square-foot, Ranch-style building with an irregular plan and a multi-sectional gable roof with composition shingles and at least two brick chimneys, sited near the center of the parcel (**Photograph 2**). The building is clad with a variety of materials, including board-and-batten, stucco, and floor-to-ceiling glass panels (**Photograph 3**). Fenestration consists of replacement vinyl horizontal sliding and fixed-pane windows. A prefabricated metal storage shed is located along the western fence line (**Photograph 4**).

Northwest of the primary residence is an approximately 1,750-square-foot, wood-frame outbuilding with a side-gable roof, corrugated-metal siding and roofing, and a shed-roof extension on the northeast side (**Photograph 5**).

Photograph 2. Southwest side of primary residence; camera facing northeast from Monterey Road, February 15, 2023.

Photograph 3. Northeast side of primary residence; camera facing northeast from Ogier Avenue, February 15, 2023.

Photograph 4. Prefabricated storage shed (center) along the west fence line of primary residence (right), with portable buildings (background); camera facing northeast from Monterey Road, February 15, 2023.

Photograph 5. Northeast side of outbuilding; camera facing southwest from Coyote Creek riparian corridor, February 15, 2023.

Northeast of the primary residence is the secondary residence, an approximately 1,650-square-foot building with a rectangular footprint and a gable roof. This residence is not visible from the public right-of-way.

Encompassing roughly 6.2 acres in the southwest corner of the parcel is the Parkway Lakes RV Park: a 108-unit mobile home community with a central clubhouse with office and swimming pool ringed by asphalt-paved access roads (**Photograph 6**).

Northeast of the outbuilding along the northeastern parcel boundary—which aligns with the left bank of the former Coyote Creek alignment—is an approximately 300-square-foot, corrugated-iron Quonset hut with a metal stove pipe (**Photograph 7**).

Numerous prefabricated mobile buildings are located along the northeastern parcel boundary adjacent to the Quonset hut, with one prefabricated residence sited northeast of and adjacent to the primary residence (**Photograph 8** and **Photograph 9**).

Photograph 6. Entrance to Parkway Lakes RV Park; camera facing southeast from Ogier Avenue, February 15, 2023.

Photograph 7. Northeast side of Quonset hut (center), with mobile buildings (background); camera facing southwest from Coyote Creek riparian corridor, February 15, 2023.

Photograph 8. Prefabricated mobile buildings along northeast parcel boundary; camera facing southeast from Coyote Creek riparian corridor, February 15, 2023.

Photograph 9. Southwest side of prefabricated residence (center), with east edge of primary residence (left); camera facing northeast from Monterey Road, February 15, 2023.

P6. Date Constructed / Age and Sources; and B6. Construction History (continued):

Building*	Construction History	Source(s)
Primary residence*	Built sometime between 1917-1931; additions constructed between 1956-1963; replacement vinyl windows installed at unknown date.	U.S. Geological Survey (USGS), *Morgan Hill Quadrangle*, 1:62,500 (Washington, D.C.: USGS, 1917); USGS, *Morgan Hill Quadrangle*, 1:62,500 (Washington, D.C.: USGS, 1917, reprinted 1931); HistoricAerials.com, "550 Ogier Avenue" (1956); Cartwright Aerial Surveys (CAS), Flight CA-SCL, Frame SCL 1-56, 1:20,000, July 18, 1963, available at https://mil.library.ucsb.edu/ap_indexes/FrameFinder/ (UCSB; accessed January 2023).
Outbuilding*	Built sometime between 1968-1980.	CAS, Flight CAS-2310, Frame 2310-3-161, 1:12,000, May 6, 1968, UCSB; HistoricAerials.com, "550 Ogier Avenue" (1980).
Secondary residence*	Built sometime between 1982-1987	HistoricAerials.com, "550 Ogier Avenue" (1982 and 1987).
RV park*	Built sometime between 1982-1987	HistoricAerials.com, "550 Ogier Avenue" (1982 and 1987).
Prefabricated shed* (Primary residence)	Moved onto parcel sometime between 1987-2004.	HistoricAerials.com, "550 Ogier Avenue" (1987); Google Earth, "550 Ogier Avenue" (November 2004).
Quonset hut*	Moved onto parcel sometime between 1998-2004.	HistoricAerials.com, "550 Ogier Avenue" (1998); Google Earth, "550 Ogier Avenue" (November 2004).
Prefabricated residences / mobile buildings	Moved onto parcel post-2021.	Google Earth.com, "550 Ogier Avenue" (September 2021).

*Building designations by JRP.

B10. Significance (continued):

The earliest Euro-American settlements in the vicinity of the Ogier Ponds Project occurred in the 1830s, when the Mexican government granted to Juan Alvires the 20,052-acre *Rancho Refugio de la Laguna Seca* (Laguna Seca Rancho) and the 8,927-acre *Rancho Ojo de Agua de la Coche* to Juan Maria Hernandez the following year. As with most other Mexican-era rancho grant holders, Alvires raised cattle on his land, but he also cultivated wheat, operated a flourmill, and resided in a no-longer-extant adobe house built along the bank of Coyote Creek.[1] The rancho period's pastoral way of life continued into the early 1850s, as Anglo Americans and other non-Latino settlers began to arrive in the area, including William Fisher, an English-born tallow trader who acquired the Laguna Seca Rancho at auction in 1845. Fisher died five years later, and the land passed to his wife, Liberata Fisher née Ceseña. Following the Mexican-American War (1846-1848) and California statehood (1850), and as required under the federal Land Act of 1851, Fisher's heirs filed a claim with the Public Land Commission to validate their ownership of the Laguna Seca Rancho, which was confirmed by the federal government in 1865. By 1876, Fisher's heirs

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill" (prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.

and successors-in-interest had subdivided the former Laguna Seca Rancho into more than 20 parcels ranging in size from 10 acres to upwards of 4,200 acres, many of which they had sold to a steady influx of migrant farmers.[2]

The southern Santa Clara Valley underwent a dramatic agricultural transformation during the early period of American settlement. While large landowners like the Fishers continued to graze cattle, wheat farming surpassed this practice along with sheep ranching, dairying, and general farming as the region's main agricultural endeavors by the 1860s. Owing to the easy cultivation and high fertility of the Santa Clara Valley soil, farmers realized high yields with little capital investment, contributing to the steady annual rise of acreage dedicated to wheat.[3] By 1880, wheat's popularity in the Santa Clara Valley succumbed to poor yields and low prices, begetting a profound shift toward the establishment of orchards and vineyards in the region.[4] In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. In addition to prunes, Santa Clara Valley farmers also planted other stone fruit orchards such as apricots, peaches, and cherries.[5] In addition to orchards, many farmers in the Santa Clara Valley planted grapes. In the early 1860s, José Maria Malaguerra developed one of the earliest vineyards in the county on a 211-acre tract along Coyote Creek on acreage previously contained in the Laguna Seca Rancho. Other early wineries in the Morgan Hill area included that of Joel W. Ransome, who planted French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes and built a no-longer-extant winery by the 1880s. Around this same time, the community of San Martin and its surrounding area developed into a regional center of viticulture, with multiple farms raising wine grapes and building small wineries and brandy distilleries. Occupying considerably less acreage than orchard crops, viticulture remained a common practice through the twentieth century, where in 1925 Italian immigrant Emilio Guglielmo established a still active vineyard and commercial winery in Morgan Hill.[6]

Expanded transportation networks and population centers emerged during the mid to late nineteenth century alongside and further drove agricultural development in the southern Santa Clara Valley. *El Camino Real* (mentioned above) was originally comprised of a north-southerly meandering dirt trail travelled by foot, horseback, and ox carts during the era of Spanish colonial settlement in the late eighteenth and early nineteenth centuries. In the 1850s, the Santa Clara County Board of Supervisors elected to incorporate the thoroughfare into the county road system, where it served as the primary link between San José and Gilroy. During this period, numerous settlements were established along this main transportation artery as way stations, where settlers constructed inns, stables, and blacksmith shops to serve the Butterfield Overland Mail Company—a national stagecoach company that operated in the valley in the late 1850s and early 1860s. These settlements were originally named for their distances from central San José, including Twelve Mile House at present-day Coyote, Fifteen Mile House at the no-longer-extant Perry Station, and Eighteen Mile House at the former community of Madrone (now incorporated into present-day Morgan Hill). Around this same time, the short-lived Santa Clara & Pajaro Valley Railroad Company (1868-1870) laid 30 miles of track between San José and Gilroy alongside the Monterey Road alignment before the company was fully absorbed into the Southern Pacific Railroad Company. As with the overland way stations, numerous train depots were established along the route, including those at Coyote, Madrone, and Gilroy, which further spurred regional development. In

[2] Archives and Architecture, "County of Santa Clara Historic Context Statement," 33; Circa, "Historic Context Statement for the City of Morgan Hill," 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 11-12; Basin, "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR)," 5-9.

[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, "County of Santa Clara Historic Context Statement," 37, 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 12, 13.

[4] Archives and Architecture, "County of Santa Clara Historic Context Statement," 40-41, 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 14.

[5] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[6] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2; Herrmann Bros., *Official Map of the County of Santa Clara, California* (San Jose, California: Britton & Rey, 1890); Candace Reed, National Register of Historic Places Inventory—Nomination Form: Malaguerra Winery (NPS # 80000858) (prepared November 1977, listed October 1980), National Register Research Database; H. S. Foote, *Pen Pictures from the Garden of the World or Santa Clara County, Illustrated* (Chicago: The Lewis Publishing Company, 1888), 385-386; Guglielmo Winery, "History," https://guglielmowinery.com/history/ (accessed January 2023).

the early twentieth century, Monterey Road was incorporated into the U.S. 101 Bayshore Highway, with various businesses in the adjoining towns emerging to serve California's nascent automobile culture, such as stores, hotels, gas stations, and restaurants with "drive-thrus" and large parking lots. However, in the early 1980s, U.S. 101 was realigned and built as a freeway east of the historic route to bypass Coyote, Morgan Hill, San Martin, and Gilroy.[7]

In addition to expanded transportation networks, a variety of technological advances also drove the rise of regional horticulture. Fruit farming was boosted in the late 1860s with the simultaneous completion of the transcontinental railroad as well as the Santa Clara & Pajaro Valley Railroad (discussed above), which provided access to large eastern U.S. markets to Santa Clara Valley fruit farmers. With the development of ice-cooled refrigerated rail cars in the 1880s, fresh fruit shipments only furthered the popularity of the valley's orchard crops throughout the country, incentivizing higher production in the region. By 1890, this horticultural transition had spread to most parts of the Santa Clara Valley where irrigation water from streams or wells was available.[8] Advancements in irrigation technology also facilitated the development of intensive horticulture in the Santa Clara Valley.[9] Vertical turbine pumps came into popular usage on farms in the Santa Clara Valley around 1915 and had a profound effect on the valley as farmers no longer needed access to surface streams to irrigate their crops, thus facilitating an expansion of orchards and vineyards. Groundwater pumping emerged concurrent with the widespread electrification of the southern Santa Clara Valley, which began around the turn of the twentieth century. Beginning in 1911, the Santa Clara County Board of Supervisors awarded franchises to various companies to install and operate electrical systems along various public roads throughout the county. One such company, the Coast Counties Gas & Electric Company (CCG&E) provided electrical service to Gilroy, Morgan Hill, and the surrounding areas, as well as parts of San Benito and Santa Cruz counties. However, increased groundwater pumping subsequently caused a rapid and substantial drop in groundwater levels, leading to the creation of the Santa Clara Valley Water Conservation District (now Valley Water) in 1929 to restore the regional aquifer and to control groundwater levels. Other similar water districts formed in the valley in the following decades.[10]

The change from grain cultivation to diversified horticulture with an emphasis on orcharding in the late nineteenth century also triggered changing land ownership patterns. The trend toward subdivision, begun on the former Laguna Seca Rancho in the 1860s, spread throughout the southern Santa Clara Valley as the emergence of highly profitable fruit crops prompted large ranch owners to subdivide their massive holdings and sell their land for small orchards plots encompassing between five and 50 acres, with 20-acre orchards generating sufficient income to support a single family.[11] Orchard fruit production continued

[7] Basin Research Associates, "Cultural Resources Technical Report," 5-10; Derek Whaley, "Railroads: Southern Pacific Railroad Subsidiaries" (May 6, 2016), https://www.santacruztrains.com/2016/05/southern-pacific-railroad-subsidiaries.html (accessed January 2023); Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 307; Circa, "Historic Context Statement for the City of Morgan Hill," 38.
[8] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.
[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3; "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.
[10] Etcheverry, *Irrigation Practice and Engineering,* 179-191; Greene, *Pumping Machinery,* 44-46, 110-112; Lundy, "A History of the Deep Well Turbine Pump Industry," 1-3; Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of the County Archives of California: No. 44 – Santa Clara County (San Jose)* (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143;
[11] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15; F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part),

to grow into the twentieth century and remained the dominant agricultural activity in the Santa Clara Valley. In the early twentieth century, prunes were the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post-World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District that ensured sufficient water for irrigation.[12] In the decades after World War II ended in 1945, orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, but Morgan Hill and the adjacent unincorporated area, owing to its distance from San José, retained its rural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the late 1970s, when high-tech firms began locating in the city and the California Department of Transportation realigned and expanded the U.S. 101 freeway, facilitating an easier commute to San José and transforming Morgan Hill into a bedroom community. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread north of Morgan Hill towards the vicinity of the Ogier Ponds, further altering the once rural and agricultural character of the area.[13]

The oldest built environment resource recorded on this form was constructed sometime between 1917 and 1931 on a tract comprising Lots 19, 20, and 21 of the Ogier Subdivision—an early twentieth-century subdivision of a portion of the Laguna Seca Rancho first subdivided via deed sometime in the 1860s. During this early period, prominent Santa Clara Valley landholder Daniel Murphy conveyed that acreage contained in the study parcel as a portion of a 1,000-acre property to fellow Irish-Canadian immigrant, Walter Fitzgerald, Sr., as payment for timber work performed in the mountains near Gilroy. By 1876, Walter Fitzgerald had subdivided the 1,000-acre tract, which was traversed by Coyote Creek, into four parcels, where his sons, Gregory, James, and John jointly ran agricultural operations (**Plate 1**). John Fitzgerald was assigned ownership of the 320-acre tract containing the present-day study parcel, where he established his no-longer-extant farmstead complex on the north side of Coyote Creek, outside the boundaries of the present-day study parcel. He retained possession of the property through 1900, with French-born dairy farmer Frank Labrucherie acquiring the tract by 1910.[14]

Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023).

[12] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.

[13] USGS, *Morgan Hill Quadrangle,* 15-minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1968, 1973, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.

[14] U.S. Geological Survey (USGS), *Morgan Hill Quadrangle*, 1:62,500 (Washington, D.C.: USGS, 1917); USGS, *Morgan Hill Quadrangle*, 1:62,500 (Washington, D.C.: USGS, 1917, reprinted 1931); F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; Thompson & West, *Historical Atlas Map of Santa Clara County, California* (San Francisco: Thompson & West, 1876), Map No. 7; Eugene T. Sawyer, *History of Santa Clara County, California, with Biographical Sketches* (Los Angeles: Historic Record Company, 1922), 586; U.S. Census Bureau, Manuscript Population Schedule: 1880, California, Santa Clara County, Burnett Township, Enumeration District No. 256, page 7C, accessed via Ancestry.com; Herrmann Brothers, *Official Map of the County of Santa Clara, California* (San Jose, California: Herrmann Bros., 1890); U.S. Census Bureau, Manuscript Agricultural Schedule: 1880, California, Santa Clara County, Burnett Township, Enumeration District No. 256, sheet 5A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1900, California, Santa Clara County, Burnett Township, Enumeration District No. 47, sheet 18 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, Burnett Township (part), Enumeration District No. 66, sheet 7 (Ancestry.com).

In 1914, Labrucherie conveyed the former Fitzgerald tract to John B. Ogier, a lifelong resident of Santa Clara County alternately listed as a general farmer, dairy farmer, and orchardist. That same year, Ogier subdivided the property into 21 lots ranging in size from about six acres to 54.5 acres (**Plate 2**). The subdivision additionally laid out Ogier and Barnhart avenues. Ogier's agent, James A. Clayton & Company—an influential real estate and development firm established in San Jose in 1867—initially sold off lots at $125 to $150 per acre, which were ultimately priced up to $300 per acre by 1916. Development was slow over the next two decades and largely confined to the west bank of the creek in those lots abutting Monterey Road (including that tract comprising Lots 19, 20, and 21, containing the present-day parcel recorded on this form). As depicted in topographical mapping in 1917, a farmstead with no-longer-extant components was present in the general location of the extant complex on present-day APN 725-05-014 (recorded and evaluated on a separate DPR 523 form appended to the report cited in *P11). By 1931, the primary residence recorded on this form was likewise present (**Plate 3**). As confirmed by later aerial photography, this building comprised the central Minimal Ranch core of the extant primary residence, which was significantly expanded in subsequent decades, and most of the parcel was dedicated to prune orchards (**Plate 4** and **Plate 5**). The earliest identified owners of that acreage containing present-day APNs 725-05-013, -011 (the study parcel), and -014 (recorded and evaluated on a separate DPR 523 form appended to the report cited in *P11) were Margaret and Innocenzio Battaglia, who had acquired Ogier Subdivision lots 19, 20, and 21 by 1927, over ten years before they conveyed a portion of their property to the State of California for the expansion of Monterey Road (then-U.S. 101). Italian immigrants based in San Jose, the Battaglias do not appear to have resided on the property but almost certainly leased it to an unidentified tenant farmer, who raised the no-longer-extant prune orchards mentioned above.[15]

Following Margaret Battaglia's death in 1944, Innocenzio Battaglia transferred ownership of that acreage containing the subject parcel by the early 1950s to his son, William I. Battaglia, and William's wife, Minnie, who retained possession of the property through 1970. Born and raised in Santa Clara County, William Battaglia owned and operated prune, apricot, and cherry orchards and packing facilities and a garlic-processing plant in San Jose and prune orchards and processing facilities in Yuba County in addition to that acreage containing the study parcel, where he raised and processed prunes as the Battaglia Packing Company. During William and Minnie Battaglia's tenure of ownership, they erected the historic-period components of the extant industrial complex on present-day APN 725-05-014 (recorded and evaluated on a separate DPR 523 form appended to the report cited in *P11) in addition to expanding the primary residence out to its current irregular plan sometime between 1956 and 1963 (**Plate 6** and **Plate 7**). During this same period, a no-longer-extant roadside produce stand was erected at the westernmost corner. By 1980, the prune orchards had been entirely removed from the property. These developments may have occurred under Battaglia or possibly Robert W. and Wilma M. Forward, who had acquired the property by 1974. Born in Canada, Robert Forward arrived in Santa Clara County with his family by 1920. Like his father, Forward established a dairy farm in the county, although he does not appear to have initiated any dairying operations on the study parcel but rather

[15] Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," 1914, Santa Clara County Recorder; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023); Margaret Battaglia et vir to Coast Counties Gas & Electric Co., Standard Grant of Right-of-Way for Electric Transmission Line, August 22, 1927 (recorded September 2, 1927), 343 O.R. 278, Santa Clara County Clerk-Recorder's Office, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1930, California, Santa Clara County, San Jose Township (part), Robertsville Precinct, Enumeration District No. 43-83, sheet 15B (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1940, California, Santa Clara County, San Jose Township, Enumeration District No. 43-126, sheet 12A (Ancestry.com); Fairchild Aerial Surveys (FAS), Flight CIV-1940, Frame 343-2, 1:20,000, June 5, 1940, flown for U.S. Department of Agriculture – Agriculture Adjustment Administration (USDA-AAA), UCSB.

leased the acreage to Anthony Battaglia and Margaret Bersano née Battaglia, William and Minnie's son and daughter, by the end of the decade. By 1982, Battaglia, Bersano, and their respective spouses had taken ownership of the property, which was subdivided into its current configuration sometime between 1985 and 2000. A secondary residence was constructed sometime between 1982 and 1987, one year after Anthony Battaglia's wife, Michael Battaglia, incorporated Parkway Lakes R.V., Inc., a closed corporation that established the extant RV park at the west corner of the parcel by 1987. While the Battaglia's company went defunct in 2000, the RV park appears to have been in continuous operation. Michael Battaglia was recorded living at the primary residence as recently as 2002. The present owner acquired the property in 2014.[16]

[16] FindAGrave.com, "Margarita Enfantino Battaglia: Memorial ID 7453755" and "Innocenzio Battaglia: Memorial ID 7453754," accessed via Findagrave.com; William Battaglia and Minnie Battaglia, Lease to Kaiser Industries Corporation, August 20, 1964 (recorded May 4, 1966), 7369 O.R. 427, Santa Clara County Clerk-Recorder; "Sheriff's Sale: S.C.D. No.: 104072," *San Jose Mercury* (April 28, 1967): 64; U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township, Enumeration District No. 89, sheet 27B (Ancestry.com); "Large Orchard Changes Owners in $99,000 Deal," *San Jose Mercury Herald* (April 16, 1929): 11; "Jury to Decide if Garlic is Nuisance," *San Jose Evening News* (October 30, 1934): 1; "Time Sought in Prune Deal," *San Jose Mercury Herald* (September 25, 1937): 8; "State Sued in Flood Loss," *The San Jose News* (December 14, 1938): 4; "Million Dollar Subdivision for Curtner Avenue," *San Jose Evening News* (July 17, 1946): 1; USGS, *Morgan Hill Quadrangle*, 7.5-minute Series, 1:24,000 (Washington, D.C.: USGS, 1955); HistoricAerials.com, "550 Monterey Highway" (1956, 1980, 1982, and 1987); Cartwright Aerial Surveys (CAS), Flight CA-SCL, Frame SCL 1-56, 1:20,000, July 18, 1963, UCSB; CAS, Flight CAS-65-130, SCL 23-144, 1:12,000, May 27, 1965, flown for California Division of Highways, UCSB; CAS, Flight CAS-2310, Frame 2310-3-161, 1:12,000, May 6, 1968, UCSB; "Million-dollar Loss in Morgan Hill Fire," *San Jose Mercury* (February 11, 1970): 1; R. W. Forward, Wilma M. Forward, and Robert W. Forward, Grant Deed (Individual) to County of Santa Clara, June 10, 1974 (recorded July 24, 1974), B158 O.R. 12, Santa Clara County Clerk-Recorder; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Agnews Precinct, Enumeration District No. 183, sheet 1A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1950, California, Santa Clara County, Santa Clara, Enumeration District No. 43-174, sheet 1 (Ancestry.com); Robert W. Forward and Wilma Forward, Master Ground Lease to Margaret Bersano and Anthony Battaglia, January 13, 1977 (recorded November 26, 1977), 302 O.R. 627, Santa Clara County Clerk-Recorder; Edward F. Bersano and Margaret M. Bersano and Anthony Battaglia and Michael D. Battaglia, Grant Deed to Edward F. Bersano and Margaret M. Bersano and Anthony Battaglia and Michael D. Battaglia, September 28, 1982 (recorded October 7, 1982), H070 O.R. 231, Santa Clara County Recorder; Almaden Valley Engineers, "Record of Survey, being a Portion of Lots 19, 20, & 21 of the 'Map of the Ogier Subdivision in the Rancho la Laguna Seca,' recorded in Book 'O' of Maps, Pages 61 & 62, Records of Santa Clara County, California, for Anthony and Michael Battaglia," June 1985 (recorded March 21, 1986), Map Book 557, Page 36, Santa Clara County Recorder; "Exhibit B," appended to Edward F. Bersano, Margaret M. Bersano, Anthony Battaglia, and Michael D. Battaglia, Certificate of Compliance (Lot Line Adjustment), August 21, 2000 (recorded August 21, 2000), Document No. 15364281, Santa Clara County Recorder; California Secretary of State, "Parkway Lakes R.V., Inc. (1295868)," https://bizfileonline.sos.ca.gov/search/business (accessed January 2023); Carnes & Associates, "Record of Survey being a Portion of Lots 19, 20 & 21 as Shown upon that Certain Map Entitled 'Map of Ogier Subdivision,' recorded in Book 'O' of Maps at pages 61 and 62, Santa Clara County Records," October 2007, (recorded October 13, 2010), Map Book 839, Page 24, Santa Clara County Recorder; Ancestry.com, *U.S. Phone and Address Directories, 1993-2002* (Provo, Utah: Ancestry.com Operations, Inc. 2005); Santa Clara County Assessor, property information for APN 725-05-011, accessed via ParcelQuest.com.

Plate 1. Excerpt of 1876 map of Santa Clara County with 1,000-acre Fitzgerald property outlined in red and tract containing present-day study parcel outlined within that boundary in green (at top). Annotations by JRP. Note the no-longer-extant farmstead complex on the east side of Coyote Creek as depicted by a black square.[17]

Plate 2. Excerpt of 1914 map of Ogier Subdivision with boundaries of Battaglia property (Lots 19, 20, and 21) outlined in red and approximate boundaries of present-day APN 725-05-011 outlined within that boundary in green (at the top). Annotation by JRP. Note that the property boundary calls to the center of the Coyote River.[18]

Plate 3. Excerpt of 1931 topographical map of Morgan Hill Quadrangle, with approximate contemporary parcel boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at the top). Annotation by JRP. Note present built environment in the general location of the primary residence recorded on this form.[19]

Plate 4. Excerpt of 1940 aerial photograph with approximate contemporary parcel boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at the top). Annotation by JRP. Note present orchards and no-longer-extant farmstead components located along Coyote Creek.[20]

[17] Thompson & West, *Historical Atlas Map of Santa Clara County, California* (San Francisco: Thompson & West, 1876), Map No. 7.
[18] Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," 1914, Santa Clara County Recorder.
[19] USGS, *Morgan Hill Quadrangle* (1931).
[20] FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB.

Plate 5. Detail view of buildings identified in **Plate 4,** with central core of extant residence circled in yellow (left) and no-longer-extant farmstead components on adjacent APN 725-05-014 circled in red (right). Annotation by JRP.

Plate 6. Excerpt of 1965 aerial photograph with approximate contemporary parcel boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at the top). Annotation by JRP.[21]

Plate 7. Detail view of built environment on study parcel identified in **Plate 6**, with extant primary residence circled in yellow (right) and no-longer-extant building / structure circled in red (left), 1965. Annotation by JRP.

Evaluation

The primary residence at 550 Ogier Avenue (APN 725-05-011)—the one confirmed historic-period built environment resource on the subject parcel—does not have important associations with significant historic events, patterns, or trends of development at the local, state, or national level (NRHP Criterion A / CRHR Criterion 1). The original core of the expanded Ranch-style residence recorded on this form was constructed sometime between 1917 and 1931, when the Battaglia family converted the recently subdivided acreage contained within the study parcel (and adjacent APN 725-05-014) to orchards—a common and ubiquitous developmental trend throughout the southern Santa Clara Valley that predated this period by at least half a century. Decades later, the residence was expanded to its current general footprint under the ownership of William Battaglia, who developed an industrial fruit-processing complex on the larger property. Historical evidence, however, does not indicate that

[21] Cartwright Aerial Surveys (CAS), Flight CAS-65-130, SCL 23-144, 1:12,000, May 27, 1965, flown for California Division of Highways, UCSB.

the property recorded on this form (nor the larger Battaglia property that included APN 725-014 and -013) distinguished itself from the many other small farms that emerged in the region in the early to mid-twentieth century for playing a specifically or demonstrably vital role in the development of the southern Santa Clara Valley economy, nor for playing a role in any significant innovations to horticultural methods or technologies. Moreover, since the 1980s, the property has undergone a fundamental transformation from an owner-occupied industrial agricultural complex with associated orchards to a mobile home community. Therefore, the built resources on this property are not eligible for listing in either register under NRHP Criterion A or CRHR Criterion 1.

The subject parcel is not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). The only historic-period built environment contained within the subject parcel—the primary residence—is most closely associated with three generations of the Battaglia family, which included: Margaret and Innocenzio, who do not appear to have ever resided there; William and Minnie; and Anthony and Michael, who were recorded at the residence as recently as 2002. While William and Minnie Battaglia appear to have attained some success in the prune-packing industry, historical evidence does not indicate that they made significant contributions within their field of endeavor nor within their community during their period of direct association with the property. Similarly, the historical record does not indicate that Robert and Wilma Forward, who acquired ownership sometime in the 1970s but likely did not reside on the subject parcel, made notable achievements within their respective fields of endeavor nor within their community during their period of association with the property recorded on this form. Thus, the subject parcel does not appear eligible for listing in either register under NRHP Criterion B or CRHR Criterion 2.

The built environment resources contained within the subject parcel do not possess distinctive characteristics of a type, period, or method of construction, nor are they the important works of a master architect or builder and it does not possess high artistic values (NRHP Criterion C / CRHR Criterion 3). The parcel contains one confirmed historic-period built environment resource—the Ranch-style primary residence, originally built sometime between 1917 and 1931 and expanded sometime between 1956 and 1963—and one possible historic-period building—the outbuilding, constructed sometime between 1968 and 1980—with all other resources constructed or moved onto the parcel between the mid-1980s up to the present. As such, the collective property does not clearly communicate a specific architectural style or definitive property type, but rather multiple periods of development. Individually, the primary residence recorded on this form does not convey its original period of construction but rather its subsequent expansion, of which it represents a modest expression of Ranch-style architecture. Featuring long horizontal massing and a multi-component gable roof, the primary residence nonetheless is an unremarkable example of the style. The outbuilding is a utilitarian building, and as such, prioritized economy over architectural flourishes, does not exhibit high artistic qualities, and does not represent the work of a master architect or builder. Therefore, neither the subject property nor the individual historic-period built environment components contained therein are eligible for listing in either register under NRHP Criterion C / CRHR Criterion 3.

The subject property is not eligible under NRHP Criterion D / CRHR Criterion 4 because it has neither yielded nor is likely to yield important information about historic construction materials or technologies that otherwise would not be available through documentary evidence. Also, the resource's land use, the layout of the extant built environment resources, and the relationship the buildings have with the surrounding landscape, are typical for agricultural properties of the period and do not appear to provide important information within the broader economic, social, and cultural setting of the region during its historic-period occupation. Potential archaeological resources on this parcel, if any, are not evaluated herein.

In addition to lacking significance under all NRHP and CRHR criteria, the subject property likewise has diminished integrity in several aspects. The former industrial agricultural complex recorded on this form has been steadily developed between the early twentieth century and the turn of the twenty-first century—a period encompassing the subject parcel's transition from a working orchard to a mobile home community. As such, it has diminished integrity of setting and association as it is unable to coherently communicate any single period of development and it no longer functions as the residential component to an agricultural processing facility. The primary residence was comprehensively expanded to its current general configuration during the mid-twentieth century, and it has been further altered by the installation of replacement vinyl windows at an unknown date; therefore, it suffers diminished integrity of design, materials, and workmanship, possessing virtually no integrity to its original period of construction. Finally, the property suffers reduced integrity of feeling, as it cannot clearly communicate any historic period of development to the observer. No historic period built environment resources has been moved, and thus they retain integrity of location.

The property is not eligible for listing in the NRHP or CRHR because it lacks significance under all criteria.

Site Map:

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ____
Review Code ____ Reviewer ____ Date ____

***Resource Name or #** (Assigned by recorder): MR # 4

P1. Other Identifier: 550 Monterey Road

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara County
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5′ Quad**: Morgan Hill, CA **Date**: 1955 (photorevised 1980) **T**:__; **R**:__; **Sec**:___; Mount Diablo Meridian

c. Address: 10160 Monterey Highway City: Morgan Hill Zip: 95037

d. UTM: (give more than one for large and/or linear resources) Zone: _____; ____________mE/ ____________mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcel Number (APN): 725-05-014

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records an 11.5-acre parcel located east of Monterey Road between the community of Coyote and the city of Morgan Hill in an unincorporated part of rural Santa Clara County. The parcel contains an industrial complex comprised of six buildings—five warehouses and one residence—constructed at various times along with three auxiliary sheds occupied by multiple tenants at various locations (**Photograph 1**) (see **Site Map** on Continuation Sheet). The remainder of the parcel is comprised of modern asphalt-paved driveways and parking lots, along with paved and unpaved storage yards. (See Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP4 – Ancillary building; HP8 – Industrial building

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Overview of industrial agricultural complex from Monterey Road; camera facing northeast, February 15, 2023.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
See Continuation Sheet

***P7. Owner and Address:**
H.K.N., LLC
Singing Hill Lane
Saratoga, CA 95070

***P8. Recorded by:** (Name, affiliation, address)
Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: February 15, 2023

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Historic Resources Report for the Anderson Dam Seismic Retrofit Conservation Measures Project – Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project, Santa Clara County, California," prepared for Valley Water, 2023.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): MR # 4

B1. Historic Name: Battaglia Packing Company fruit-processing plant
B2. Common Name: See Continuation Sheet
B3. Original Use: Agricultural B4. Present Use: Industrial
***B5. Architectural Style**: Bungalow; Utilitarian
***B6. Construction History**: (Construction date, alteration, and date of alterations) See Continuation Sheet
***B7. Moved?** ☐ **No** ☒ **Yes** ☐ **Unknown** **Date:** Sometime between 1965-1968 **Original Location:** Unknown
***B8. Related Features:** _________
B9. Architect: unknown b. Builder: unknown
***B10. Significance: Theme**: N/A **Area**: N/A
Period of Significance: N/A **Property Type**: N/A **Applicable Criteria**: N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The subject property does not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). This property has been evaluated in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) as well as Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This property is not a historical resource under CEQA.

Historic Context

The oldest built environment resource recorded on this form was constructed in the mid-twentieth century along Coyote Creek in the southern Santa Clara Valley near the present-day Ogier Ponds. (See Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: HistoricAerials.com, "550 Monterey Highway" (1956); CAS, Flight CAS-2310, Frame 2310-3-161, 1968, UCSB; "Large Orchard Changes Owners in $99,000 Deal," *San Jose Mercury Herald* (April 16, 1929): 11; "Million-dollar Loss in Morgan Hill Fire," *San Jose Mercury* (February 11, 1970): 1.

B13. Remarks:

***B14. Evaluator**: Samuel Skow
***Date of Evaluation**: February 2023

(This space reserved for official comments.)

P3a. Description (continued):

The oldest extant building at its original location on the study parcel is the Surplus Industrial Supply Company, Inc. warehouse building: a roughly 18,200-square-foot, double-wide warehouse with concrete tilt-up walls and twin bow-truss roofs with regularly distributed roof vents (**Photograph 2**). A wood-frame addition with a gable roof, asphalt shingles, and vertical-groove plywood siding is located on the northwest side (**Photograph 3**). Fenestration consists of at least four metal roll-up doors on the southwest, southeast, and northeast sides and flush wood personnel doors distributed throughout. Sited west of this warehouse is an approximately 120-square-foot, wood-frame shed clad with plywood with a gable roof with narrow eaves and asphalt composition shingles (**Photograph 4**). The shed is likely associated with the warehouse based on their shared proximity within a fenced enclosure.

Northeast of the Surplus Industrial Supply Company, Inc., warehouse is the A&A Granite Creations, Inc., workshop: an approximately 2,500-square-foot, wood-frame warehouse clad with corrugated metal (**Photograph 5**). The building has a front-gable roof with flush eaves, metal coping, and rolled-asphalt. Fenestration consists of a roll-up metal door and a flush wood personnel door on the front (southwest) side and a sliding metal door on an overhead metal track on the northwest side.

Photograph 2. Southeast and front (northeast) sides of Surplus Industrial Supply Company, Inc., warehouse; camera facing west, February 15, 2023.

Photograph 3. Front (northeast) and northwest sides of Surplus Industrial Supply Company, Inc., warehouse; camera facing south, February 15, 2023.

Photograph 4. Southeast and northeast sides of Surplus Industrial Supply Company, Inc., shed; camera facing southwest, February 15, 2023.

Photograph 5. Northwest and front (southwest) sides of A&A Granite Creations, Inc., workshop; camera facing northeast, February 15, 2023.

Southeast of the A&A Granite Creations workshop near the westernmost entrance on Barnhart Avenue is a roughly 1,050-square-foot Bungalow with a rectangular footprint, non-original stucco cladding, and a low-pitched front-gable roof with open eaves and asphalt composition shingles (**Photograph 6**). The front (southwest) façade features an above-grade porch sheltered beneath a projecting gable roof. Fenestration consists of replacement vinyl and aluminum-frame vertical sliding windows, with non-original plywood surrounds on the two front windows that flank a replacement wood panel door. Sited immediately southeast of and adjacent to the bungalow is a prefabricated wood-frame shed with a square footprint, vertical-groove plywood siding, and a front-gable roof with narrow open eaves. The house and shed are contained within an area demarcated by a wood-plank fence line and decorative hedges (**Photograph 7**).

Photograph 6. Northwest side and front (southwest) façade of Bungalow and prefabricated shed; camera facing southeast, February 15, 2023.

Photograph 7. Front (southwest) façade and southeast sides of Bungalow and prefabricated shed; camera facing northwest, February 15, 2023.

Northeast of and adjacent to the Surplus Industrial Supply Company warehouse is the Unit C warehouse occupied by Mill-Wood Designs, LLC: an approximately 10,350-square-foot, prefabricated metal building with an asphalt-paved lot surrounded by chain-link fencing with plastic slats (**Photograph 8** and **Photograph 9**). The building has a rectangular footprint, low-pitched gable roof with flush eaves, metal coping, and regularly distributed roof vents. Raised-seam metal clads the walls and roof. The building features two modern, wood-frame additions on the rear (northeast) and northwest sides that have board-and-batten siding and a shed roof and vertical-groove plywood siding and a gable roof, respectively. Fenestration on the main building consists of roll-up metal doors on the front (southwest) façade and rear (northeast) side and a flush metal personnel door on the southeast side. A modern prefabricated shed is sited adjacent to an above-grade wood platform on the northwest side.

Northeast of the Bungalow in the northeast corner of the parcel is the Unit A warehouse complex occupied by Marra Bros. Distributing, Inc., which consists of two modern prefabricated metal warehouses, encompassing roughly 22,000 and 24,500 square feet, linked via covered breezeway (**Photograph 10** and **Photograph 11**).

***Recorded by**: S. Skow & A. Young ***Date**: February 15, 2023 ☒ Continuation ☐ Update

Photograph 8. Front (southwest) and southeast sides of Unit C warehouse (Mill-Wood Designs, LLC); camera facing northwest, February 15, 2023.

Photograph 9. Rear (northeast) and northwest sides of Unit C warehouse (Mill-Wood Designs, LLC); camera facing southeast, February 15, 2023.

Photograph 10. Southwest and southeast sides of southwestern section of Unit A warehouse complex; camera facing northeast, February 15, 2023.

Photograph 11. Front (southwest) façade and southeast sides of northeastern section of Unit A complex; camera facing north, February 15, 2023.

***Recorded by**: S. Skow & A. Young ***Date**: February 15, 2023 ☒ Continuation ☐ Update

P6. Date Constructed / Age and Sources; B2. Common Name; and B6. Construction History (continued):

Common Name*	Construction History	Sources
Double-wide warehouse* (Surplus Industrial Supply Company, Inc.)	Built sometime between 1956-1963; expanded into "double-wide" building sometime between 1963-1965; wood-frame addition constructed on northwest side sometime between 1968-1980.	HistoricAerials.com, "550 Monterey Highway" (1956 and 1980); Cartwright Aerial Surveys (CAS), Flight CA-SCL, Frame SCL 1-56, 1:20,000, July 18, 1963, available at https://mil.library.ucsb.edu/ap_indexes/FrameFinder/ (UCSB; accessed January 2023); CAS, Flight CAS-65-130, SCL 23-144, 1:12,000, May 27, 1965, flown for California Division of Highways, UCSB; CAS, Flight CAS-2310, Frame 2310-3-161, 1:12,000, May 6, 1968, UCSB.
Shop (A&A Granite Creations, Inc.)	Built sometime between 1963-1965.	CAS, Flight CA-SCL, Frame SCL 1-56, 1963, UCSB; CAS, Flight CAS-65-130, SCL 23-144, 1965, UCSB.
Bungalow*	Built / moved onto property sometime between 1965-1968.	CAS, Flight CAS-65-130, SCL 23-144, 1965, UCSB; CAS, Flight CAS-2310, Frame 2310-3-161, 1968, UCSB.
Unit A (southwest) (Marra Bros. Distributing, Inc.)	Built sometime between 1968-1980.	CAS, Flight CAS-2310, Frame 2310-3-161, 1968, UCSB; HistoricAerials.com, "550 Monterey Highway" (1980).
Landscape / hardscape*	Historic orchards removed and area paved sometime between 1968-1980	CAS, Flight CAS-2310, Frame 2310-3-161, 1968, UCSB; HistoricAerials.com, "550 Monterey Highway" (1980).
Unit C warehouse (Mill-Wood Designs, LLC)	Warehouse built sometime between 1970-1977; rear (northeast) and northwest side additions constructed sometime between 1987-1998	"Million-dollar Loss in Morgan Hill Fire," *San Jose Mercury* (February 11, 1970): 1; "Exhibit A," appended to Robert W. Forward and Wilma Forward, Master Ground Lease to Margaret Bersano and Anthony Battaglia, January 13, 1977 (recorded November 26, 1977), 302 O.R. 627, Santa Clara County Clerk-Recorder's Office, San Jose, California.
Unit A (northeast) (Marra Bros. Distributing, Inc.)	Built sometime between 1980-1982; central addition constructed sometime between 1982-1987; expanded to current footprint sometime between 1987-1998.	HistoricAerials.com, "550 Monterey Highway" (1980, 1982, and 1987); Google Earth, "550 Monterey Highway, Morgan Hill, CA" (August 1998).
Shed* (Surplus Industrial Supply Company, Inc.)	Built sometime between 1998-2004.	Google Earth, "550 Monterey Highway" (August 1998 and November 2004).
Shed* (Bungalow)	Built ca. 2009.	Google Earth, "550 Monterey Highway" (November 2008 and March 2009).

*Building designations by JRP.

B10. Significance (continued):

The earliest Euro-American settlements in the vicinity of the Ogier Ponds Project occurred in the 1830s, when the Mexican government granted to Juan Alvires the 20,052-acre *Rancho Refugio de la Laguna Seca* (Laguna Seca Rancho) and the 8,927-acre *Rancho Ojo de Agua de la Coche* to Juan Maria Hernandez the following year. As with most other Mexican-era rancho grant holders, Alvires raised cattle on his land, but he also cultivated wheat, operated a flourmill, and resided in a no-longer-extant adobe house built along the bank of Coyote Creek.[1] The rancho period's pastoral way of life continued into the early 1850s, as Anglo Americans and other non-Latino settlers began to arrive in the area, including William Fisher, an English-born tallow trader who acquired the Laguna Seca Rancho at auction in 1845. Fisher died five years later, and the land passed to his wife, Liberata Fisher née Ceseña. Following the Mexican-American War (1846-1848) and California statehood (1850), and as required under the federal Land Act of 1851, Fisher's heirs filed a claim with the Public Land Commission to validate their ownership of the Laguna Seca Rancho, which was confirmed by the federal government in 1865. By 1876, Fisher's heirs and successors-in-interest had subdivided the former Laguna Seca Rancho into more than 20 parcels ranging in size from 10 acres to upwards of 4,200 acres, many of which they had sold to a steady influx of migrant farmers.[2]

The southern Santa Clara Valley underwent a dramatic agricultural transformation during the early period of American settlement. While large landowners like the Fishers continued to graze cattle, wheat farming surpassed this practice along with sheep ranching, dairying, and general farming as the region's main agricultural endeavors by the 1860s. Owing to the easy cultivation and high fertility of the Santa Clara Valley soil, farmers realized high yields with little capital investment, contributing to the steady annual rise of acreage dedicated to wheat.[3] By 1880, wheat's popularity in the Santa Clara Valley succumbed to poor yields and low prices, begetting a profound shift toward the establishment of orchards and vineyards in the region.[4] In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. In addition to prunes, Santa Clara Valley farmers also planted other stone fruit orchards such as apricots, peaches, and cherries.[5] In addition to orchards, many farmers in the Santa Clara Valley planted grapes. In the early 1860s, José Maria Malaguerra developed one of the earliest vineyards in the county on a 211-acre tract along Coyote Creek on acreage previously contained in the Laguna Seca Rancho. Other early wineries in the Morgan Hill area included that of Joel W. Ransome, who planted French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes and built a no-longer-extant winery by the 1880s. Around this same time, the community of San Martin and its surrounding area developed into a regional center of viticulture, with multiple farms raising wine grapes and building small wineries and brandy distilleries. Occupying considerably less acreage than orchard crops, viticulture remained a common practice through the twentieth century, where in 1925 Italian immigrant Emilio Guglielmo established a still active vineyard and commercial winery in Morgan Hill.[6]

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill" (prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.

[2] Archives and Architecture, "County of Santa Clara Historic Context Statement," 33; Circa, "Historic Context Statement for the City of Morgan Hill," 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 11-12; Basin, "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR)," 5-9.

[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, "County of Santa Clara Historic Context Statement," 37, 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 12, 13.

[4] Archives and Architecture, "County of Santa Clara Historic Context Statement," 40-41, 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 14.

[5] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[6] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2; Herrmann Bros., *Official Map of the County of Santa Clara, California* (San Jose, California: Britton & Rey, 1890); Candace Reed, National Register of Historic Places Inventory—Nomination Form: Malaguerra Winery (NPS # 80000858) (prepared November 1977, listed October 1980), National Register Research Database; H. S. Foote, *Pen Pictures from the Garden of the World or Santa Clara County, Illustrated* (Chicago: The Lewis Publishing Company, 1888), 385-386; Guglielmo Winery, "History," https://guglielmowinery.com/history/ (accessed January 2023).

Expanded transportation networks and population centers emerged during the mid to late nineteenth century alongside and further drove agricultural development in the southern Santa Clara Valley. *El Camino Real* (mentioned above) was originally comprised of a north-southerly meandering dirt trail travelled by foot, horseback, and ox carts during the era of Spanish colonial settlement in the late eighteenth and early nineteenth centuries. In the 1850s, the Santa Clara County Board of Supervisors elected to incorporate the thoroughfare into the county road system, where it served as the primary link between San José and Gilroy. During this period, numerous settlements were established along this main transportation artery as way stations, where settlers constructed inns, stables, and blacksmith shops to serve the Butterfield Overland Mail Company—a national stagecoach company that operated in the valley in the late 1850s and early 1860s. These settlements were originally named for their distances from central San José, including Twelve Mile House at present-day Coyote, Fifteen Mile House at the no-longer-extant Perry Station, and Eighteen Mile House at the former community of Madrone (now incorporated into present-day Morgan Hill). Around this same time, the short-lived Santa Clara & Pajaro Valley Railroad Company (1868-1870) laid 30 miles of track between San José and Gilroy alongside the Monterey Road alignment before the company was fully absorbed into the Southern Pacific Railroad Company. As with the overland way stations, numerous train depots were established along the route, including those at Coyote, Madrone, and Gilroy, which further spurred regional development. In the early twentieth century, Monterey Road was incorporated into the U.S. 101 Bayshore Highway, with various businesses in the adjoining towns emerging to serve California's nascent automobile culture, such as stores, hotels, gas stations, and restaurants with "drive-thrus" and large parking lots. However, in the early 1980s, U.S. 101 was realigned and built as a freeway east of the historic route to bypass Coyote, Morgan Hill, San Martin, and Gilroy.[7]

In addition to expanded transportation networks, a variety of technological advances also drove the rise of regional horticulture. Fruit farming was boosted in the late 1860s with the simultaneous completion of the transcontinental railroad as well as the Santa Clara & Pajaro Valley Railroad (discussed above), which provided access to large eastern U.S. markets to Santa Clara Valley fruit farmers. With the development of ice-cooled refrigerated rail cars in the 1880s, fresh fruit shipments only furthered the popularity of the valley's orchard crops throughout the country, incentivizing higher production in the region. By 1890, this horticultural transition had spread to most parts of the Santa Clara Valley where irrigation water from streams or wells was available.[8] Advancements in irrigation technology also facilitated the development of intensive horticulture in the Santa Clara Valley.[9] Vertical turbine pumps came into popular usage on farms in the Santa Clara Valley around 1915 and had a profound effect on the valley as farmers no longer needed access to surface streams to irrigate their crops, thus facilitating an expansion of orchards and vineyards. Groundwater pumping emerged concurrent with the widespread electrification of the southern Santa Clara Valley, which began around the turn of the twentieth century. Beginning in 1911, the Santa Clara County Board of Supervisors awarded franchises to various companies to install and operate electrical systems along various public roads throughout the county. One such company, the Coast Counties Gas & Electric Company (CCG&E) provided electrical service to Gilroy, Morgan Hill, and the surrounding areas, as well as parts of San Benito and Santa Cruz counties. However, increased groundwater pumping subsequently caused a rapid and substantial drop in groundwater levels, leading to the creation of the Santa Clara Valley Water Conservation District (now Valley Water) in 1929 to restore the regional aquifer and to control groundwater levels. Other similar water districts formed in the valley in the following decades.[10]

[7] Basin Research Associates, "Cultural Resources Technical Report," 5-10; Derek Whaley, "Railroads: Southern Pacific Railroad Subsidiaries" (May 6, 2016), https://www.santacruztrains.com/2016/05/southern-pacific-railroad-subsidiaries.html (accessed January 2023); Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 307; Circa, "Historic Context Statement for the City of Morgan Hill," 38.

[8] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3; "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.

[10] Etcheverry, *Irrigation Practice and Engineering,* 179-191; Greene, *Pumping Machinery,* 44-46, 110-112; Lundy, "A History of the Deep Well Turbine Pump Industry," 1-3; Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of*

The change from grain cultivation to diversified horticulture with an emphasis on orcharding in the late nineteenth century also triggered changing land ownership patterns. The trend toward subdivision, begun on the former Laguna Seca Rancho in the 1860s, spread throughout the southern Santa Clara Valley as the emergence of highly profitable fruit crops prompted large ranch owners to subdivide their massive holdings and sell their land for small orchards plots encompassing between five and 50 acres, with 20-acre orchards generating sufficient income to support a single family.[11] Orchard fruit production continued to grow into the twentieth century and remained the dominant agricultural activity in the Santa Clara Valley. In the early twentieth century, prunes were the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post-World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District that ensured sufficient water for irrigation.[12] In the decades after World War II ended in 1945, orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, but Morgan Hill and the adjacent unincorporated area, owing to its distance from San José, retained its rural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the late 1970s, when high-tech firms began locating in the city and the California Department of Transportation realigned and expanded the U.S. 101 freeway, facilitating an easier commute to San José and transforming Morgan Hill into a bedroom community. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread north of Morgan Hill towards the vicinity of the Ogier Ponds, further altering the once rural and agricultural character of the area.[13]

The oldest built environment resource recorded on this form was constructed sometime between 1956 and 1963 on a tract comprising Lots 19, 20, and 21 of the Ogier Subdivision—an early twentieth-century subdivision of a portion of the Laguna Seca Rancho first subdivided via deed sometime in the 1860s. During this early period, prominent Santa Clara Valley landholder Daniel Murphy conveyed that acreage contained in the study parcel as a portion of a 1,000-acre property to fellow Irish-Canadian immigrant, Walter Fitzgerald, Sr., as payment for timber work performed in the mountains near Gilroy. By 1876, Walter Fitzgerald had subdivided the 1,000-acre tract, which was traversed by Coyote Creek, into four parcels, where his sons, Gregory, James, and John jointly ran agricultural operations (**Plate 1**). John Fitzgerald was assigned ownership of the 320-acre tract containing the present-day study parcel, where he established his no-longer-extant farmstead complex on

the County Archives of California: No. 44 – Santa Clara County (San Jose) (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143;

[11] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15; F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023).

[12] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.

[13] USGS, *Morgan Hill Quadrangle,* 15-minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1968, 1973, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.

the north side of Coyote Creek, outside the boundaries of the present-day study parcel. He retained possession of the property through 1900, with French-born dairy farmer Frank Labrucherie acquiring the tract by 1910.[14]

In 1914, Labrucherie conveyed the former Fitzgerald tract to John B. Ogier, a lifelong resident of Santa Clara County alternately listed as a general farmer, dairy farmer, and orchardist. That same year, Ogier subdivided the property into 21 lots ranging in size from about six acres to 54.5 acres (**Plate 2**). The subdivision additionally laid out Ogier and Barnhart avenues. Ogier's agent, James A. Clayton & Company—an influential real estate and development firm established in San Jose in 1867—initially sold off lots at $125 to $150 per acre, which were ultimately priced up to $300 per acre by 1916. Development was slow over the next two decades and largely confined to the west bank of the creek in those lots abutting Monterey Road (including the tract comprising Lots 19, 20, and 21, containing the present-day parcel recorded on this form). As depicted in topographical mapping, a farmstead was present in the general location of the complex recorded on this form by 1917 (**Plate 3**). As confirmed by later aerial photography, this complex included a no-longer-extant barn and outbuilding, with most of the parcel dedicated to prune orchards (**Plate 4**). By 1931, a residence outside the boundaries of the study parcel but contained within Ogier Subdivision lots 19, 20, and 21 was also present. The earliest identified owners of this tract containing present-day APNs 725-05-013, -014 (the study parcels), and -011 (recorded and evaluated on a separate DPR 523 form appended to the report cited in *P11) were Margaret and Innocenzio Battaglia, who had acquired the lots by 1927, over ten years before they conveyed a portion of their property to the State of California for the expansion of Monterey Road (then-U.S. 101). Italian immigrants based in San Jose, the Battaglias do not appear to have resided on the property but almost certainly leased it to an unidentified tenant farmer, who raised the no-longer-extant prune orchards mentioned above.[15]

[14] HistoricAerials.com, "550 Monterey Highway, Morgan Hill, CA" (1948 and 1953); F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; Thompson & West, *Historical Atlas Map of Santa Clara County, California* (San Francisco: Thompson & West, 1876), Map No. 7; Eugene T. Sawyer, *History of Santa Clara County, California, with Biographical Sketches* (Los Angeles: Historic Record Company, 1922), 586; U.S. Census Bureau, Manuscript Population Schedule: 1880, California, Santa Clara County, Burnett Township, Enumeration District No. 256, page 7C, accessed via Ancestry.com; Herrmann Brothers, *Official Map of the County of Santa Clara, California* (San Jose, California: Herrmann Bros., 1890); U.S. Census Bureau, Manuscript Agricultural Schedule: 1880, California, Santa Clara County, Burnett Township, Enumeration District No. 256, sheet 5A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1900, California, Santa Clara County, Burnett Township, Enumeration District No. 47, sheet 18 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, Burnett Township (part), Enumeration District No. 66, sheet 7 (Ancestry.com).

[15] Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," 1914, Santa Clara County Recorder; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023); Margaret Battaglia et vir to Coast Counties Gas & Electric Co., Standard Grant of Right-of-Way for Electric Transmission Line, August 22, 1927 (recorded September 2, 1927), 343 O.R. 278, Santa Clara County Clerk-Recorder's Office, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1930, California, Santa Clara County, San Jose Township (part), Robertsville Precinct, Enumeration District No. 43-83, sheet 15B (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1940, California, Santa Clara County, San Jose Township, Enumeration District No. 43-126, sheet 12A (Ancestry.com); Fairchild Aerial Surveys (FAS), Flight CIV-1940, Frame 343-2, 1:20,000, June 5, 1940, flown for U.S. Department of Agriculture – Agriculture Adjustment Administration (USDA-AAA), UCSB.

Plate 1. Excerpt of 1876 map of Santa Clara County with 1,000-acre Fitzgerald property outlined in red and tract containing present-day study parcel outlined within that boundary in green (at the top). Annotations by JRP. Note the no-longer-extant farmstead complex on the east side of Coyote Creek as depicted by a black square.[16]

Plate 2. Excerpt of 1914 map of Ogier Subdivision with boundaries of Battaglia property (Lots 19, 20, and 21) outlined in red and approximate boundaries of present-day APN 725-05-014 outlined within that boundary in green (at bottom). Annotation by JRP. Note that the property boundary calls to the center of the Coyote River.[17]

Plate 3. Excerpt of 1917 topographical map of Morgan Hill Quadrangle, with approximate contemporary parcel boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at right). Annotation by JRP. Note present farmstead complex in general location of study property. Also note that Barnhart Avenue only extends as far northeast from Monterey Road as the building complex.[18]

Plate 4. Excerpt of 1940 aerial photograph with approximate boundaries of Ogier Subdivision Lots 19, 20, and 21 outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at right). Annotation by JRP. Note the no-longer-extant residence sited along the west bank of Coyote Creek.[19]

Following Margaret Battalgia's death in 1944, Innocenzio Battaglia transferred ownership of that acreage containing the subject parcel by the early 1950s to his son, William I. Battaglia, and William's wife, Minnie, who retained possession of the property through 1970. Born and raised in Santa Clara County, William Battaglia owned and operated prune, apricot, and

[16] Thompson & West, *Historical Atlas Map of Santa Clara County, California* (San Francisco: Thompson & West, 1876), Map No. 7.
[17] Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," 1914, Santa Clara County Recorder.
[18] USGS, *Morgan Hill Quadrangle* (1917).
[19] FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB.

cherry orchards and packing facilities and a garlic-processing plant in San Jose and prune orchards and processing facilities in Yuba County in addition to the acreage containing the study parcel, where he raised and processed prunes as the Battaglia Packing Company. During William and Minnie Battaglia's tenure of ownership, they erected a no-longer-extant processing facility in the general location of Unit C (recorded on this form) in about 1951 as a prune-packing warehouse, where it stood until a fire in 1970 razed the complex. The Battaglias additionally built the double-wide warehouse (built sometime between 1956 and 1963 and expanded circa 1964), the Bungalow (built or moved onto the property from an unknown location circa 1964), and the shop building (also constructed circa 1964) (**Plate 5** and **Plate 6**). During this same period, sometime between 1956 and 1963, the residence on present-day APN 725-05-011 (recorded and evaluated on a separate DPR 523 form) was expanded out to its current irregular plan. Sometime between 1968 and 1980, the original components of the northeastern-most warehouse complex were developed (before it was ultimately expanded to its current configuration sometime between 1987 and 1998), and the extant Unit C warehouse was constructed at the location of the razed complex sometime between 1970 and 1977. By 1980, the prune orchards had been entirely removed from the property. These developments may have occurred under Battaglia or possibly Robert W. and Wilma M. Forward, who had acquired the property by 1974. Born in Canada, Robert Forward arrived in Santa Clara County with his family by 1920. Like his father, Forward established a dairy farm in the county, although he does not appear to have initiated any dairying operations on the study parcel but rather leased the acreage to Anthony Battaglia and Margaret Bersano née Battaglia, William and Minnie's son and daughter, by the end of the decade. By 1982, Battaglia, Bersano, and their respective spouses had taken ownership of the property, which was subdivided into its current configuration sometime between 1985 and 2000. The current occupants—Marra Bros. Distributing, Inc.; Mill-Wood Designs, LLC; Surplus Industrial Supply Company, Inc.; and A&A Granite Creations, Inc.—appear to have based their operations on the study parcel within the last seven years, and the current owner took possession of the property in 2017.[20]

[20] FindAGrave.com, "Margarita Enfantino Battaglia: Memorial ID 7453755" and "Innocenzio Battaglia: Memorial ID 7453754," accessed via Findagrave.com; William Battaglia and Minnie Battaglia, Lease to Kaiser Industries Corporation, August 20, 1964 (recorded May 4, 1966), 7369 O.R. 427, Santa Clara County Clerk-Recorder; "Sheriff's Sale: S.C.D. No.: 104072," *San Jose Mercury* (April 28, 1967): 64; U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township, Enumeration District No. 89, sheet 27B (Ancestry.com); "Large Orchard Changes Owners in $99,000 Deal," *San Jose Mercury Herald* (April 16, 1929): 11; "Jury to Decide if Garlic is Nuisance," *San Jose Evening News* (October 30, 1934): 1; "Time Sought in Prune Deal," *San Jose Mercury Herald* (September 25, 1937): 8; "State Sued in Flood Loss," *The San Jose News* (December 14, 1938): 4; "Million Dollar Subdivision for Curtner Avenue," *San Jose Evening News* (July 17, 1946): 1; USGS, *Morgan Hill Quadrangle*, 7.5-minute Series, 1:24,000 (Washington, D.C.: USGS, 1955); HistoricAerials.com, "550 Monterey Highway" (1956, 1980, 1982, and 1987); Cartwright Aerial Surveys (CAS), Flight CA-SCL, Frame SCL 1-56, 1:20,000, July 18, 1963, UCSB; CAS, Flight CAS-65-130, SCL 23-144, 1:12,000, May 27, 1965, flown for California Division of Highways, UCSB; CAS, Flight CAS-2310, Frame 2310-3-161, 1:12,000, May 6, 1968, UCSB; "Million-dollar Loss in Morgan Hill Fire," *San Jose Mercury* (February 11, 1970): 1; R. W. Forward, Wilma M. Forward, and Robert W. Forward, Grant Deed (Individual) to County of Santa Clara, June 10, 1974 (recorded July 24, 1974), B158 O.R. 12, Santa Clara County Clerk-Recorder; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Agnews Precinct, Enumeration District No. 183, sheet 1A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1950, California, Santa Clara County, Santa Clara, Enumeration District No. 43-174, sheet 1 (Ancestry.com); Robert W. Forward and Wilma Forward, Master Ground Lease to Margaret Bersano and Anthony Battaglia, January 13, 1977 (recorded November 26, 1977), 302 O.R. 627, Santa Clara County Clerk-Recorder; Edward F. Bersano and Margaret M. Bersano and Anthony Battaglia and Michael D. Battaglia, Grant Deed to Edward F. Bersano and Margaret M. Bersano and Anthony Battaglia and Michael D. Battaglia, September 28, 1982 (recorded October 7, 1982), H070 O.R. 231, Santa Clara County Recorder; Almaden Valley Engineers, "Record of Survey, being a Portion of Lots 19, 20, & 21 of the 'Map of the Ogier Subdivision in the Rancho la Laguna Seca,' recorded in Book 'O' of Maps, Pages 61 & 62, Records of Santa Clara County, California, for Anthony and Michael Battaglia," June 1985 (recorded March 21, 1986), Map Book 557, Page 36, Santa Clara County Recorder; "Exhibit B," appended to Edward F. Bersano, Margaret M. Bersano, Anthony Battaglia, and Michael D. Battaglia, Certificate of Compliance (Lot Line Adjustment), August 21, 2000 (recorded August 21, 2000), Document No. 15364281, Santa Clara County Recorder; California Secretary of State, "Marra Bros. Distr., Inc. (962188)," "Mill-Wood Designs, LLC (201736010140)," "Surplus Industrial Supply Company, Inc. (3336336)," and "A & A Granite Creations, Inc. (4083087," https://bizfileonline.sos.ca.gov/search/business (accessed January 2023); Santa Clara County Assessor, property information for APN 725-05-014, accessed via ParcelQuest.com.

Plate 5. Excerpt of 1955 topographical map of Morgan Hill Quadrangle, with approximate contemporary parcel boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at right). Annotation by JRP. Note the presence of a rectangular-plan warehouse at the general location of the northernmost building recorded on this form.[21]

Plate 6. Excerpt of 1968 aerial photograph with approximate Ogier Lot 19, 20, and 21 tract boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at right). Annotation by JRP.[22]

Evaluation

The industrial agricultural complex at 550 Monterey Road (APN 725-05-014) does not have important associations with significant historic events, patterns, or trends of development at the local, state, or national level (NRHP Criterion A / CRHR Criterion 1). The oldest extant built environment resources on the parcel date to the late 1950s or 1960s, when the property hosted prune orchards and industrial fruit-processing facilities under the Battaglia Packing Company—nearly a century after orchards were introduced to the Santa Clara Valley. Moreover, historical evidence does not indicate that the property recorded on this form distinguished itself from the many other small farms that emerged in the region in the early to mid-twentieth century for playing a specifically or demonstrably vital role in the development of the southern Santa Clara Valley economy, nor for playing a role in any significant innovations to horticultural methods or technologies. Therefore, the industrial agricultural parcel does not appear eligible for listing in either register under NRHP Criterion A or CRHR Criterion 1.

The subject parcel is not significant for an association with the lives of persons important to history (NRHP Criterion B / CRHR Criterion 2). While development on the parcel appears to date to the early twentieth century, the oldest built environment dates to the late 1950s or 1960s, during the property's ownership by industrial orchardist William Battaglia and his wife, Minnie Battaglia. While the Battaglias appear to have attained some success in the prune-packing industry, historical evidence does not indicate that they made significant contributions within their field of endeavor nor within their community during their period of direct association with the property. Similarly, the historical record does not indicate that Robert and Wilma Forward, who acquired ownership sometime in the 1970s during a subsequent period of development, made notable achievements within their respective fields of endeavor nor within their community during their period of association with the property recorded on this form. Thus, the subject parcel does not appear eligible for listing in either register under NRHP Criterion B or CRHR Criterion 2.

The buildings recorded on this form do not possess distinctive characteristics of a type, period, or method of construction, nor are they the important works of a master architect or builder and they do not possess high artistic values (NRHP Criterion C / CRHR Criterion 3). Collectively, this parcel is predominately occupied by utilitarian warehouse buildings. As such, these buildings represent a ubiquitous design type with typical features: rectangular plans; low roof pitches; and raised-seam metal

[21] USGS, *Morgan Hill* Quadrangle (1955).
[22] CAS, Flight CAS-2310 Frame 2310-3-161, 1968, UCSB.

roofing and composition sheet cladding. The design prioritized economy over architectural flourishes, does not exhibit high artistic qualities, and does not represent the work of a master architect or builder. The parcel contains a heavily modified Bungalow, constructed at an unknown date and likely moved to the site in the mid-1960s. In addition to its extensive alterations (discussed below), this building is an unremarkable example of Bungalow architecture—a style popular between the turn of the twentieth century and the 1930s. High style examples of this are referred to as Craftsman Bungalow. While the building features a low-pitched gable roof, open eaves, and an above-grade porch, it is a modest representation of the style. Therefore, the subject property is not eligible for listing in either register under NRHP Criterion C / CRHR Criterion 3.

The subject property is not eligible under NRHP Criterion D / CRHR Criterion 4 because it has neither yielded nor is likely to yield important information about historic construction materials or technologies that otherwise would not be available through documentary evidence. Also, the resource's land use, the layout of the extant built environment resources, and the relationship the buildings have with the surrounding landscape, are typical for agricultural properties of the period and do not appear to provide important information within the broader economic, social, and cultural setting of the region during its historic-period occupation. Potential archaeological resources on this parcel, if any, are not evaluated herein.

In addition to lacking significance under all NRHP and CRHR criteria, the subject property likewise has diminished integrity in several aspects. The complex recorded on this form has been steadily developed between the early twentieth century and the turn of the twenty-first century—a period encompassing the property's transition from a working orchard to a mixed-use industrial complex. As such, it has diminished integrity of setting and association as it is unable to coherently communicate any single period of development and it no longer functions as an agricultural processing facility. The prefabricated metal warehouse buildings retain generally integrity of design, materials, and workmanship; however, the Bungalow—which was likely moved onto the property from an unknown location—has been altered by the installation of non-original stucco cladding, vinyl and aluminum windows, and a replacement door, and therefore suffers diminished integrity of design, materials, workmanship, and location. Finally, the property has reduced integrity of feeling, as it cannot clearly communicate any historic period of development to the observer.

The property is not eligible for listing in the NRHP or CRHR because it lack significance under all criteria.

CONTINUATION SHEET

***Resource Name or #** (Assigned by recorder): MR # 4

***Recorded by**: S. Skow & A. Young ***Date**: February 15, 2023 ☒ Continuation ☐ Update

Site Map:

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________
HRI # ____________
Trinomial ____________
NRHP Status Code 6Z

Other Listings ____________
Review Code ________ Reviewer ____________ Date ________

***Resource Name or #** (Assigned by recorder) MR # 5

P1. Other Identifier: Segments of 230kV Moss Landing-Metcalf Nos. 1 and 2 and 115kV Metcalf-Morgan Hill Transmission Corridor

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Santa Clara

***b. USGS 7.5′ Quad** Morgan Hill **Date** 1955 (photorevised 1980) **T** ____; **R** ____; ¼ **of Sec** ___; Mount Diablo **B.M.**

c. Address N/A City _______ Zip ___________

d. UTM: Zone 10S; 613128.52mE/ 4119589.12mN (north endpoint) / 616787.63mE/ 4112918.35mN (south endpoint)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
This form records and evaluates segments of an electrical transmission corridor containing three high-voltage transmission lines that are owned and operated by the Pacific Gas & Electric Company (PG&E): the two-circuit, 115kV Metcalf-Morgan Hill; and the 230kV Moss Landing-Metcalf Nos. 1 and 2, which are carried on the same towers. Constructed at different times—1929 and the early 1950s—the three lines are recorded on a single form because they occupy a single transmission corridor spanning between the Metcalf transmission substation in Coyote to the north and a point within the northern outskirts of the city of Morgan Hill to the south, a route that traverses the Area of Potential Effects (APE) for the project cited in *P11. This transmission corridor was recorded at three locations: along Malech Road near the northern terminus at the Coyote substation, northwest of the APE; along Barnhart Avenue and where the lines traverse the APE near the Ogier Ponds; and from a point located southwest of the APE, where the lines cross Live Oak Avenue. With the exception of that segment contained within the APE, which occupies the Santa Clara County-owned Coyote Creek riparian zone, each transmission corridor segment was recorded from the public right-of-way on three Linear Feature Records. (See Continuation Sheet).

***P3b. Resource Attributes:** (List attributes and codes) HP11 – Engineering Structure; HP9 – Public Utility

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) **Photograph 1.** High-voltage transmission corridor containing 115kV Metcalf-Morgan Hill (right) and 230kV Moss Landing-Metcalf Nos. 1 and 2 (left) along Barnhart Avenue; camera facing southwest, February 15, 2023.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1929; 1950 (*Pacific Service Magazine*; *Electrical West*)

***P7. Owner and Address:**
Pacific Gas & Electric Company
77 Beale Street
San Francisco, CA 94105

***P8. Recorded by:** (Name, affiliation, address)
Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded:** February 15, 2023

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Historic Resources Report for the Anderson Dam Seismic Retrofit Conservation Measures Project – Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project, Santa Clara County, California," prepared for Valley Water, 2023.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☒ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record
☐ Other (list) ____________

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) MR # 5

B1. Historic Name: 110kV Newark-Salinas; 230kV Moss Landing-Sunol / 230kV Moss Landing-Newark

B2. Common Name: 115kV Metcalf-Morgan Hill; 230kV Moss Landing-Metcalf No. 1; 230kV Moss Landing-Metcalf No. 2

B3. Original Use: High voltage electrical transmission B4. Present Use: High voltage electrical transmission

***B5. Architectural Style:** Utilitarian infrastructure

***B6. Construction History:** (Construction date, alteration, and date of alterations) **115kV Metcalf-Morgan Hill:** built in 1929 as segment of double-circuit 110kV Newark-Salinas, rerouted to Metcalf Substation in 1955, replacement insulators installed at unknown date(s); **230kV Moss Landing-Metcalf Nos. 1 and 2:** built in 1950 as segment of single-circuit 230kV Moss Landing-Sunol, second circuit added and line rerouted / extended to Hayward in 1952, double-circuit line rerouted to Metcalf Substation in 1955, replacement insulators installed at unknown date(s).

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**

***B8. Related Features:** N/A

B9. Engineer and Builder: Pacific Gas &Electric Company (PG&E)

***B10. Significance: Theme**: N/A **Area**: N/A

Period of Significance: N/A **Property Type**: N/A **Applicable Criteria**: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The recorded segments of PG&E's high-voltage electrical transmission corridor containing the 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits do not meet the criteria for listing in the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR). These structures have been evaluated in accordance with Section 106 of the NHPA of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800), and Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. These structures are not historical resources under CEQA.

Historic Context

The oldest transmission line recorded on this form was constructed in the early twentieth century in the southern Santa Clara Valley, with a portion of its alignment traversing the present-day Ogier Ponds. (See Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

(Sketch Map with north arrow required.)

***B12. References:** Charles M. Coleman, *PG and E of California: The Centennial Story of Pacific Gas and Electric Company, 1852-1952* (New York: McGraw-Hill Cook Company, Inc., 1952); J. P. Jollyman, "The Trail of 'Pacific Service' through the Land of the Padres," *Pacific Service Magazine* 17, no. 7 (January 1929); PAR Environmental Services, Inc. (PAR), "The Lights Went On all at Once: The History of Electricity in California" (prepared for California Energy Commission, June 25, 2003), 12-14.

See Location Map and Sketch Maps on Continuation Sheets.

B13. Remarks:

***B14. Evaluator:** Samuel Skow

***Date of Evaluation:** February 2023

(This space reserved for official comments.)

***Resource Name or #** (Assigned by recorder) MR # 5

L1. Historic and/or Common Name: 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf transmission corridor

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:** MMH-MLM TC-1

***b. Location of point or segment:** UTM: Zone 10S, 613128.52mE / 4119589.12mN (north endpoint); 613509.92mE / 4119251.97mN (south endpoint).

See **Site Maps** on Continuation Sheets.

This segment of the 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission corridor spans approximately 0.3 mile, traveling northwest-southeast between two points that cross Malech Road near the Coyote Ridge Open Space Preserve on the east side of U.S. Highway 101 in southern Santa Clara County.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

In this recorded segment, the 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits traverse the Diablo Range foothills in a northwest-southeast direction on parallel vertical planes (**Photograph 2**). The three-phase high-voltage circuits are carried by lattice-steel, double-circuit suspension towers with suspension insulators mounted to cross arms dedicated to basic conductor carriage; the 115kV lines feature nine-disc replacement ceramic insulators, and the 230kV lines feature 15-disc replacement ceramic insulators (**Photograph 3** and **Photograph 4**). The L4. Dimensions below describe the transmission corridor. For a detailed description of 115kV and 230kV tower types and components, see P3a. Description on Continuation Sheet.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width:** 94.5 (approx.)
- **b. Bottom Width:** 121 feet (approx.)
- **c. Height or Depth:** 92-133 feet (approx.)
- **d. Length of Segment:** 0.3 miles (approx.)

L4e. Sketch of Cross-Section (include scale) **Facing:**

n/a

L5. Associated Resources: n/a

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

This transmission corridor traverses the grassy hillside of a stretch of the Diablo Range foothills between U.S. Highway 101 and the Coyote Ridge Open Space Preserve in southern Santa Clara County.

L8a. Photograph, Map, or Drawing.

L7. Integrity Considerations: Replacement ceramic spatial suspension insulators installed.

L8b. Description of Photo, Map, or Drawing: **Photograph 2**. 115kV (left) and 230kV (right) suspension towers from Malech Road; camera facing northwest, February 15, 2023.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)

Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: February 15, 2023

L8a. Photographs (continued):

Photograph 3. Detail view of 115kV Metcalf-Morgan Hill double-circuit tower top cage with replacement, nine-disc ceramic suspension insulators and Stockbridge dampers; camera facing southeast, February 15, 2023.

Photograph 4. Detail view of 230kV Moss Landing-Metcalf Nos. 1 and 2 tower top cage with replacement 15-disc ceramic suspension insulators; camera facing southeast, February 15, 2023.

 ***Resource Name or #** (Assigned by recorder) MR # 5

L1. Historic and/or Common Name: 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf transmission corridor

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:** MMH-MLM TC-2

***b. Location of point or segment:** UTM: Zone 10S, 616639.88mE / 4115767.17mN (northeast endpoint); 615562.38mE / 4114834.61mN (southwest endpoint).
See **Site Maps** on Continuation Sheets.
This segment of the 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission corridor spans approximately 0.9 mile, traveling northeast-southwest between two points that traverse the APE for the project cited in *P11, extending the length of Barnhart Avenue and crossing Monterey Road and the Caltrain (former Southern Pacific Railroad) tracks in an unincorporated part of southern Santa Clara County between the community of Coyote and the city of Morgan Hill.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
In this recorded segment, the 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits traverse the Ogier Ponds complex and extend the length of Barnhart Avenue crossing Monterey Road and the Caltrain alignment in a northeast-southwest direction on parallel vertical planes (**Photograph 5** and **Photograph 6**). The three-phase high-voltage circuits are carried by lattice-steel, double-circuit towers, including suspension towers with suspension insulators dedicated to basic conductor carriage, and dead-end towers with double dead-end insulators positioned to facilitate angled directional changes in the transmission route (**Photograph 7**). The lines all feature replacement ceramic insulators, with nine-disc suspension insulators and 12-disc double dead-end insulators installed along the 115kV lines and 15-disc suspension insulators and 24-disc double dead-end insulators installed along the 230kV lines. The L4. Dimensions below describe the transmission corridor. For a detailed description of 115kV and 230kV tower types and components, see P3a. Description on Continuation Sheet.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width:** 70 feet (approx.)
- **b. Bottom Width:** 90 feet (approx.)
- **c. Height or Depth:** 92-133 feet (approx.)
- **d. Length of Segment:** 0.90 mile (approx.)

L4e. Sketch of Cross-Section (include scale) **Facing:**

n/a

L5. Associated Resources: n/a

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
This transmission corridor traverses the Ogier Ponds complex contained within the Coyote Creek riparian corridor before extending down Barnhart Avenue and crossing Monterey Road and the Caltrain alignment, which are surrounded orchards, pasturelands, and other agricultural complexes in southern Santa Clara County.

L7. Integrity Considerations: Replacement ceramic spatial suspension and double dead-end insulators installed throughout, and cellular reception equipment installed on one 230kV tower.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 5. 115kV (left) and 230kV (right) suspension towers from northeast terminus of Barnhart Avenue; camera facing northeast, February 15, 2023.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: February 15, 2023

L8a. Photographs (continued):

Photograph 6. 115kV (right) and 230kV (left) suspension towers from northeast terminus of Barnhart Avenue; camera facing southwest, February 15, 2023.

Photograph 7. Detail view of 115kV Metcalf-Morgan Hill double-circuit tower top cage with replacement, 12-disc ceramic double dead-end insulators; camera facing southwest, February 15, 2023.

*Resource Name or # (Assigned by recorder) MR # 5

L1. Historic and/or Common Name: 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf transmission corridor

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:** MMH-MLM TC-2

***b. Location of point or segment:** UTM: Zone 10S 615438.20mE / 4114500.01mN (north endpoint); 616787.63mE / 4112918.35mN (south endpoint).

See **Site Maps** on Continuation Sheets

This segment of the 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission corridor spans approximately 1.30 miles, traveling northwest-southeast between two points that extend from just northwest of Miramonte Avenue to a point northeast of Hale Avenue between Madrone and Tilton avenues in the city of Morgan Hill in southern Santa Clara County.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

In this recorded segment, the 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits traverse agricultural parcels in a northwest-southeast direction on parallel vertical planes (**Photograph 8** and **Photograph 9**). The three-phase high-voltage circuits are carried by lattice-steel, double-circuit towers, including suspension towers with suspension insulators dedicated to basic conductor carriage, and dead-end towers with double dead-end insulators positioned to facilitate angled directional changes in the transmission route. The lines all feature replacement ceramic insulators, with nine-disc suspension insulators and 12-disc double dead-end insulators installed along the 115kV lines and 15-disc suspension insulators and 24-disc double dead-end insulators installed along the 230kV lines. The L4. Dimensions below describe the transmission corridor. For a detailed description of 115kV and 230kV tower types and components, see P3a. Description on Continuation Sheet.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width:** 72 feet (approx.)
b. **Bottom Width:** 106 feet (approx.)
c. **Height or Depth:** 92-133 feet (approx.)
d. **Length of Segment:** 1.30 miles (approx.)

L4e. Sketch of Cross-Section (include scale) **Facing:**

n/a

L8a. Photograph, Map, or Drawing.

L5. Associated Resources: n/a

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

This transmission corridor traverses agricultural parcels in an unincorporated part of the southern Santa Clara Valley as well as a part of northern Morgan Hill.

L7. Integrity Considerations: Replacement ceramic spatial suspension insulators installed.

L8b. Description of Photo, Map, or Drawing:

Photograph 8: 115kV (right) and 230kV (left) suspension towers from Live Oak Avenue; camera facing northwest, February 15, 2023.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)

Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

L11. Date: February 15, 2023

L8a. Photographs (continued):

Photograph 9. 115kV (left) and 230kV (right) suspension towers from Live Oak Avenue; camera facing southeast, February 15, 2023.

P3a. Description (continued):

The 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits are all linkages in PG&E's high-voltage transmission network. The circuits are recorded on a single form herein because they traverse a single transmission corridor through the southern Santa Clara Valley—including that area containing the APE for the project cited in *P11—for about six miles at each of their northern termini.

The Metcalf-Morgan Hill transmission circuit originates at the Metcalf substation in the unincorporated community of Coyote just outside the southern boundaries of the city of San Jose in the southern Santa Clara Valley. From this northern terminus, the circuit travels approximately nine miles in a southeasterly direction, traversing the Diablo Range foothills, the Ogier Ponds complex within the Coyote Creek riparian corridor, and southern Santa Clara Valley agricultural lands before terminating at the Morgan Hill substation in the city of Morgan Hill. This form records segments of the circuit cumulatively spanning roughly six miles between where the line traverses Malech Road near the Metcalf substation at the north end to a point in the northern outskirts of Morgan Hill at the south.

Running adjacent to the Metcalf-Morgan Hill line for about the last six miles of its span are the Moss Landing-Metcalf Nos. 1 and 2 transmission circuits, which both originate at the Moss Landing Power Plant in northwestern Monterey County off the coast of Monterey Bay. From this southern terminus, the high-voltage circuits are carried roughly 28 miles in a northerly direction, traversing the Santa Cruz Mountains before joining the Metcalf-Morgan Hill alignment in the northern outskirts of Morgan Hill, where both lines extend north to the Metcalf substation, discussed above. This form records that approximately six-mile span where the two lines share a transmission corridor.

See **Location Map** and **Sketch Maps** on Continuation Sheets for subject circuit alignments and recorded segments.

All three transmission circuits addressed on this form are three-phase circuits comprised of single replacement aluminum conductor steel-supported (ACSS) cables. Stockbridge dampers—small, weighted balances—are present at multiple locations within the recorded segment of the Metcalf-Morgan Hill line to mitigate against wind-induced vibrations (**Photograph 3**). The principal tower type used to carry the subject circuits in the segments recorded on this form are 115kV and 230kV double-circuit suspension towers, with the higher voltage circuits carried on proportionally larger towers. Designed for basic conductor carriage along straightaways, these lattice-steel towers feature square bases with all four sides of the tower body tapering toward the top cage, where six lattice-steel cross arms extend from both sides. Attached to the ends of the cross arms are string-type suspension insulators with suspension clamps for conductor carriage on parallel vertical planes. Each tower likewise features concrete stub footings. A variation of this ubiquitous tower type is the double-circuit dead-end tower, which features heavier construction and reinforced double dead-end insulators to compensate for increased conductor strain as the alignment traverses large spans (such as over major roadways, water bodies, and ravines) and when the alignment changes course by more than a few degrees (**Photograph 7**). These dead-end towers follow the same general design criteria as the suspension towers described above: lattice-steel, pyramidal bases with top cages and side-mounted cross arms, and concrete stub footings. Their primary differences lie in their structural reinforcement, as indicated by their insulators. The double dead-end towers recorded in the study segments have three pairs of double dead-end insulators per circuit, with each conductor anchored by two designated dead-end insulators. Each dead-end insulator comprises two conjoined strings of original porcelain or replacement ceramic discs.

B10. Significance (continued):

The earliest Euro-American settlements in the vicinity of the structures recorded herein occurred in the 1830s, when the Mexican government granted to Juan Alvires the 20,052-acre *Rancho Refugio de la Laguna Seca* (Laguna Seca Rancho) and the 8,927-acre *Rancho Ojo de Agua de la Coche* to Juan Maria Hernandez the following year. As with most other Mexican-era rancho grant holders, Alvires raised cattle on his land, but he also cultivated wheat, operated a flourmill, and resided in a no-longer-extant adobe house built along the bank of Coyote Creek.[1] The rancho period's pastoral way of life continued into

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill"

the early 1850s, as Anglo Americans and other non-Latino settlers began to arrive in the area, including William Fisher, an English-born tallow trader who acquired the Laguna Seca Rancho at auction in 1845. Fisher died five years later, and the land passed to his wife, Liberata Fisher née Ceseña. Following the Mexican-American War (1846-1848) and California statehood (1850), and as required under the federal Land Act of 1851, Fisher's heirs filed a claim with the Public Land Commission to validate their ownership of the Laguna Seca Rancho, which was confirmed by the federal government in 1865. By 1876, Fisher's heirs and successors-in-interest had subdivided the former Laguna Seca Rancho into more than 20 parcels ranging in size from 10 acres to upwards of 4,200 acres, many of which they had sold to a steady influx of migrant farmers.[2]

The southern Santa Clara Valley underwent a dramatic agricultural transformation during the early period of American settlement. While large landowners like the Fishers continued to graze cattle, wheat farming surpassed this practice along with sheep ranching, dairying, and general farming as the region's main agricultural endeavors by the 1860s. Owing to the easy cultivation and high fertility of the Santa Clara Valley soil, farmers realized high yields with little capital investment, contributing to the steady annual rise of acreage dedicated to wheat.[3] By 1880, wheat's popularity in the Santa Clara Valley succumbed to poor yields and low prices, begetting a profound shift toward the establishment of orchards and vineyards in the region.[4] In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the first successful commercial orchard crop. In addition to prunes, Santa Clara Valley farmers also planted other stone fruit orchards such as apricots, peaches, and cherries.[5] In addition to orchards, many farmers in the Santa Clara Valley planted grapes. In the early 1860s, José Maria Malaguerra developed one of the earliest vineyards in the county on a 211-acre tract along Coyote Creek on acreage previously contained in the Laguna Seca Rancho. Other early wineries in the Morgan Hill area included that of Joel W. Ransome, who planted French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes and built a no-longer-extant winery by the 1880s. Around this same time, the community of San Martin and its surrounding area developed into a regional center of viticulture, with multiple farms raising wine grapes and building small wineries and brandy distilleries. Occupying considerably less acreage than orchard crops, viticulture remained a common practice through the twentieth century, where in 1925 Italian immigrant Emilio Guglielmo established a still active vineyard and commercial winery in Morgan Hill.[6]

Expanded transportation networks and population centers emerged during the mid to late nineteenth century alongside and further drove agricultural development in the southern Santa Clara Valley. *El Camino Real* was originally comprised of a north-southerly meandering dirt trail travelled by foot, horseback, and ox carts during the era of Spanish colonial settlement in the late eighteenth and early nineteenth centuries. In the 1850s, the Santa Clara County Board of Supervisors elected to

(prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.

[2] Archives and Architecture, "County of Santa Clara Historic Context Statement," 33; Circa, "Historic Context Statement for the City of Morgan Hill," 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 11-12; Basin, "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR)," 5-9.

[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, "County of Santa Clara Historic Context Statement," 37, 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 12, 13.

[4] Archives and Architecture, "County of Santa Clara Historic Context Statement," 40-41, 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 14.

[5] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[6] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2; Herrmann Bros., *Official Map of the County of Santa Clara, California* (San Jose, California: Britton & Rey, 1890); Candace Reed, National Register of Historic Places Inventory—Nomination Form: Malaguerra Winery (NPS # 80000858) (prepared November 1977, listed October 1980), National Register Research Database; H. S. Foote, *Pen Pictures from the Garden of the World or Santa Clara County, Illustrated* (Chicago: The Lewis Publishing Company, 1888), 385-386; Guglielmo Winery, "History," https://guglielmowinery.com/history/ (accessed January 2023).

incorporate the thoroughfare into the county road system, where it served as the primary link between San José and Gilroy. During this period, numerous settlements were established along this main transportation artery as way stations, where settlers constructed inns, stables, and blacksmith shops to serve the Butterfield Overland Mail Company—a national stagecoach company that operated in the valley in the late 1850s and early 1860s. These settlements were originally named for their distances from central San José, including Twelve Mile House at present-day Coyote, Fifteen Mile House at the no-longer-extant Perry Station, and Eighteen Mile House at the former community of Madrone (now incorporated into present-day Morgan Hill). Around this same time, the short-lived Santa Clara & Pajaro Valley Railroad Company (1868-1870) laid 30 miles of track between San José and Gilroy alongside the Monterey Road alignment before the company was fully absorbed into the Southern Pacific Railroad Company. As with the overland way stations, numerous train depots were established along the route, including those at Coyote, Madrone, and Gilroy, which further spurred regional development. In the early twentieth century, Monterey Road was incorporated into the U.S. 101 Bayshore Highway, with various businesses in the adjoining towns emerging to serve California's nascent automobile culture, such as stores, hotels, gas stations, and restaurants with "drive-thrus" and large parking lots. However, in the early 1980s, U.S. 101 was realigned and built as a freeway east of the historic route to bypass Coyote, Morgan Hill, San Martin, and Gilroy.[7]

In addition to expanded transportation networks, a variety of technological advances also drove the rise of regional horticulture. Fruit farming was boosted in the late 1860s with the simultaneous completion of the transcontinental railroad as well as the Santa Clara & Pajaro Valley Railroad / Southern Pacific Railroad, which provided access to large eastern U.S. markets to Santa Clara Valley fruit farmers. With the development of ice-cooled refrigerated rail cars in the 1880s, fresh fruit shipments only furthered the popularity of the valley's orchard crops throughout the country, incentivizing higher production in the region. By 1890, this horticultural transition had spread to most parts of the Santa Clara Valley where irrigation water from streams or wells was available.[8] Advancements in irrigation technology also facilitated the development of intensive horticulture in the Santa Clara Valley.[9] Vertical turbine pumps came into popular usage on farms in the Santa Clara Valley around 1915 and had a profound effect on the valley as farmers no longer needed access to surface streams to irrigate their crops, thus facilitating an expansion of orchards and vineyards. Groundwater pumping emerged concurrent with the widespread electrification of the southern Santa Clara Valley, which began around the turn of the twentieth century (discussed below). However, increased groundwater pumping subsequently caused a rapid and substantial drop in groundwater levels, leading to the creation of the Santa Clara Valley Water Conservation District (now Valley Water) in 1929 to restore the regional aquifer and to control groundwater levels. Other similar water districts formed in the valley in the following decades.[10]

The change from grain cultivation to diversified horticulture with an emphasis on orcharding in the late nineteenth century also triggered changing land ownership patterns. The trend toward subdivision, begun on the former Laguna Seca Rancho in

[7] Basin Research Associates, "Cultural Resources Technical Report," 5-10; Derek Whaley, "Railroads: Southern Pacific Railroad Subsidiaries" (May 6, 2016), https://www.santacruztrains.com/2016/05/southern-pacific-railroad-subsidiaries.html (accessed January 2023); Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 307; Circa, "Historic Context Statement for the City of Morgan Hill," 38.
[8] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.
[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3; "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.
[10] Etcheverry, *Irrigation Practice and Engineering,* 179-191; Greene, *Pumping Machinery,* 44-46, 110-112; Lundy, "A History of the Deep Well Turbine Pump Industry," 1-3; Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of the County Archives of California: No. 44 – Santa Clara County (San Jose)* (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143;

the 1860s, spread throughout the southern Santa Clara Valley as the emergence of highly profitable fruit crops prompted large ranch owners to subdivide their massive holdings and sell their land for small orchards plots encompassing between five and 50 acres, with 20-acre orchards generating sufficient income to support a single family.[11] Orchard fruit production continued to grow into the twentieth century and remained the dominant agricultural activity in the Santa Clara Valley. In the early twentieth century, prunes were the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post-World War II era, aided by the groundwater development projects of the Santa Clara Valley Water District that ensured sufficient water for irrigation.[12] In the decades after World War II ended in 1945, orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, but Morgan Hill and the adjacent unincorporated area, owing to its distance from San José, retained its rural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the late 1970s, when high-tech firms began locating in the city and the California Department of Transportation realigned and expanded the U.S. 101 freeway, facilitating an easier commute to San José and transforming Morgan Hill into a bedroom community. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread north of Morgan Hill towards the vicinity of the Ogier Ponds, further altering the once rural and agricultural character of the area.[13]

110kV Newark-Salinas Transmission Line (present-day 115kV Metcalf-Morgan Hill Circuit)

In the late 1920s, PG&E constructed the double-circuit, 110,000-volt (110kV) Newark-Salinas transmission line, predecessor to the 115kV Metcalf-Morgan Hill circuit recorded on this form. While the city of San Jose's urban center enjoyed gas street lighting as early as 1860 followed by electric streetlights in the early 1880s, the predominately agrarian southern Santa Clara Valley did not receive electrification until the turn of the twentieth century, when a growing number of orchardists began using electric pumps to extract groundwater for irrigation. Beginning in 1911, the Santa Clara County Board of Supervisors awarded franchises to various companies to install and operate electrical systems along the various public roads throughout the county. One such company, the Coast Counties Gas & Electric Company (CCG&E)—a consolidation of various electrical production, transmission, and distribution companies—provided electrical service to Gilroy, Morgan Hill, and the surrounding areas as well as Hollister and San Juan in San Benito County and Santa Cruz and Watsonville in Santa Cruz County beginning in 1912 (**Plate 1**). In addition to its hydroelectric and steam facilities in Santa Cruz County, CCG&E also purchased hydroelectric power from PG&E for distribution throughout its service area, where it had established substations in Gilroy and Morgan Hill by 1920, with 900 and 225-kilowatt (kW) capacities, respectively. From here, the company distributed power across single-circuit 22kV pole lines to roughly 5,600 customers in the region, including rural consumers who not only used the power for

[11] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15; F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023).
[12] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.
[13] USGS, *Morgan Hill Quadrangle,* 15-minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1968, 1973, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.

industrial agriculture but increasingly on indoor lighting and a growing roster of domestic appliances. PG&E ultimately acquired CCG&E, its holdings, and its service area in 1954, growing its customer base by some 47,000 consumers.[14]

Plate 1. 1912 Map of Territory Served by the Coast Counties Gas & Electric Company, with approximate location of APE circled in red. Annotation by JRP. Note the presence of a no-longer-extant substation at Madrone.[15]

During the 1920s, PG&E implemented a transformative campaign of utilities acquisition, systems expansion, and transmission standardization throughout the northern and central parts of California. Included among the many utilities, infrastructure, and service areas acquired during this period was the Coast Valleys Gas & Electric Company and its holdings (not to be confused with CCG&E, discussed above). Organized in 1912 as a consolidation of several older utilities in Monterey and San Benito counties, the Coast Valleys Company provided gas and electric service to the towns of Salinas, Monterey, and King City, in addition to farming communities in the unincorporated parts of both counties. PG&E took possession of the utility, along with the Sierra and San Francisco Power Company based in Stanislaus and Tuolumne counties, when it acquired H. M. Byllesby & Company in 1927. As early as 1924, PG&E engineers had already begun planning a two-circuit, approximately 70-mile, 110kV transmission line carried by steel towers through a private right-of-way between the company's central distribution point at Newark to new substation facilities in Salinas, where power would be further distributed south to Monterey and Carmel via 22- and 11kV lines and to Soledad and King City via 60kV lines. The project called for 45 miles of new tower construction between Newark and Gilroy and rebuilt lines from Gilroy to Salinas. As planned and ultimately constructed, the alignment extended south from Newark along the east side of Monterey Road and the Southern Pacific Railroad (now Caltrain) before crossing both thoroughfares along Barnhart Avenue (in the APE for the project cited in *P11) and continuing south along the west side of the transportation corridor, where the line again crossed the highway to the east side of Gilroy before turning southwest toward Salinas (**Plate 2** and **Plate 3**). In addition to erecting transmission circuits, PG&E also augmented the

[14] Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of the County Archives of California: No. 44 – Santa Clara County (San Jose)* (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174.
[15] "Territory Served by Coast Counties Gas & Electric Company [map]," printed in "Coast Counties Gas and Electric Company," *Journal of Electricity Power and Gas* 29, no. 7 (August 17, 1912): 132.

Newark substation facilities and constructed an entirely new outdoor substation adjacent to the existing one at Morgan Hill, then owned and operated by CCG&E. The Morgan Hill facility was outfitted with self-cooling, 30,000kW transformers and supplied power to CCG&E at the older substation, which was then distributed throughout the southern Santa Clara Valley service area.[16]

Construction of the Newark and Morgan Hill substations and the 110kV line between them was completed by January 1929. As constructed, the transmission route traversed the Santa Clara Valley's network of orchards, and—according to PG&E Chief Engineer J. P. Jollyman—"[Fruit] trees of unusual height were found which required towers of extra height to give additional clearance from the line wires to ground. In this valuable orchard country, the towers are carefully located with reference to the fruit trees so as to obstruct cultivation as little as possible." Jollyman additionally noted that, in the immediate vicinity of the APE, "[In] addition to the State Highway, the coast line of the Southern Pacific Railroad had to be crossed as well as our own double-circuit 60,000-volt line, also important telegraph and telephone lines," referring to electrical distribution and telecommunications infrastructure that run parallel along both sides of Monterey Road.[17] While noting various obstacles, PG&E used standard design and construction methodologies with the development of the 110kV Newark-Salinas line in 1929. PG&E had been transmitting at that voltage throughout its system since 1913, when it constructed the Drum-Cordelia line that extends from the Drum Powerhouse in Placer County to the Cordelia Substation in Fairfield, Solano County. In the intervening years, the company had dramatically expanded its service area, incorporated tens of thousands of miles of distribution and transmission lines standardized at 60kV and 110kV, respectively, and revolutionized the system by developing hydroelectric plants along the Pit River in Shasta County, where 220kV transmission lines extended south to the Central Valley and the San Francisco Bay Area, serving over 300 cities and towns throughout northern California. Between Newark and Salinas, the twin, three-phase circuits were carried on parallel vertical planes, suspended from string insulators mounted to a steel lattice suspension tower with pyramidal base, concrete footings, top cage, and cross arms (**Plate 4**). To accommodate angles in the route—including where the line crossed Monterey Road and the Southern Pacific Railroad—special reinforced towers were designed with enlarged concrete footings to handle the increased conductor tension (**Plate 5**). The Newark-Salinas line remained virtually unaltered until the mid-1950s, when it was rerouted through PG&E's newly constructed Metcalf substation—one of several features of the company's massive statewide expansion in the mid-twentieth century (discussed below).[18]

[16] Charles M. Coleman, *PG and E of California: The Centennial Story of Pacific Gas and Electric Company, 1852-1952* (New York: McGraw-Hill Cook Company, Inc., 1952), 281-282; "The Year's Progress in the Department of Engineering," *Pacific Service Magazine* 16, no. 2 (October 1924): 11; J. P. Jollyman, "'Pacific Service' in New Territory—Our Newark-Salinas Tower Line," *Pacific Service Magazine* 17, no. 3 (January 1928): 84-87; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143; James F. Pollard, " 'Pacific Service' and the Farmer—Rubber Culture in Salinas Valley," *Pacific Service Magazine* 17, no. 6 (October 1928): 190-191; U.S. Army Corps of Engineers, Morgan Hill Quadrangle, 15-minute series, 1:62,500 (Washington, D.C.: U.S. Army, 1939); Pacific Gas and Electric Company (PG&E), *Gas and Electric Transmission System and Territory Served by Pacific Gas and Electric Co.* (San Francisco: PG&E, 1939); J. P. Jollyman, "The Trail of 'Pacific Service' through the Land of the Padres," *Pacific Service Magazine* 17, no. 7 (January 1929): 210-213.
[17] Jollyman, "The Trail of 'Pacific Service' through the Land of the Padres," 212.
[18] PAR Environmental Services, Inc. (PAR), "The Lights Went On all at Once: The History of Electricity in California" (prepared for California Energy Commission, June 25, 2003), 12-14; "Pacific Service is Furnished to Over 1,009,500 Consumers of Gas, Electricity, Water, Steam," *Pacific Service Magazine* 17, no. 9 (July 1929): 297; Walter Dryer, "Tower Footing Tests: Validate Design," *Electrical World* 93, no. 20 (May 18, 1929): 967.

Plate 2. 1928 map of the proposed 110kV Newark-Salinas transmission circuit, with approximate location of segment contained in APE circled in red. Annotation by JRP.[19]

Plate 3. Excerpt of 1939 topographical map of Morgan Hill Quadrangle, with approximate location of where the present-day 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits traverse the APE circled in red. Annotation by JRP. Note the presence of a single, 110kV transmission circuit in the alignment of the study properties.[20]

[19] Map published in Jollyman, "'Pacific Service' in New Territory," (1928): 84.
[20] U.S. Army Corps of Engineers, *Morgan Hill Quadrangle*, 15-minute series, 1:62,500 (Washington, D.C.: U.S. Army, 1939).

Plate 4. Published photograph of 110kV Newark-Salinas transmission line "crossing orchard region near Evergreen," San Jose, ca. 1929.[21]

Plate 5. Published photograph of "B.H.O. tower near Madrone … used for moderate angles," ca. 1929. This tower is located west of and adjacent to the SPRR, just outside the APE.[22]

230kV Moss Landing-Sunol Transmission Circuit (present-day 230kV Moss Landing-Metcalf Nos. 1 and 2)

PG&E constructed the 230kV Moss Landing-Sunol transmission circuit—predecessor to present-day 230kV Moss Landing-Metcalf No. 1—parallel to the 110kV Newark-Salinas line in 1950 as part of a general systemwide expansion to meet surging demand in its growing service area during the mid-twentieth century. In the decades after World War II ended in 1945, large power companies like PG&E entered a period of almost ceaseless construction to meet an annually growing need. By 1959, the output of power production in the United States was fourteen times what it had been in 1920, and more than 60 percent of the increase had occurred in the decade between 1949 and 1959. In 1960, experts forecasted the demand for power to increase another 2.7 times by 1980. The major sources for new generation at that time were undeveloped hydropower sites and thermal projects, both conventional steam and nuclear. Conventional steam ultimately became the predominant method of generating substantial quantities of new power in California in the postwar period.[23]

To meet the postwar demand for power in the burgeoning San Francisco Bay Area and central California, PG&E initiated an $800 million expansion program for new facilities to be constructed between 1946 and 1951. The construction program added

[21] Photographer unknown, published in Jollyman, "The Trail of 'Pacific Service' through the Land of the Padres" (1929): 212.
[22] Photographer unknown, published in Jollyman, "The Trail of 'Pacific Service' through the Land of the Padres" (1929): 212.
[23] Frank L. Weaver, "Power Development in the United States," *Civil Engineering* (September 1960): 70.

eleven powerhouses to the existing system, including two conventional steam plants employing new technology that dramatically increased output over older steam plants and hydroelectric facilities. The first operational power plant in PG&E's major steam-power expansion program was the Moss Landing Steam Plant, comprised of three units each with a 100,000kW generating capacity, the first of which went online in April 1950. Among the various plants constructed during this period, the 660,000kW Pittsburg Steam Station, built in 1954, was at the time the largest outdoor plant in the western United States. Californians' demand for power was unremitting. Once the first postwar building program was complete, PG&E, along with other utilities throughout the state, continued to develop plans for more generation. The company invested ever greater funds into thermal power, which featured greater production potential and faster, easier facility construction. As PG&E improved thermal technology and boosted its power-generating capacity, northern California grew progressively less reliant on hydroelectric power generated from within the state.[24]

The postwar growth in power-generating facilities throughout California required an equally augmented transmission system. With construction of the extra-high voltage (EHV) 500kV Pacific Northwest-Pacific Southwest Intertie over a decade away, the earliest phase of PG&E's enhanced electrical network involved the development of new 230kV transmission lines—the highest voltage then transmitted by PG&E and most other energy providers—new substation facilities, and technological upgrades to preexisting ones throughout its ever-expanding service area.[25] During this period of growth, the California power system, which included non-PG&E utilities, expanded overall, from 741 230kV circuit miles in 1940, to a network of 5,607 230kV circuit miles and 1,025 500kV circuit miles in 1968.[26]

An early element of this expanded transmission system was the 230kV Moss Landing-Sunol line. Included among 320 transmission miles constructed in 1950—the year that the Moss Landing steam-power plant first became operational—the Moss Landing-Sunol line was one of two high-voltage lines transmitting power from Moss Landing to other parts of PG&E's service area in northern and central California, the other one being the 67-mile Moss Landing-Panoche line that terminated at the Panoche Substation in Fresno County. As originally constructed, the Moss Landing-Sunol alignment extended roughly 62 miles northeasterly from Moss Landing along the Monterey Coast, over the Santa Cruz Mountains, and to the northern outskirts of Morgan Hill where it joined the preexisting Newark-Salinas corridor, discussed above (**Plate 6**). From here, the line ran parallel to the 110kV line adjacent to the Monterey Highway / Southern Pacific Railroad corridor northwesterly to the general vicinity of the Metcalf Substation site (constructed five years later) before splitting from the route and extending northerly to the Sunol substation in central Alameda County. This original line consisted of a single, three-phase circuit transported on a vertical plane by double-circuit metal lattice suspension towers with concrete footings, pyramidal bases, elongated top cages, and cross arms with string insulators. Two years later, an additional 230kV three-phase circuit was added to the alignment, which was rerouted through the Newark Substation, extended northwest to Hayward, and tapped into the 230kV Moraga-San Mateo No. 1 and 2 lines, then under construction. These and other transmission construction, extension, and realignment projects were all undertaken to integrate the Pittsburg Steam Plant into the PG&E system at large. In 1955, the line was again rerouted slightly, along with the 110kV Newark-Salinas line (discussed above), to deliver power to the newly constructed Metcalf Substation in Coyote. Constructed as a fully automated, minimally staffed facility, the Metcalf Substation also introduced 230kV power to the southern Santa Clara Valley for the first time. Aside from the installation of replacement ceramic string-type insulators and—on at least one tower recorded in the span—the installation of cellular reception

[24] Coleman, *PG and E of California*, 331-335; PAR, "The Lights Went On all at Once," 31-32; "Another 100-Mw. Steam Unit for PG and E," *Electrical West* 105, no. 3 (September 1950): 74-75.
[25] The Pacific Northwest-Pacific Southwest Intertie (Pacific Intertie) was the seminal transregional extra high-voltage (EHV) alternating-current and high-voltage direct-current transmission network spanning between the hydroelectric facilities on the Columbia River in northern Oregon and the massive population centers of southern California. It was planned, built, owned, operated, and maintained by federal agencies, local municipal utilities, and private investor-owned utilities and forms the foundation of the modern Western U.S. Power System. For more information on the Pacific Intertie, see: JRP Historical Consulting, LLC, "Resource ID: 1778 – Segments of the Pacific Northwest-Pacific Southwest Intertie DPR 523 Form" (2018), appended to ICF, "California High-Speed Rail San Jose to Merced: Historic Architectural Survey Report" (2019).
[26] PAR, "The Lights Went On all at Once," 32-33; "Huge Expansion Program to Triple Electric System," *PG&E Progress* 40, no. 4 (April 1963).

equipment, the 110kV Newark-Salinas line (present-day 115kV Metcalf-Morgan Hill) and the 230kV Moss Landing-Newark line (present-day 230kV Moss Landing-Metcalf Nos. 1 and 2) generally remain in their 1955 alignments.[27]

Plate 6. Excerpt of **1955** topographical map of Morgan Hill Quadrangle, with approximate location of where the present-day 115kV Metcalf-Morgan Hill and 230kV Moss Landing-Metcalf Nos. 1 and 2 transmission circuits traverse the APE circled in red. Annotation by JRP.[28]

Evaluation

Infrastructure, including high-voltage electrical transmission lines, supports the growth and functioning of communities, and often the formation of communities would not be possible without the associated infrastructure. However, this inherent importance does not indicate that all infrastructure is historically significant. Rather, infrastructure must be considered within the context of its development and by comparison to other infrastructure of its type to properly evaluate its historic significance. Significant infrastructure is often that which meets new engineering challenges, is innovative in design, or opens new patterns of development.

With this in mind, neither the Metcalf-Morgan Hill nor the Moss Landing-Metcalf Nos. 1 and 2 transmission lines are associated with significant developments in the transmission and utilization of hydroelectric or thermal power (NRHP Criterion A or CRHR Criterion 1). Originally constructed to transmit power beyond the southern Santa Clara Valley service area, these circuits—constructed in 1929 and 1950—nonetheless delivered power to this region via the Morgan Hill substation,

[27] "Pacific Gas and Electric: Transmission," *Electrical West* 106, no. 2 (February 1951): 87; "Pacific Gas and Electric: Transmission," *Electrical West* 104, no. 2 (February 1950): 63; "Decision No. 47143, Application No. 33182 (May 13, 1952)," *Decisions of the Public Utilities Commission of the State of California: Vol. 51, July 24, 1951, to August 5, 1952* (San Francisco: California Public Utilities Commission, 1953), 704-705; "New Power Outlet is Hooked Up," *San Jose Mercury* (July 27, 1955): 14.
[28] U.S. Geological Survey, *Morgan Hill Quadrangle*, 7.5-minute series, 1:24,000 (Washington, D.C.: USGS, 1955).

which was then delivered by CCG&E to customers such as farmers who used electric pumps to extract groundwater for irrigation. However, the area was an active agricultural region prior to the introduction of electricity. Use of electrical power in the agricultural industry was a common feature of industrial farming throughout the American West by the time electrical power was first introduced to southern Santa Clara Valley farmsteads. The construction of these transmission lines in the early to mid-twentieth century did not impact in any significant ways the development of electrical companies and networks in California or the region. The service area and customer pool were comparably small compared to those in San Francisco Bay Area cities nearby, and the extension of electrical lines through Santa Clara Valley agricultural districts was commonplace by the early twentieth century. The augmentation of the system in the early 1950s was part of PG&E's much larger statewide expansion program, principally aimed at greater power generation for increasing customer pools in established population centers and emerging residential suburban enclaves. The extension of high-voltage electricity to the region was a byproduct of this expansion, but it was by no means its principal aim.

The Metcalf-Morgan Hill and Moss Landing-Metcalf Nos. 1 and 2 transmission lines were all constructed by PG&E, but they do not appear to have any special association with known significant persons within that organization. Designed, built, maintained, and operated by company employees, research did not identified any person significant in local, state, or national history that has a special association with these transmission lines that would warrant eligibility under this criterion. Furthermore, it is highly unlikely given the nature of this resource that an individual, if identified, would have gained importance in their profession for his/her/their association with activities or contributions related to this particular resource (NRHP Criterion B or CRHR Criterion 2).

Nor are the Metcalf-Morgan Hill and Moss Landing-Metcalf No. 1 and 2 transmission lines significant examples of a type, period, or method of construction, nor are they the important works of master architects or builders and they do not possess high artistic values (NRHP Criterion C or CRHR Criterion 3). At the times of their construction, these lines operated at well-established PG&E currents, trailing developments in other areas of the system. When PG&E constructed the original line between Newark and Salinas in 1929, significant achievements had already been made in transmission line engineering exceeding the distance and current of the 110kV line constructed that year. When the line between Moss Landing and Sunol was added to the alignment in 1950, it transmitted at 230kV—the highest voltage then transmitted by PG&E and an engineering milestone originally met nearly 30 years prior. While PG&E employed significant engineers within its staff, research did not indicate that a significant engineer designed the transmission lines, nor would these structures be considered among the important works of such a master.

The transmission lines recorded on this form are not eligible under NRHP Criterion D / CRHR Criterion 4 because they have neither yielded nor are likely to yield important information about historic construction materials or technologies that otherwise would not be available through documentary evidence. Also, the resources' land use, the layout of the extant built environment resources, and the relationship the structures have with the surrounding landscape, are typical for transmission lines of the period and do not appear to provide important information within the broader economic, social, and cultural setting of the region during its historic-period occupation.

While the transmission lines recorded on this form lack significance under all criteria, they nonetheless retain generally good integrity to the historic period. In terms of location, the lines have been altered somewhat by their rerouting through the Metcalf substation in 1955, although those segments contained within the roughly six-mile transmission corridor recorded on this form remain in the historic right-of-way established by PG&E in the mid-to-late 1920s. The integrity of the setting of the lines has been diminished somewhat by the construction of additional transmission infrastructure in close proximity, particularly in and around the Metcalf and Morgan Hill substations, in addition to the residential development of former agricultural lands; however, this does not prevent an observer from understanding the line. Although replacement ceramic string-type insulators have been installed throughout the recorded segments of both lines, they nonetheless retain high degrees of integrity of design, materials, and workmanship. The lines continue to transmit high-voltage electricity for distribution throughout the southern Santa Clara Valley service area and the greater San Francisco Bay Area, thus retaining good integrity of association. Finally, the lines retain good integrity of feeling—the most subjective of integrity considerations—in that they retain the ability to convey to an observer the era in which they were built. However, because the lines lack historic significance under all criteria, they are nonetheless not eligible for listing in the NRHP or CRHR.

Resource Name or # (Assigned by recorder) MR # 5

***Recorded by** S. Skow & A. Young *Date February 15, 2023

☒ Continuation ☐ Update

Location and Vicinity Map:

***Recorded by** S. Skow & A. Young *Date February 15, 2023 ☒ Continuation ☐ Update

Sketch Map:

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings ______________________
Review Code ________ **Reviewer** ______________________ **Date** ________

 ***Resource Name or #** (Assigned by recorder): MR # 6

P1. Other Identifier: U-Pick Cherries: Ranch # 5

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County**: Santa Clara County
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5′ Quad**: Morgan Hill, CA **Date**: 1955 (photorevised 1980) **T**:__; **R**:__; **Sec**:___; Mount Diablo Meridian

c. Address: 550 Monterey Road City: Morgan Hill Zip: 95037

d. UTM: (give more than one for large and/or linear resources) Zone: _____; ____________mE/ ____________mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor Parcel Number (APN): 725-04-002

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This form records a 103.97-acre parcel located on the east side of Monterey Road between the community of Coyote and the city of Morgan Hill in an unincorporated part of rural Santa Clara County. Most of the acreage is dedicated to cherry orchards with a small building complex in the northernmost corner and promotional roadside signage at the westernmost corner along Monterey Road (**Photograph 1**) (see **Site Map** on Continuation Sheet). The complex is accessed via dirt driveway extending southeast from Barnhart Avenue, which frames the northwest boundary. The complex consists of a residential building, a large barn, at least one metal shipping container, and several ancillary buildings and structures not visible from the public rights-of-way on Barnhart Avenue and Monterey Road. (See Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP33 – Farm/ranch

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Westernmost corner of APN 725-04-002; camera facing southeast, February 15, 2023.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
Pre-1917 (U.S. Geological Survey)

***P7. Owner and Address:**
Christopher J. Borello & Mary E. Borello, et al (Trustees)
8900 Marcella Ave
Gilroy, CA 95020

***P8. Recorded by:** (Name, affiliation, address)
Samuel Skow & Andrew Young
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded**: February 15, 2023

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC, "Historic Resources Report for the Anderson Dam Seismic Retrofit Conservation Measures Project – Conservation Measure 1: Ogier Ponds Geomorphic and Habitat Restoration Project, Santa Clara County, California," prepared for Valley Water, 2023.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list)

***NRHP Status Code**: 6Z
***Resource Name or #** (Assigned by recorder): MR # 6

B1. Historic Name: Fitzgerald Ranch; Rodeck Ranch
B2. Common Name: U-Pick Ranch # 5
B3. Original Use: Agricultural B4. Present Use: Agricultural
***B5. Architectural Style**: National Folk; Utilitarian
***B6. Construction History**: (Construction date, alteration, and date of alterations) **Residence:** built pre-1917, asphalt-shingle roofing, replacement lapboard siding, aluminum-frame sliding windows, and plywood window surrounds added at unknown date; **Outbuilding (Barn):** built sometime between 1980-1982; **Misc. Outbuildings / Storage Containers:** built / moved onto parcel beginning ca. 2018 up to present.
***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**
***B8. Related Features:** _________
B9. Architect: unknown b. Builder: unknown
***B10. Significance: Theme**: N/A **Area**: N/A
Period of Significance: N/A **Property Type**: N/A **Applicable Criteria**: N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The subject property does not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). This property has been evaluated in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800) as well as Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This property is not a historical resource under CEQA.

Historic Context

The oldest built environment resource recorded on this form was constructed in the late nineteenth century to early twentieth century along Coyote Creek in the southern Santa Clara Valley near the present-day Ogier Ponds. (See Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References**: "Tribute to the Late S. G. Rodeck," *Petaluma Argus* (November 25, 1925): 10; U.S. Geological Survey (USGS), *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1917); "309 Acres Sell for $631,000," *San Jose Mercury* (December 31, 1961): 59.

B13. Remarks:

***B14. Evaluator**: Samuel Skow
***Date of Evaluation**: February 2023

(This space reserved for official comments.)

P3a. Description (continued):

Encompassing roughly 1,300 square feet, the National Folk residence has a generally square footprint with a pop-out mudroom on the northeast side, front-gable roof with modern asphalt composition shingles, and replacement horizontal lapboard siding (**Photograph 2**). At least two windows are replacement aluminum-frame, horizontal sliders with modern plywood surrounds. Much of the building's northwest side was obscured by cherry trees and trailers, with all other sides completely obscured from the public rights-of-way on Barnhart Avenue and Monterey Road.

Immediately northeast of and adjacent to the residence is a two-story, approximately 2,500-square-foot barn with a rectangular footprint, open shed-roof lean-to on the northwest side, front-gable roof clad with corrugated-metal sheets, and corrugated-metal siding throughout (**Photograph 3**).

To the rear (southeast) of the residence and barn are an assortment of buildings, storage containers, and potentially other structures that were constructed and/or moved onto the property within the last five years.

B10. Significance (continued):

The earliest Euro-American settlements in the vicinity of the Ogier Ponds Project occurred in the 1830s, when the Mexican government granted to Juan Alvires the 20,052-acre *Rancho Refugio de la Laguna Seca* (Laguna Seca Rancho) and the 8,927-acre *Rancho Ojo de Agua de la Coche* to Juan Maria Hernandez the following year. As with most other Mexican-era rancho grant holders, Alvires raised cattle on his land, but he also cultivated wheat, operated a flourmill, and resided in a no-longer-extant adobe house built along the bank of Coyote Creek.[1] The rancho period's pastoral way of life continued into the early 1850s, as Anglo Americans and other non-Latino settlers began to arrive in the area, including William Fisher, an English-born tallow trader who acquired the Laguna Seca Rancho at auction in 1845. Fisher died five years later, and the land passed to his wife, Liberata Fisher née Ceseña. Following the Mexican-American War (1846-1848) and California statehood (1850), and as required under the federal Land Act of 1851, Fisher's heirs filed a claim with the Public Land Commission to validate their ownership of the Laguna Seca Rancho, which was confirmed by the federal government in 1865. By 1876, Fisher's heirs and successors-in-interest had subdivided the former Laguna Seca Rancho into more than 20 parcels ranging in size from 10 acres to upwards of 4,200 acres, many of which they had sold to a steady influx of migrant farmers.[2]

The southern Santa Clara Valley underwent a dramatic agricultural transformation during the early period of American settlement. While large landowners like the Fishers continued to graze cattle, wheat farming surpassed this practice along with sheep ranching, dairying, and general farming as the region's main agricultural endeavors by the 1860s. Owing to the easy cultivation and high fertility of the Santa Clara Valley soil, farmers realized high yields with little capital investment, contributing to the steady annual rise of acreage dedicated to wheat.[3] By 1880, wheat's popularity in the Santa Clara Valley succumbed to poor yields and low prices, begetting a profound shift toward the establishment of orchards and vineyards in the region.[4] In this early period of horticulture and viticulture in the Santa Clara Valley, French Prune orchards ascended as the

[1] Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement" (prepared for the County of Santa Clara, December 2004, revised February 2012), 33; Circa: Historic Property Development, "Historic Context Statement for the City of Morgan Hill" (prepared for City of Morgan Hill, October 2006), 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County" (March 31, 2003), 11-12; Basin Research Associates, Inc., "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR), Coyote Valley Specific Plan (CVSP), Including Bailey Over the Hill Initial Study (with McKean Road Corridor), City of San Jose and Unincorporated Santa Clara County, California" (prepared for David J. Powers & Associates, February 2006), 5-9.
[2] Archives and Architecture, "County of Santa Clara Historic Context Statement," 33; Circa, "Historic Context Statement for the City of Morgan Hill," 24-26; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 11-12; Basin, "Cultural Resources Technical Report in Support of the Environmental Impact Report (EIR)," 5-9.
[3] Stephen Payne, *Santa Clara County: Harvest of Change* (Northridge, CA: Windsor Publications, 1987), 69-72; Archives and Architecture, "County of Santa Clara Historic Context Statement," 37, 38, 42; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 12, 13.
[4] Archives and Architecture, "County of Santa Clara Historic Context Statement," 40-41, 60; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 14.

first successful commercial orchard crop. In addition to prunes, Santa Clara Valley farmers also planted other stone fruit orchards such as apricots, peaches, and cherries.[5] In addition to orchards, many farmers in the Santa Clara Valley planted grapes. In the early 1860s, José Maria Malaguerra developed one of the earliest vineyards in the county on a 211-acre tract along Coyote Creek on acreage previously contained in the Laguna Seca Rancho. Other early wineries in the Morgan Hill area included that of Joel W. Ransome, who planted French Prunes, Zinfandel wine grapes, raisin grapes, and table grapes and built a no-longer-extant winery by the 1880s. Around this same time, the community of San Martin and its surrounding area developed into a regional center of viticulture, with multiple farms raising wine grapes and building small wineries and brandy distilleries. Occupying considerably less acreage than orchard crops, viticulture remained a common practice through the twentieth century, where in 1925 Italian immigrant Emilio Guglielmo established a still active vineyard and commercial winery in Morgan Hill.[6]

Expanded transportation networks and population centers emerged during the mid to late nineteenth century alongside and further drove agricultural development in the southern Santa Clara Valley. *El Camino Real* (mentioned above) was originally comprised of a north-southerly meandering dirt trail travelled by foot, horseback, and ox carts during the era of Spanish colonial settlement in the late eighteenth and early nineteenth centuries. In the 1850s, the Santa Clara County Board of Supervisors elected to incorporate the thoroughfare into the county road system, where it served as the primary link between San José and Gilroy. During this period, numerous settlements were established along this main transportation artery as way stations, where settlers constructed inns, stables, and blacksmith shops to serve the Butterfield Overland Mail Company—a national stagecoach company that operated in the valley in the late 1850s and early 1860s. These settlements were originally named for their distances from central San José, including Twelve Mile House at present-day Coyote, Fifteen Mile House at the no-longer-extant Perry Station, and Eighteen Mile House at the former community of Madrone (now incorporated into present-day Morgan Hill). Around this same time, the short-lived Santa Clara & Pajaro Valley Railroad Company (1868-1870) laid 30 miles of track between San José and Gilroy alongside the Monterey Road alignment before the company was fully absorbed into the Southern Pacific Railroad Company. As with the overland way stations, numerous train depots were established along the route, including those at Coyote, Madrone, and Gilroy, which further spurred regional development. In the early twentieth century, Monterey Road was incorporated into the U.S. 101 Bayshore Highway, with various businesses in the adjoining towns emerging to serve California's nascent automobile culture, such as stores, hotels, gas stations, and restaurants with "drive-thrus" and large parking lots. However, in the early 1980s, U.S. 101 was realigned and built as a freeway east of the historic route to bypass Coyote, Morgan Hill, San Martin, and Gilroy.[7]

In addition to expanded transportation networks, a variety of technological advances also drove the rise of regional horticulture. Fruit farming was boosted in the late 1860s with the simultaneous completion of the transcontinental railroad as well as the Santa Clara & Pajaro Valley Railroad (discussed above), which provided access to large eastern U.S. markets to Santa Clara Valley fruit farmers. With the development of ice-cooled refrigerated rail cars in the 1880s, fresh fruit shipments only furthered the popularity of the valley's orchard crops throughout the country, incentivizing higher production in the region. By 1890, this horticultural transition had spread to most parts of the Santa Clara Valley where irrigation water from streams or wells

[5] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.
[6] Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15, 16, 18, 19; Santa Clara County, Department of Agriculture, "Annual Crop Report," 1955, 2; Herrmann Bros., *Official Map of the County of Santa Clara, California* (San Jose, California: Britton & Rey, 1890); Candace Reed, National Register of Historic Places Inventory—Nomination Form: Malaguerra Winery (NPS # 80000858) (prepared November 1977, listed October 1980), National Register Research Database; H. S. Foote, *Pen Pictures from the Garden of the World or Santa Clara County, Illustrated* (Chicago: The Lewis Publishing Company, 1888), 385-386; Guglielmo Winery, "History," https://guglielmowinery.com/history/ (accessed January 2023).
[7] Basin Research Associates, "Cultural Resources Technical Report," 5-10; Derek Whaley, "Railroads: Southern Pacific Railroad Subsidiaries" (May 6, 2016), https://www.santacruztrains.com/2016/05/southern-pacific-railroad-subsidiaries.html (accessed January 2023); Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 307; Circa, "Historic Context Statement for the City of Morgan Hill," 38.

was available.[8] Advancements in irrigation technology also facilitated the development of intensive horticulture in the Santa Clara Valley.[9] Vertical turbine pumps came into popular usage on farms in the Santa Clara Valley around 1915 and had a profound effect on the valley as farmers no longer needed access to surface streams to irrigate their crops, thus facilitating an expansion of orchards and vineyards. Groundwater pumping emerged concurrent with the widespread electrification of the southern Santa Clara Valley, which began around the turn of the twentieth century. Beginning in 1911, the Santa Clara County Board of Supervisors awarded franchises to various companies to install and operate electrical systems along various public roads throughout the county. One such company, the Coast Counties Gas & Electric Company (CCG&E) provided electrical service to Gilroy, Morgan Hill, and the surrounding areas, as well as parts of San Benito and Santa Cruz counties. However, increased groundwater pumping subsequently caused a rapid and substantial drop in groundwater levels, leading to the creation of the Santa Clara Valley Water Conservation District (now Valley Water) in 1929 to restore the regional aquifer and to control groundwater levels. Other similar water districts formed in the valley in the following decades.[10]

The change from grain cultivation to diversified horticulture with an emphasis on orcharding in the late nineteenth century also triggered changing land ownership patterns. The trend toward subdivision, begun on the former Laguna Seca Rancho in the 1860s, spread throughout the southern Santa Clara Valley as the emergence of highly profitable fruit crops prompted large ranch owners to subdivide their massive holdings and sell their land for small orchards plots encompassing between five and 50 acres, with 20-acre orchards generating sufficient income to support a single family.[11] Orchard fruit production continued to grow into the twentieth century and remained the dominant agricultural activity in the Santa Clara Valley. In the early twentieth century, prunes were the most popular tree crop followed in order by apricots, peaches, cherries, grapes, and walnuts. Acreage devoted to orchard crops peaked in 1929 at 171,330 acres. Horticulture remained the principal agricultural industry in the Santa Clara Valley until the post-World War II era, aided by the groundwater development projects of the Santa Clara

[8] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15.

[9] B.A. Etcheverry, *Irrigation Practice and Engineering, Vol. 1* (New York: McGraw-Hill, 1915), 179-191; Arthur M. Greene, Jr., *Pumping Machinery* (New York: John Wiley & Sons, 1911), 44-46, 110-112; Everett W. Lundy, "A History of the Deep Well Turbine Pump Industry," January 1968, 1-3; "Irrigation Machinery and Appliances at Albuquerque Conference," *The Rural Californian*, September 1895, 461.

[10] Etcheverry, *Irrigation Practice and Engineering,* 179-191; Greene, *Pumping Machinery,* 44-46, 110-112; Lundy, "A History of the Deep Well Turbine Pump Industry," 1-3; Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Co., 1922), 221; The Historical Records Survey Division of Professional and Service Projects, Works Progress Administration, *Inventory of the County Archives of California: No. 44 – Santa Clara County (San Jose)* (San Francisco: Historical Records Survey, April 1939), 10; Frederick Hall Fowler, *Hydroelectric Power Systems of California and their Extensions into Oregon and Nevada: Water Supply Paper 493* (Washington, D.C.: Government Printing Office, 1923), 428, 433, 435; "Power Company Histories: Pacific Gas and Electric," *Electrical West: 75th Anniversary Issue* (1962): 174; J. P. Jollyman, "Extensions at Newark Substation to Accommodate New Power Supply," *Pacific Service Magazine* 18, no. 5 (July 1931): 142-143;

[11] Payne, *Santa Clara County: Harvest of Change*, 78; Circa, "Historic Context Statement for the City of Morgan Hill," 52, 53; Dill Design Group, "Santa Clara County Heritage Resource Inventory Update, South County," 15; F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1870, California, Santa Clara County, Township of San Jose, page 26 (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township (part), Enumeration District No. 85, sheet 26A (Ancestry.com); Polk-Husted Directory Co., *Polk-Husted Directory Co's San Jose and Santa Clara City Directory 1916* (Sacramento: Polk-Husted Directory Co., 1916), 181; U.S. Census Bureau, Manuscript Population Schedule: 1920, California, Santa Clara County, Burnett Township, Enumeration District No. 121, sheet 4A (Ancestry.com); R. L. Polk & Co., *Polk's Directory of San Jose City and Santa Clara County 1926* (San Francisco: R. L. Polk & Co., 1926), 755; JRP Historical Consulting, LLC, "VTA's BART Silicon Valley—Phase II Extension Project: Finding of Effect for Architectural Resources" (prepared for Santa Clara Valley Transportation Authority and the Federal Transit Administration, October 2017), 4-19; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (December 28, 1914): 6; "Ogier Subdivision [advertisement]," *San Jose Mercury Herald* (May 7, 1916): 6; USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023).

Valley Water District that ensured sufficient water for irrigation.[12] In the decades after World War II ended in 1945, orchard acreage in the northern Santa Clara Valley succumbed to residential, commercial, and industrial development, but Morgan Hill and the adjacent unincorporated area, owing to its distance from San José, retained its rural character for a longer period. Agriculture continued to be the backbone of the Morgan Hill area economy until the late 1970s, when high-tech firms began locating in the city and the California Department of Transportation realigned and expanded the U.S. 101 freeway, facilitating an easier commute to San José and transforming Morgan Hill into a bedroom community. This triggered construction of large residential subdivisions east and north of Morgan Hill and the annexation of these areas into the city. In recent decades, and continuing today, relatively dense residential development has spread north of Morgan Hill towards the vicinity of the Ogier Ponds, further altering the once rural and agricultural character of the area.[13]

Aerial photography confirms that the residence recorded on this from was present in 1940, with topographical mapping showing the presence of a small farmstead at the location in 1917. Earlier mapping indicates the presence of built environment in the location of the study parcel as early as 1876 on acreage historically contained within a tract subdivided via deed from the Laguna Seca Rancho sometime in the 1860s (**Plate 1**). However, the present study cannot confirm whether any built environment resources from the nineteenth century remain extant on the parcel recorded on this form. During this early period, prominent Santa Clara Valley landholder Daniel Murphy conveyed the acreage contained in the study parcel as a portion of a 1,000-acre property to fellow Irish-Canadian immigrant, Walter Fitzgerald, Sr., as payment for timber work performed in the mountains near Gilroy. By 1876, Walter Fitzgerald had subdivided the 1,000-acre tract, which was traversed by Coyote Creek, into four parcels, where his Canadian-born sons, Gregory, James, and John jointly ran agricultural operations. Here, the three brothers collectively raised 160 acres of wheat, 120 acres of barley, one-half acre of Irish potatoes, and 20 apple trees, in addition to dairy cows, hens, and pigs in 1879. Gregory Fitzgerald was assigned ownership of the roughly 310-acre tract containing the present-day study parcel, where he established his farmstead complex south of Coyote Creek in the general vicinity of the extant residence (**Plate 2** and **Plate 3**). He retained possession of the property until 1898 when he lost it in a mortgage foreclosure suit with the Bank of San Jose. Gregory Fitzgerald died five years later.[14]

Following the foreclosure, the tract containing the subject parcel appears to have changed hands somewhat regularly in the first few decades of the twentieth century. By 1914, Ellsworth G. Sharon, a Wisconsin-born carpenter based in San Jose, had acquired ownership, although he does not appear to have retained the property for long as he was recorded living in San Diego County by 1920. By 1924, the property was owned by Samuel G. Rodeck, an orchardist based in Campbell who hailed from Sonoma County. That year, Rodeck sold the property to Campbell-based real estate firm, Kennedy & Farley, which owned the Rodeck Ranch through 1926. The following year, San Francisco capitalists J. C. Berendsen and Bert Boyd each acquired an undivided one-half interest in the land, which they leased to tenant farmer Frank Miller. In 1930, orchardist Frank J. Polak purchased the property from Berendsen (alternately "Berrensen") for $150,000. That year, the property reportedly contained 72 acres planted in apricot trees and 102 acres planted in prune trees, with the remaining acreage comprised of empty pasture lands. The property also included two pumping plants, an unspecified number of outbuildings, and an eight-room residence.

[12] Payne, *Santa Clara County: Harvest of Change*, 78, 79; Circa, "Historic Context Statement for the City of Morgan Hill," 51-54, 70; Archives and Architecture, LLC, "County of Santa Clara Historic Context Statement," 40-41.

[13] USGS, *Morgan Hill Quadrangle,* 15-minute, 1:62,500 (Washington: USGS, 1940); USGS, *Mount Sizer Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1971); USGS, *Morgan Hill Quadrangle,* 7.5 minute, 1:24,000 (Washington: USGS, 1955, 1968, 1973, 1980); Circa, "Historic Context Statement for the City of Morgan Hill," 36-38.

[14] U.S. Geological Survey (USGS), *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1917); USGS, *Morgan Hill Quadrangle*, 1:62,5000 (Washington, D.C.: USGS, 1931); Fairchild Aerial Surveys (FAS), Flight CIV-1940, Frame 343-2, 1:20,000, June 5, 1940, flown for U.S. Department of Agriculture – Agriculture Adjustment Administration (USDA-AAA), available at https://mil.library.ucsb.edu/ap_indexes/FrameFinder/ (UCSB; accessed January 2023); Thompson & West, *Historical Atlas Map of Santa Clara County, California* (San Francisco: Thompson & West, 1876), Map No. 7; Eugene T. Sawyer, *History of Santa Clara County, California, with Biographical Sketches* (Los Angeles: Historic Record Company, 1922), 586; U.S. Census Bureau, Manuscript Population Schedule: 1880, California, Santa Clara County, Burnett Township, Enumeration District No. 256, page 7C, accessed via Ancestry.com; Herrmann Brothers, *Official Map of the County of Santa Clara, California* (San Jose, California: Herrmann Bros., 1890); U.S. Census Bureau, Manuscript Agricultural Schedule: 1880, California, Santa Clara County, Burnett Township, Enumeration District No. 256, sheet 5A (Ancestry.com); "About the Courts: W. Fitzgerald's Estate: A Hundred Thousand," *San Jose Daily Herald* (June 30, 1888): 3; "Mortgage Foreclosure," *San Jose Daily Mercury* (April 9, 1898): 7; "Died," *San Jose Daily Mercury* (December 3, 1903): 10.

The orchards were reportedly planted in 1918, presumably by Rodeck (but possibly by Sharon), who may have also constructed the outbuildings and pumping plants sometime earlier. Born and raised in San José, Frank Polak lived on the working orchard property with his wife Grace and daughter Frances. Polak served with the Santa Clara County Farm Bureau and the Santa Clara County unit of the California Apricot Growers' Union in the 1940s, in addition to the Tri-County Water Authority (serving Santa Clara, San Benito, Santa Cruz, and parts of Monterey counties) and the Santa Clara Valley Water Conservation District in the 1950s until his death in 1960. In addition to his horticultural work, Polak additionally received a permit from Santa Clara County in 1954 to establish sand and gravel quarry operations on his property near the banks of Coyote Creek where Ogier Pond No. 1 and the Borrow Pit Reclamation Ponds are currently located.[15]

As noted above, the residence recorded on this form was constructed sometime before 1917 (**Plate 4**). As recorded that year, the farmstead complex was accessible from Monterey Road via a no-longer-extant perpendicular dirt road running parallel to Barnhart Avenue; the original driveway was removed by 1931, and the study complex has been accessible via Barnhart Avenue up to the present (**Plate 5**). In 1938, the tract containing the study property was planted in prune trees along the westernmost edge abutting the highway, and one of the two pumphouses was recorded in the expanded Monterey Highway alignment. By 1940, most of the property was planted in orchards, which, in addition to prune trees, also included apricot and walnut trees; the residence recorded on this form appears to be the only extant building from this period (**Plate 6** and **Plate 7)**.[16]

Plate 1. Excerpt of 1876 map of Santa Clara County with 1,000-acre Fitzgerald property outlined in red and tract containing present-day study parcel outlined within that boundary in green (center). Annotations by JRP. Note the farmstead complex as depicted by a black square in the general vicinity of the extant study property.[17]

[15] F. A. Herrmann, "Map of the Ogier Subdivision in the Rancho La Laguna Seca," September 1914 (recorded October 2, 1914), Map Book "O," page 61, Santa Clara County Recorder, San Jose, California; U.S. Census Bureau, Manuscript Population Schedule: 1910, California, Santa Clara County, San Jose Township, Enumeration District No. 95, sheet 5A (Ancestry.com); U.S. Census Bureau, Manuscript Population Schedule: 1920, California, San Diego County, West Fallbrook Precinct, Enumeration District No. 220, sheet 4A (Ancestry.com); "Big Realty Deal Made, Campbell," *San Jose Mercury Herald* (July 6, 1924): 26; "Tribute to the Late S. G. Rodeck," *Petaluma Argus* (November 25, 1925): 10; "Largest Farm Land Deal of Year Closed," *San Jose Evening News* (April 12, 1930): 1; "Morgan Hill Pupils See Fertilizer Study," *San Jose Mercury Herald* (October 20, 1929): 4; McMillan & McMillan, *Official Map of Santa Clara County, California* (San Francisco: Walkup Map Co., 1929); U.S. Census Bureau, Manuscript Population Schedule: 1930, California, Santa Clara County, Burnett Township, Enumeration District No. 43-3, sheets 1A – 16B (Ancestry.com); California Department of Transportation, "Right-of-Way Record Map No. R-504.10," rev. March 1991, available at https://caltrans.maps.arcgis.com/apps/webappviewer/ (accessed January 2023); "Ranch Sold," *Oakland Tribune* (April 14, 1930): 2D; U.S. Census Bureau, Manuscript Population Schedule: 1940, California, Santa Clara County, Burnett Township, Enumeration District No. 43-2, sheet 4A (Ancestry.com); "Death Takes Frank Polak, Water Aide," *Daily Palo Alto Times* (October 24, 1960): 4.

[16] USGS, *Morgan Hill Quadrangle* (1917); USGS, *Morgan Hill Quadrangle*, 7.5-minute Series, 1:24,000 (Washington, D.C.: USGS, 1955); FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB.

[17] Thompson & West, *Historical Atlas Map of Santa Clara County, California* (San Francisco: Thompson & West, 1876), Map No. 7.

Plate 2. Published photograph of Gregory Fitzgerald's ranch, ca. 1896, camera facing northeast. Note the no-longer-extant dirt wagon road and farmstead buildings (background).[18]

Plate 3. Published photograph of ranches held by John and Gregory Fitzgerald, ca. 1896. Note absent orchards.[19]

Plate 4. Excerpt of 1917 topographical map of Morgan Hill Quadrangle, with approximate contemporary parcel boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at left). Annotation by JRP. Note present farmstead complex in general location of study property with alternate driveway alignment. Also note that Barnhart Avenue only extends as far northeast from Monterey Road as the building complex.[20]

Plate 5. Excerpt of 1931 topographical map of Morgan Hill Quadrangle, with approximate contemporary parcel boundaries outlined in red and approximate present-day study parcel boundaries outlined within that boundary in green (at left). Annotation by JRP. Note present Barnhart Avenue driveway configuration.[21]

[18] San Jose Mercury photographer, published in Charles M. Shortridge, *Santa Clara County and Its Resources, Historical, Descriptive, Statistical: A Souvenir of the San Jose Mercury* (1895, repr.; San Jose, California: San Jose Historical Museum Association, 1986), 248.
[19] San Jose Mercury photographer, published in Shortridge, *Santa Clara County and Its Resources*, 249.
[20] USGS, *Morgan Hill Quadrangle* (1917).
[21] USGS, *Morgan Hill Quadrangle* (1931).

Plate 6. Excerpt of 1940 aerial photograph with approximate 1860s parcel boundaries outlined in red, approximate present-day study parcel boundaries outlined within that boundary in green (at left), and extant building complex circled in yellow. Annotation by JRP. Note the expansive orchard plantings on both sides of Coyote Creek.[22]

Plate 7. Detail view of building complex identified in **Plate 6**, with extant residence circled in yellow (left) and no-longer-extant outbuildings circled in red (center and right). Note building complex located in Coyote Creek riparian area, outside the boundaries of the present-day study parcel.

Aside from the quarrying operations, the parcel appears to have remained dedicated to orchards through 1963. That same year, aerial photographs depict a no-longer-extant barn present in the building complex, aligned northwest-southeast near the present site of the extant, northeast-southwest aligned barn **(Plate 8** and **Plate 9**). The original building was demolished or removed sometime between 1968 and 1980, and the extant barn was erected sometime between 1980 and 1982. Additionally, by 1965, a growing proportion of the property was dedicated to vineyards, which corresponded to the time of the property's acquisition by the San Martin Vineyards Company for $631,000 in 1961. The San Martin Vineyards Company was incorporated in 1938 by members of the Filice family, who arrived in the Santa Clara Valley from Calabria, Italy, around the turn of the twentieth century. In 1932, Bruno Filice acquired the then-defunct San Martin Winery, and by 1938, the San Martin Vineyards Company had also set up processing and distribution facilities in San José. By the late 1960s, the company had planted over 1,000 acres in vineyards throughout the Santa Clara Valley, where the company likewise established tasting rooms at the historic San Martin Winery in addition to other facilities in the cities of San José, Monterey, and San Francisco. In 1972, the San Martin Vineyards Company partnered with Texas-based real estate firm, Southdown, Inc., to form Santa Clara Vintners, Inc., which cultivated 1,650 acres of vineyards in Monterey County. The San Martin Vineyards Company operated until 1984, when the Morgan Hill earthquake destroyed most of its facilities and its stock, driving the company into bankruptcy. The family business was subsequently reorganized as Filice Estate Vineyards, which was based in Gilroy and invested heavily in real estate throughout the Santa Clara Valley as well as cherry plantations—the orchard presently planted on the subject parcel. Ownership of the subject parcel transferred to Filice Estate Vineyards by 1985, and the present owners acquired it sometime after 1987, a period during which it took on its present-day configuration.[23]

[22] FAS, Flight CIV-1940, Frame 343-2, 1940, UCSB.

[23] Cartwright Aerial Surveys (CAS), Flight CA-SCL, Frame SCL 1-56, 1:20,000, July 18, 1963, UCSB; CAS, Flight CAS-65-130, SCL 23-144, 1:12,000, May 27, 1965, flown for California Division of Highways, UCSB; CAS, Flight CAS-2310, Frame 2310-3-161, 1:12,000, May 6, 1968, UCSB; HistoricAerials.com, "Coyote, CA," 1980 and 1982; "309 Acres Sell for $631,000," *San Jose Mercury* (December 31, 1961): 59; Blair-Westfall, "Record of Survey Being a Portion of La Laguna Seca Rancho, Santa Clara County," November 1966 (recorded December 9, 1966), Map Book 217, Page 15, Santa Clara County Recorder; California Secretary of State, "Business Search: San Martin Vineyards Company (70177927)," https://bizfileonline.sos.ca.gov/search/business (accessed January 2023); Ernest P. Peninou, *A History of the San Francisco Viticultural District, comprising the Counties of Alameda, Monterey, San Benito, San Francisco , San Mateo, Santa Clara, and Santa Cruz, with Grape Acreage Statistics and Directories of Grape Growers: An Unpublished Manuscript* (Santa Rosa, California: Nomis Press, 2004), 92; John Melville, rev. by Jefferson Morgan, *Guide to California Wines* (1955, repr.; San Carlos, California: Nourse Publishing Company, 1972), 136-137; Tina Grant, ed., *International Directory of Company Histories, Vol. 14* (Detroit,

Plate 8. Excerpt of 1968 aerial photograph with approximate 1860s parcel boundaries outlined in red, approximate present-day study parcel boundaries outlined within that boundary in green (at left), and extant building complex circled in yellow. Annotation by JRP. Note the proportion of acreage planted in vineyards**.**[24]

Plate 9. Detail view of building complex identified in **Plate 8**, with extant residence circled in yellow (left) and no-longer-extant outbuilding circled in red (right), 1968. Annotation by JRP.

Evaluation

Under NRHP Criterion A or CRHR Criterion 1, the National Folk residence contained within APN 725-04-002 may have once shared significant associations with important historic patterns of development at the local level, but it can no longer convey that significance because of a loss of historic integrity as a result of subsequent developments to the parcel and alterations to the building itself. Aerial photography confirms that the residence recorded on this form was present in 1940, with historic topographical mapping showing the presence of a farmstead in 1917 that likely included the extant residence and several no-longer-extant outbuildings. In fact, elements of this complex—including the residence—may have even been contained in the farmstead depicted on the parcel as early as 1876. As such, the residence would have functioned in concert with other components of a mid- to late-nineteenth-century southern Santa Clara Valley farmstead.

This nineteenth-century farmstead, of which the residence recorded on this form may have once been a component, would have emerged at a pivotal time in the developmental history of the region. In the 1870s, farms and ranches played a vital role in building a strong agricultural economy and developing the regional landscape. While most of Santa Clara County's agricultural diversity did not emerge until after the 1890s, when the large rancho properties were finally subdivided, the Laguna Seca Rancho was subdivided much earlier, resulting in the emergence of the south valley as a comparably diverse agricultural landscape divided amongst numerous small-hold farms and ranches. After the 1890s, these small farmsteads grew increasingly

Michigan: St. James, Press, 1996), 454-455; "Test Shakes Up California Wine Industry," Campus News: Web Features (July 31, 2000), University of California, Berkeley, https://newsarchive.berkeley.edu/news/features/2000/07/31_wine_vid.html (accessed January 2023); Eric Brazil, "Untimely Rainfall is the Pits for Cherry Industry," *The San Francisco Examiner* (May 27, 2993): A4; Almaden Valley Engineers, "Record of Survey, being a Portion of Lots 19, 20, & 21 of the 'Map of the Ogier Subdivision in the Rancho la Laguna Seca,' recorded in Book 'O' of Maps, Pages 61 & 62, Records of Santa Clara County, California, for Anthony and Michael Battaglia," June 1985 (recorded March 21, 1986), Map Book 557, Page 36, Santa Clara County Recorder; Martin O. Marcott, "Record of Survey, being a Portion of the Lands of the Felice [sic] Estate Vineyards in the Rancho la Laguna Seca, Unincorporated Area of Santa Clara County, California," September 1987 (recorded January 12, 1988), Map Book 582, Page 5, Santa Clara County Recorder.

[24] CAS, Flight CAS-2310 Frame 2310-3-161, 1968, UCSB.

common, and with the subsequent development of older farming properties at the turn of the twentieth century, the presence of *intact* mid-nineteenth-century farmsteads in the southern Santa Clara Valley has grown increasingly uncommon.

While it is important to note that the research and limited survey conducted at this time cannot positively confirm or deny a pre-1876 built date for the residence recorded on this form, this evaluation asserts that even the substantiation of such a claim would not change this conclusion of ineligibility due to integrity considerations. As an element of a mid-nineteenth-century farmstead, the building in question has lost any meaningful association to that property type as the other elements—a barn and various function-specific outbuildings—have since been demolished and replaced by an early 1980s barn and various twenty-first-century buildings and structures. As such, the property is unable to convey its significance to its period of original development. Furthermore, historical evidence does not indicate that the property recorded on this form distinguished itself from the many other small farms that emerged in the region in the early twentieth century for playing a specifically or demonstrably vital role in the development of the southern Santa Clara Valley economy, nor for playing a role in any significant innovations to horticultural methods or technologies. By 1918, the former Fitzgerald farmstead, which largely featured open rangeland and acreage dedicated to grain cultivation, was planted in prune and apricot orchards, similar to neighboring properties developed concurrently. In the 1960s, much of the property's acreage was converted to vineyards, nearly a century after the introduction of viticulture to the region. Therefore, owing to a substantial loss of integrity to the original period of development and a lack of significant associations with historical events, trends, or patterns of development at the national, state, or local level during subsequent periods of redevelopment, this property is not eligible for listing under NRHP / CRHR Criterion A / 1.

Under NRHP Criterion B or CRHR Criterion 2, this property does not share meaningful associations with the lives of persons who are individually important to history at the national, state, or local level. While Gregory Fitzgerald was an early settler of the Santa Clara Valley region, having arrived sometime around the turn of the 1860s, his role as an early farmer and rancher does not rise to the level of significance required under this criterion. Later owners, Ellsworth Sharon, Samuel Rodeck, J. C. Berendsen, and Bert Boyd likewise did not distinguish themselves as demonstrably significant under this criterion within their individual fields of endeavor nor within the developmental history of the region. Similarly, Frank Polak was active in various civic and industrial organizations that promoted the region's agricultural economy; however, he does not appear to have played a formative role in any of these groups, nor made significant contributions to his field of endeavor or his community during his period of direct association with the property. Additionally, historical evidence does not indicate that any individual within the Filice family nor the San Martin Vineyards Company rose to the requisite level of historical significance within the wine industry for listing under this criterion. Thus, the subject parcel does not appear eligible for listing in either register under NRHP Criterion B or CRHR Criterion 2.

Under NRHP Criterion C or CRHR Criterion 3, the buildings recorded on this form are not individually or collectively eligible for listing because they do not possess distinctive characteristics of a type, period, or method of construction, nor are they important works of a master architect or builder and they do not possess high artistic values. This parcel contains a heavily altered, pre-1917 (and possibly nineteenth-century) National Folk residence, an early 1980s barn, and multiple buildings, storage containers, and structures that date to the twenty-first century. Considered individually, all of these buildings represent common examples of their various property types. There is nothing about this farmhouse that is architecturally notable. The residence exhibits elements of the National Folk style, characterized by a simple form lacking elaborate stylistic design or detailing. Houses in this style had flexible floor plans and were a popular option in rural areas from about 1850 through the 1930s due to their economical building structure and materials. This residence is a modest example of National Folk architecture with numerous alterations and does not embody important characteristics of the style that might make it significant under this criterion.[25] Collectively, the buildings on this property are unable to provide a coherent representation of a typical farmstead from any era, as the parcel contains built environment from at least three periods of development. As discussed above, by the time of these buildings' construction, similarly designed buildings had spread throughout agricultural regions of California and the United States for over half a century. Research did not reveal that a master architect or builder was associated

[25] Virginia Savage McAlester, *A Field Guide to American Houses: The Definitive Guide to Identifying and Understanding America's Domestic Architecture* (New York: Alfred A. Knopf, 2015), 134-147.

with these buildings, nor would the buildings recorded on this form qualify as important works were such an individual identified.

The subject property is not eligible under NRHP Criterion D / CRHR Criterion 4 because it has neither yielded nor is likely to yield important information about historic construction materials or technologies that otherwise would not be available through documentary evidence. Also, the resource's land use, the layout of the extant built environment resources, and the relationship the buildings have with the surrounding landscape, are typical for agricultural properties of the period and do not appear to provide important information within the broader economic, social, and cultural setting of the region during its historic-period occupation. Potential archaeological resources on this parcel, if any, are not evaluated herein.

The property recorded on this form has a fundamental lack of historic integrity that compromises its ability to convey any potential significance it may have had under NRHP / CRHR Criterion A / 1, in addition to lacking significance under any of the other criteria. As discussed above, the extant residence was constructed sometime prior to 1917—possibly even earlier than 1876—but the surrounding farmstead contains built environment resources that date to the late twentieth and early twenty-first centuries, diminishing the property's collective integrity of setting, design, materials, workmanship, and feeling. The residence has also been altered by the addition of replacement siding, aluminum-frame horizontal-sliding windows, and roofing, further diminishing its individual integrity of design, materials, and workmanship. However, as the property continues to function as an agricultural complex, the residence appears to have remained in the same location, and the surrounding parcels retain their agricultural character, the subject parcel retains integrity of location and association.

This property is not eligible for listing in the NRHP or CRHR because it lacks historic integrity.

Photographs (continued):

Photograph 2. Northwest side of residence; camera facing southeast, February 15, 2023.

Photograph 3. Northernmost corner of barn; camera facing southeast, February 15, 2023.

***Recorded by**: S. Skow & A. Young ***Date**: February 15, 2023 ☒ Continuation ☐ Update

Site Map:

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix J

Groundwater Technical Memorandum

FINAL MEMORANDUM
FC 14 (02-08-19)

SUBJECT:	WEAP Modeling Results of Groundwater Storage in Coyote Valley for ADSRP	**DATE**:	7/10/2023
PREPARED BY:	Water Supply Planning Conservation Unit, Groundwater Management Unit, and Environmental Planning Unit		

Introduction

This memorandum presents modeling results that were undertaken for the construction and post-construction Anderson Dam operations scenarios that would occur throughout the implementation of the Anderson Dam Seismic Retrofit Project (ADSRP). Modeling for these scenarios was completed by Valley Water's Water Supply Planning and Conservation Unit (WSPCU). The WSPCU staff conducted the modeling to assess the overall impacts of the two ADSRP scenarios on Coyote Valley groundwater storage conditions. The purpose of this memorandum is to summarize modeling results and analyses that would be used in the ADSRP Environmental Impact Report (EIR) to evaluate whether project implementation would result in negative impacts to groundwater storage in the Coyote Valley groundwater management area (Coyote Valley). To be consistent with the Fish and Aquatic Habitat Collaborative Effort (FAHCE) EIR, the modeling was conducted using the Water Evaluation and Planning System (WEAP) monthly model. The WEAP modeling scenarios were based on 21 years (1990 to 2010) of historic hydrology and demand data provided by the WSPCU. This 1990-2010 time frame was selected to match the time period of the calibrated daily FAHCE WEAP model. This time frame was previously established during the FAHCE modeling consultation process and contained a variation of water year types, varying from critically dry to wet, to generate results under a variety of conditions. Thus, the model simulates conditions that could occur throughout the ADSRP construction and post-construction phases. Valley Water modeled several scenarios in WEAP: 2015 base conditions (i.e., pre-FERC Order baseline), during construction, and three post-construction scenarios. The 2015 base conditions reflect Coyote Valley operations with interim Anderson Reservoir seismic restrictions and before the start of Federal Energy Regulatory Commission (FERC) Order Compliance Project activities. The 2015 base conditions interim seismic restrictions limited the reservoir capacity to 51.2 thousand acre-feet (TAF). The during construction scenario reflects Coyote Valley operations when there is no storage capacity in Anderson Reservoir. The post-construction scenarios reflect Coyote Valley operations with a fully operational Anderson Reservoir, and include a 2035 demand scenario that is post-construction (2035 Post Construction Base). Demand numbers are from the 2020 Urban Water Management Plan.

The modeled scenarios support the evaluation of whether project implementation would affect Coyote Valley groundwater storage. For the purposes of this analysis, the modeled groundwater storage scenarios were compared to Valley Water's 2021 Groundwater Management Plan (GWMP) groundwater storage outcome measure.

The 2015 base conditions scenario from the daily WEAP model represents the then-current, pre-construction operations of Valley Water. The 2015 base conditions results are included as a baseline reference for the construction and post-construction operation scenarios, and the 2035 Post Construction Base (future baseline) was used as a second baseline for post-construction impacts .

The GWMP outcome measure is the quantifiable goal to track the performance of sustainable groundwater management and is functionally equivalent to a measurable objective under the Sustainable Groundwater Management Act (SGMA). According to the 2021 GWMP, the projected end of year groundwater storage outcome measure for the Coyote Valley is 5,000 acre-feet (AF), and this figure is used as a groundwater impact significance threshold. Analyses and results for the WEAP monthly model construction and post-construction scenarios are further discussed below.

Construction Scenario

Based on the results, the WEAP modeling for the construction scenario indicated no significant impacts would occur to groundwater conditions because the simulated groundwater storage during construction remains above the 5,000 AF outcome measure for Coyote Valley (Figure 1). However, comparing the during construction scenario to the 2015 Base Conditions indicates that there would be a reduction in the overall groundwater recharge from Coyote Creek and Coyote Valley groundwater storage (Figure 1). The model shows that there is a reduction in groundwater recharge in the construction scenario. The reduction in groundwater recharge is due to Anderson Reservoir being offline for construction. Since Anderson Reservoir would be offline, the local water supply to supplement the imported water used to manage the Coyote Valley groundwater levels would be reduced. However, the imported water that Valley Water plans to recharge in Coyote Creek to manage Coyote Valley groundwater, as part of normal operations, helps maintain the groundwater storage above the 5,000 AF outcome measure for the entire simulation period.

Figure 1 Groundwater Storage during ADSRP construction scenario

[1] *GWMP Goal = The GWMP outcome measures are quantifiable goals to track performance of sustainable management and are functionally equivalent to measurable objectives under the Sustainable Groundwater Management Act (SGMA). The outcome measure related to projected end of year groundwater storage for Coyote Valley is 5,000 AF.*

Post-Construction Scenarios

Once ADSRP construction has been completed, releases from the dam would be operated in accordance with the FAHCE operating rule curves. The post-construction WEAP model run includes scenarios for the

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2035 Post Construction Base (future baseline), 2035 Post Construction FAHCE, and 2035 Post Construction FAHCE Plus rule curves. Based on the WEAP monthly model results (Figure 2), no adverse groundwater impacts are expected in the post-construction scenarios. Both the FAHCE and FAHCE Plus scenario groundwater storage is very similar to the 2015 Base Conditions and 2035 Post Construction Base scenario. These model results also show the post-construction scenarios to be well above the 5,000 AF outcome measure for Coyote Valley. While no modeling was conducted for the "FAHCE Plus Modified" scenario, staff evaluated the difference between the FAHCE Plus versus Modified. The FAHCE Plus Modified would only change the timing of pulse flows releases but not the amount of water released. The timing and magnitude of the differences in the FAHCE Plus Modified rule curve will likely not change the modeling conclusions for FAHCE Plus since under either scenario there is sufficient imported water and Coyote Valley recharge capacity to maintain groundwater well above the Coyote Valley outcome measure.

Figure 2 Groundwater storage during post-construction operations.

Discussion

Based on the WEAP modeling, no significant groundwater impacts are expected for FAHCE, FAHCE Plus, or FAHCE Plus Modified under either the construction or post-construction scenarios. Although some adverse groundwater storage impacts are anticipated during ADSRP construction, the normal operations using imported water that is released to Coyote Creek as managed recharge would continue to support and prioritize groundwater recharge to the Coyote Valley groundwater management area to avoid and minimize construction phase impacts. Normal recharge operations using imported water would continue to maintain the Coyote Valley groundwater storage above the GWMP outcome measure of 5,000 AF (Valley Water 2021). If Valley Water's imported water contract supplies are not available or insufficient, Valley Water would use alternative supplies; Valley Water could purchase and import water transfer supplies from other California water rights holders or arrange an exchange for water stored within Valley Water's share of the Semitropic Groundwater Bank located in Kern County. Therefore, ADSRP construction operations would not result in significant adverse impacts to Coyote Valley groundwater storage.

Model results for post-construction scenarios are nearly equivalent to 2015 and future baselines, and all exceed the 5,000 AF of storage by the same order of magnitude. Valley Water would continue to manage all of its groundwater subbasins to ensure groundwater storage remains healthy and above the outcome measures, as defined in the 2021 Groundwater Management Plan. The Coyote Valley, in particular, is a relatively small groundwater management area with only approximately 25 thousand acre-feet (TAF) of operational storage. Given that annual pumping demands in Coyote Valley are nearly 50% of the operational storage, Coyote Valley is especially susceptible to over-pumping during drought conditions. To ensure Coyote Valley groundwater levels remain healthy through drought conditions in the 2035 scenarios, Valley Water would recharge the basin using both local Anderson Reservoir water and imported water sources, as part of normal operations. During non-drought conditions, Valley Water uses the surface water supplies to maintain Coyote Valley close to full. The goal of this is to provide Coyote Valley a drought buffer. This drought buffer helps support Valley Water's drought related shift in recharge operations in Coyote Valley.

References

Santa Clara Valley Water District (Valley Water). 2021. Santa Clara Valley Water District Groundwater Management Plan.

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix K

Hydrology Technical Appendix

Contents

Appendix K

FERC Order Compliance Project

Final Drawdown and Operations Plan Amendment Request

September 11, 2023

Secretary Kimberly Bose
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Reference: P-5737-007

Subject: Anderson Reservoir Operations and Drawdown Plan Amendment Request for the Anderson Dam Tunnel Project

Dear Secretary Bose:

This letter serves as the Santa Clara Valley Water District's (Valley Water) request for an amendment to the Anderson Reservoir Operations and Drawdown Plan (Drawdown Plan), which includes Valley Water's amendment proposal and consultation history.

The proposed Drawdown Plan amendment would 1) correct the deadpool elevation currently given in the Drawdown Plan and 2) allow Valley Water to operate Anderson Reservoir at near deadpool levels with a gradual ramp down as it approaches the deadpool elevation to be protective of steelhead and steelhead critical habitat in Coyote Creek. The proposed Drawdown Plan amendment was distributed to the Technical Working Group, which includes all the wildlife and permitting agencies (cc'd below), for review and input on July 19, 2023. Comments were received from the National Marine Fisheries Service and the State Water Resources Control Board on August 18, 2023. Valley Water has since revised the amendment to incorporate their comments. Documentation of the agency consultation history is included in the Drawdown Plan Amendment (Enclosure 1).

If you have any questions, please feel free to reach out to Wendy Young at (408) 630-2478 or via email at wendyyoung@valleywater.org. Thank you for your time.

Sincerely,

John Bourgeois
Deputy Operating Officer
Watersheds Stewardship & Planning Division

Enclosure:

1) Proposed Amendment to the Anderson Reservoir Operations and Drawdown Plan- September 8, 2023
2) SCC and PAC I & R NMFS-LOC and USBR-BE

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Appendix K

FERC Order Compliance Project

Final Drawdown and Operations
Plan Proposed Amendment

CEII

PROJECT: Anderson Dam Tunnel Project (P-5737-007) **DATE**: September 8, 2023

SUBJECT: Amendment Request: Anderson Reservoir Operations and Drawdown Plan

1. BACKGROUND

On February 20, 2020, the Federal Energy Regulatory Commission (FERC) issued a directive to implement interim risk reduction measures in advance of the Anderson Dam Seismic Retrofit Project (ADSRP). The directive included expediting the construction of a new outlet tunnel known now as the Anderson Dam Tunnel Project (ADTP) and operating Anderson Reservoir as empty as possible, which prompted the FERC Order Compliance Project (FOCP). FERC also ordered Valley Water to develop a Reservoir Operations and Drawdown Plan and consult with the natural resource agencies (U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and the National Marine Fisheries Service) on Valley Water's proposal, which was finalized by Valley Water on July 24, 2020. Subsequently, FERC ordered Valley Water to implement the FOCP Reservoir Operations and Drawdown Plan (Drawdown Plan), in part, on October 1, 2020, and February 2, 2021.

Recently, Valley Water realized that an amendment to the Drawdown Plan is needed for two reasons. Firstly, the deadpool elevation and the elevation datum require correction, as explained in a Valley Water filing to FERC on May 2, 2023 (Enclosure 1). Secondly, Valley Water is requesting a modification to the reservoir operations to provide water to critical habitat downstream of Anderson Dam in the event of an imported water outage.

The proposed amendment requires natural resource agency consultation and FERC authorization before it can be implemented. This memo includes a description of the amendment proposal, followed by a discussion of the dam safety concerns, and environmental considerations associated with amendment request.

Valley Water provided the proposed amendment to was provided to the resource agencies for review and input on July 19, 2023. Comments from the State Water Resources Control Board and National Marine Fisheries Service (NMFS) were received on August 18, 2023. Documentation of the consultation history has been included as Enclosure 2 and Valley Water has updated the proposal to incorporate comments received.

2. PROPOSED AMENDMENTS TO THE DRAWDOWN PLAN

Based on a better understanding of operating Anderson Reservoir at a drawn down condition, Valley Water is proposing two changes to the Drawdown Plan.

Correction of Deadpool Elevation.
Valley Water surveyed the elevation at the top of weir at the lowest intake structure, and it corresponds to Elevation (El.) 490.0 feet (ft.) using Datum NAV88.[1] Corrections to the Drawdown Plan are needed to reflect Valley Water's current understanding of the elevation of the deadpool, which corresponds to the top of the weir of the lowest portal of the intake structure, not the elevation of concrete foundation at the lowest intake structure (El. 488 ft.) that was originally presented as the deadpool elevation. The true deadpool level is El. 490 ft., which requires the following changes to the Drawdown Plan and its appendices:

- Replace elevation "488" with "490"
- All references to "deadpool" shall refer to El. 490 ft. (NAV88)

Near Deadpool Operations with a Gradual Ramp-Down
The operations that are described in the Drawdown Plan state that the valves will be completely open to pass all inflow as it is received. Over the course of the last two years, Valley Water has operated Anderson Reservoir in a drawn down condition for two summer seasons (2021 and 2022) and experienced some challenges in operating in accordance with the Drawdown Plan. The recent drought left the Coyote Creek watershed in drier than normal conditions, which meant that Coyote Creek above the Anderson Dam remained wetted by minimal releases from Coyote Reservoir that did not noticeably contribute to storage in Anderson Reservoir. Further, the sum of all three of the tributary inflows into Anderson Reservoir did not exceed evaporative losses that occurred within Anderson Reservoir. In fact, the Anderson Reservoir dropped by up to 0.7 feet below deadpool due to evaporative losses in summer 2021, reaching El. 489.3 ft. (NAVD 88) in June of 2021. When an outage occurred on the Santa Clara Conduit on June 20, 2021, it took over 36 hours for releases from Coyote Reservoir to reach Coyote Creek below Anderson Dam, leaving steelhead critical habitat vulnerable to a creek dry back.

Rather than being completely reliant on imported water to maintain wetted habitat below Anderson Dam, Valley Water is seeking an amendment to the Drawdown Plan to accommodate 2 ft. (water surface El. 492 ft.) of water storage above the weir of the lowest portal of the intake structure so that local water from Coyote Reservoir, if available, could be used to respond to imported water outages. The Drawdown Plan stated that the Valley Water would operate Anderson Reservoir to drain it as quickly as possible after inflow events. With the proposed amendment to the Drawdown Plan, Valley Water would continue to empty Anderson Reservoir as quickly as possible by keeping the outlet valves fully opened until Anderson Reservoir water storage reached El. 492 ft., just above the deadpool elevation, and then the valves would be operated at a partially closed position so that El. 492 ft. is maintained. The degree to which the valve would be opened/closed would be dependent on the amount of inflow that Anderson Reservoir is receiving from its three tributaries. The valves would need to be periodically adjusted, as inflow amounts vary through the seasons. If a large amount of inflow occurs and the reservoir elevation exceeds El. 492 ft., then the valves would return to being completely opened until El. 492 ft. is reached.

Based on input from NMFS on August 18, 2023, Valley Water proposes to initiate a gradual ramp-down as the reservoir nears deadpool. A gradual ramp-down reduces the risk of rapid changes in the wetted habitat downstream of the dam that could lead to fish stranding. Once the reservoir reaches El. 493.5 ft, which represents approximately 3,700 AF of storage or 4% capacity, the outlet valves would be closed partially to initiate a gradual ramp-down between El

[1] Elevation 490.0 feet in the local elevation datum NAV88 corresponds to elevation 487.2 feet in Datum NGV29, which is the datum that is reported by Valley Water's Surface Water Data Portal https://alert.valleywater.org/map?p=sensor&sid=4002&disc=f

493.5 ft and El 492 ft. by reducing flows by half and waiting at least 12 hours to reduce flows further until the storage level has been achieved. Based on the streamflow observations made in 2022, the ramp-down procedure would follow this example:

- As the streamflow measurement at Madrone Station (SF 5082) approaches 280 cubic feet per second (cfs), the operator would partially close the valves to reduce the streamflow to 140 cfs.
- After at least 12 hours, the operator would close the valves further to target a release of 70 cfs.
- The flow would continue to be reduced by 50% every 12 hours until the target stream flow and reservoir elevation have been reached. In total, the ramp-down would occur over 2-3 days.

In summary, Valley Water proposes to amend the Drawdown Plan in the following ways to allow for “near deadpool operations with a gradual ramp-down” by implementing the following operations. During and after storm events that raise Anderson Reservoir storage levels above El. 492 ft, the outlet valves would be maintained fully opened until the Anderson Reservoir storage levels peak and start to decrease down to El. 493.5 ft. At or below El. 493.5 ft., the valves would be operated to be partially closed to gradually reduce the releases to Coyote Creek. The ramp-down would lower the reservoir elevation from Elev. 493.5 ft to Elev. 492 ft over a two- to three-day period by reducing flows by 50% every 12 hours until the target reservoir elevation has been reached.

3. DAM SAFETY IMPLICATIONS

The proposed amendment to the Drawdown Plan would not result in dam safety implications. The additional storage described above would insignificantly increase the probability of reaching the DSOD storage restriction or overtopping the spillway. The additional 350 acre-feet would take less than 24 hours to release with the current outlet configuration.

4. ENVIRONMENTAL CONSIDERATIONS

Valley Water has requested the amendment to minimize the impacts of a drawn down Anderson Reservoir on steelhead critical habitat in Coyote Creek below Anderson Dam. The following environmental factors were considered.

Emergency Water Supply for Coyote Creek

The primary purpose of having additional water supply storage is to allow Valley Water to use local water storage to respond to an imported water outage that can occur from a variety of reasons, such as a prolonged power outage at the Pacheco Pumping Plant, a pipeline leak or failure, and for routine maintenance of the pipeline system. By allowing near deadpool operations, Valley Water would be able to respond to an imported water outage within several hours, rather than waiting for the outage to be fixed or for releases from Coyote Reservoir to fill Anderson Reservoir enough to overtop the weir of the lowest intake structure and flow into Coyote Creek. Responding quickly to an outage supports continuous wetted habitat in Coyote Creek’s critical habitat and minimizes the potential for an unexpected stream dry back.

Minimizing potential stream dry backs for steelhead also maintains habitat for other aquatic organisms (fishes, turtles, invertebrates), as well as the vegetation that occurs within and alongside Coyote Creek. Similarly, emergency responses to maintain stream flows also contribute to groundwater recharge and the maintenance of sustainable groundwater levels.

Water Quality
By maintaining the reservoir at El. 492 ft., local water would pass through Anderson Reservoir more routinely because the water surface would stay above the lowest intake structure's weir, rather than drop below the operable level of the intake structure. Local water passing through Anderson Reservoir would be mixed with the imported water that is released from the Coyote Discharge Line downstream of Anderson Dam, as anticipated in the original Drawdown Plan and associated Water Quality Certification Plans, such as the Water Quality Certification Condition 2 Plan (Site Specific Plan for Anderson Dam Tunnel Project), creating a blend of local and imported water in Coyote Creek.

Water quality would be mostly unchanged by the additional storage in Anderson Reservoir, if the near deadpool operations were implemented because the amendment request includes a relatively slight increase in storage, which is not anticipated to affect other water quality parameters, such as turbidity, temperature, or dissolved oxygen.

Valley Water will continue to monitor water quality and habitat conditions in Coyote Creek per the Water Quality Certificate Condition 2 Plan, the Water Temperature and Fisheries Monitoring Plan, and the Sediment Deposition Plan.

No Change in Drawdown Plan Effects
Implementing the proposed Drawdown Plan amendment is not anticipated to affect other environmental resources for the reasons listed below:

- Santa Clara Valley Habitat Plan (VHP) listed species are not expected to be observed in the reservoir and are not anticipated to be impacted by maintaining steady stream flows in Coyote Creek.
- Bald and golden eagles are known to forage and nest around the reservoir, but nest locations or prey availability would not be impacted by the slight increases in water storage.
- Historic or tribal resources would not be affected by the proposed amendment to the Drawdown Plan. Valley Water previously consulted the California State Historic Preservation Officer (SHPO) regarding a drought variance request. During that consultation an additional 20,000 acre-feet of storage was evaluated, including operations of Anderson Reservoir between El. 488 ft. and El. 545 ft., and it was determined that the additional storage would not be likely to adversely affect sensitive resources (SHPO, November 30, 2021). Similar to the variance request, the proposed amendment would not likely impact historic or tribal resources.
- Recreation facilities would not be impacted by the proposed amendment to the Drawdown Plan. Parks and trails that access the reservoir would continue to be closed throughout construction.

5. NMFS CONCURRENCE LETTER ALIGNMENT

The Coyote Discharge Line releases imported water through a system of raw water pipelines that are owned by the U.S. Bureau of Reclamation (USBR) and maintained by Valley Water. Several stretches of these pipelines are due for inspections and routine maintenance, with work planned to occur November 2023-January 2024. As such, USBR completed Endangered Species Act Consultation with NMFS regarding the Santa Clara Conduit Inspection and Rehabilitation and Pacheco Conduit Sectionalizing Valve and Acoustic Fiber Optic Repair Project (Conduit Project). NMFS provided a concurrence letter to USBR (April 11, 2022) stating that the Conduit Project is not likely to adversely affect species listed as endangered or threatened or critical habitat (Enclosure 3). The Conduit Project includes valve replacements, acoustic fiber optic repairs, internal pipeline repairs, repair/replacement of appurtenances (e.g., fittings, manholes, meters, seals, blowoff valves, air release valves), and maintenance of vault structures. The pipeline will need to be dewatered and offline for approximately 3 months. These activities are necessary to ensure that the San Felipe Division facilities continue to reliably deliver imported water from San Luis Reservoir to San Benito and Santa Clara Counties, including those that are maintaining Coyote Creek habitat while Anderson Dam is under construction.

In that consultation, NMFS stated that the Conduit Project is not likely to adversely affect steelhead, so long as the measures described in the Biological Evaluation are implemented, including the following commitment: “Valley Water will only proceed with the implementation of Project activities each year if sufficient water storage is available to maintain 10 cfs throughout the 3 month shutdown period.” The proposed amendment to the Drawdown Plan would support Valley Water’s efforts in operating the Anderson valves to maintain a steady rate of 10 cfs while the Conduit Project is occurring and imported water is not available.

Enclosures:

1. Valley Water Letter to FERC re: Deadpool Elevations (May 2, 2023)
2. Agency Consultation Log
3. USBR and NMFS Consultation on Santa Clara Conduit Inspection and Rehabilitation and Pacheco Conduit Sectionalizing Valve and Acoustic Fiber Optic Repair Project

Electronically Filed

May 2, 2023

Mr. Frank Blackett, P.E.
Regional Engineer
Division of Dam Safety and Inspections – San Francisco Regional Office
Federal Energy Regulatory Commission
100 First Street, Suite 2300
San Francisco, CA 94105-3084

Reference: Leroy Anderson Dam
Project No. 5737-CA
NATDAM ID No. CA00294

Response: Re: 2022 Dam Safety Inspection Follow-Up

Dear Mr. Blackett:

This letter is in response to the Federal Energy Regulatory Commission (FERC) letter dated April 3, 2023, regarding a letter sent on November 23, 2022, by the Santa Clara Valley Water District (Valley Water), that submitted responses to the 2022 dam safety inspection comments for Anderson Dam. The FERC comments and Valley Water's responses are furnished in this letter.

FERC Comment #1:
We note the STID lists the elevation of the lowest intake port as elevation 485 ft, as shown in section 2.5 - Intake Structure - and Figure 2-22, which is a January 8, 1988 drawing of the intake structure. This elevation appears to be based on NGVD 29 as NAVD 88 was not established until 1991. Your November 23, 2022 letter describes a June 2016 survey that measured the weir elevation of the lowest intake at elevation 487.2 ft, NGVD 29. We also note the October 21, 2019 Assessment of Interim Reservoir Restrictions prepared by URS cites elevation 488 ft as the elevation of the lowest intake port (no datum was specified), which was the basis for the deadpool elevation used in previous correspondences. Please confirm and explain whether the elevation referenced in the STID, the elevation referenced in URS' 2019 report, or the most recently surveyed elevation is correct. Also discuss if any other elevations in the as-built drawings, design documents, and other submittals would require correction and, if so, how this would be accomplished.

Valley Water Response to Comment #1:
The most recently surveyed elevation at the top of the weir is correct: 487.20 ft (NGVD29).
The corresponding actual deadpool elevation using the NAVD88 datum is 490.01 ft.
The Intake Structure Modification Drawing included in the Anderson Dam STID (Figure 2-22) shows that the top of the pipe at the lowest intake is at Elev. 485 ft (NGVD 29), which corresponds to approximately Elev. 487.8 ft (NAVD 88) per STID Table 2-2. This was approximated as Elev. 488 ft (NAVD 88) in the URS 2019 report and was the basis for the deadpool elevation used in previous correspondence.

The detail of the concrete weir above the intake to accommodate the trash rack and sluice gate was not included in the STID. Sheet 10A, Section A of the Intake Structure Modification As-Built Drawings (see Figure 1 below) shows the top of the concrete weir at elevation 486.75 ft (NGVD 29) and the intake elevation at 485.0 (NGVD 29). The effect of the weir may not have been considered in the URS 2019 report recommending the deadpool elevation.

Figure 1 - Section A from Sheet 10A: Lower Intake Module at El 485.0 Concrete Outline from Leroy Anderson Dam Intake Structure Modification Record Drawing 8/2/1990 with added notes in red

The trash rack is mounted on a concrete sill that extends 1.75 feet higher than the top of the pipe and acts as a weir or crest that water spills over. For illustrative purposes, see the photo below (Figure 2) of the identical middle intake with recent survey data elevations indicated. Note, there has been a increase in elevation of about 0.44 feet of the actual elevation when compared to the as-built record.

Figure 2 - Photograph of identical middle intake showing survey points with elevation values from the lower intake

In summary, all references to deadpool or “Restricted Level” of 488.0 feet (NAVD 88) will require correction to 490.0 feet and moving forward all elevations will need to be reviewed to ensure consistency with the above information. This will be achieved by systematically making edits to plan sets and design documents that reference incorrect elevations or by adding notations to cross refence elevations in NAVD88. Changes will be made to all documents and plan sheets moving forward, starting with the Anderson Dam Tunnel Project plan sets, followed by revisions to the Anderson Dam Seismic Retrofit Project Plans. Revised documents will be formally filed with FERC and resubmitted to Division of Safety of Dams (DSOD).

FERC Comment #2: You are reminded that you must take all appropriate measures to maintain deadpool, and in the event of significant inflow that causes exceedences in the deadpool elevation, you must safely and promptly lower the reservoir to deadpool consistent with the February 20, 2020 directive regarding dam safety interim risk reduction measures.

Valley Water Response to Comment #2:
Valley Water intends to formally request approval from FERC to correct the deadpool elevation in the February 20, 2020 directive regarding dam safety interim risk reduction measures. Anderson Reservoir had not reached the lower intake level since the 1988 Intake Structure Modification Project prior to January 2021. Now that actual conditions and elevations are known, we realize the deadpool elevation should have been specified at elevation 490 ft (NAVD 88). Additionally, the elevation data provided by the instrumentation corresponds to the local datum (NGVD 29). The elevation difference of the local datum is 2.8 feet lower than the NAVD 88 which results in a deadpool elevation of 487.20 feet (NGVD 29) when comparing to the instrumentation data provided through our systems such as the Automated Local Evaluation in Real Time (ALERT).

FERC Comment #3: Regarding your discussion of "de minimis" adjustments to deadpool operations, we note that in your approved Reservoir Drawdown and Operations Plan (Plan) you did not request nor receive approval to vary from the deadpool level to release this flow. This deviation will be noted in the compliance history of the project and considered in the course of our review of any similar incidents in the future to determine appropriate Commission action. If you vary from deadpool to release this minimum flow while imported water outages occur, you must first request a temporary variance or amendment to the Plan, including justification for needing the variance or amendment. You must detail the time periods and reservoir levels needed for the temporary variance. You must also consult with all applicable resource agencies on this request and include in your request to the Commission copies of the comments and recommendations received. If you do not adopt a recommendation by the resource agencies, please provide your reasoning based on project specific information.

Valley Water Response to Comment #3:
Valley Water understands this comment and intends to apply to amend the Reservoir Drawdown and Operations Plan in order to update the deadpool restriction elevation based on the additional information available, including hydraulic, environmental, and operational considerations.

Thank you for your consideration of this response to your letter. Please contact me at (408) 630-2983 with any questions regarding this matter.

Sincerely,

Ryan McCarter, P.E.
Acting Deputy Operating Officer
Dam Safety and Capital Delivery Division

cc:

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Agency Consultation on FOCP Drawdown Plan Amendment 1
Federal Energy Regulatory Commission Order Compliance Project (P-5737-007)

Distributed July 19, 2023; Comments Requested: August 18, 2023

Comment No.	Section No.	Page(s)	Agency Comment	Valley Water Response
U.S. Fish and Wildlife Service				
U-1				No comments provided.
California Department of Fish and Wildlife				
C-1				Concurs with comments provided by NMFS (see below)
National Marine Fisheries Service				
N-1	Overall	Overall	At the June 28, 2023 ADSRP Inter-Agency Meeting, Valley Water presented a summary of the previous month's operation of Anderson Reservoir which included the return of the reservoir to deadpool elevation. With the reservoir approaching deadpool on June 23, 2023, streamflow in Coyote Creek below Anderson Dam (as measured at Madrone gage) decreased from 260 cfs to 60 cfs in approximately 24 hours. NMFS expressed concern that this rapid rate of flow reduction during the final stages of reservoir drawdown presents a risk of stranding fish residing below the dam. In Coyote Creek a decrease in this flow range has the potential to dewater side channels and benches adjacent to the low flow channel. To minimize the risk of stranding fish, NMFS recommends the proposed Drawdown Plan Amendment include operational measures to slow or periodically pause the final reduction of streamflow as the reservoir goes to elevation 492 feet. The FAHCE Settlement Agreement provides a method for the ramping down of streamflow in Appendix E. As presented in Table 2 of Appendix E (FAHCE Settlement Agreement), a flow reduction from 300 cfs to 25 cfs would be performed in 7 increments equally timed over a 72-hour period. We recommend Valley Water incorporate a similar ramping method for the final evacuation of storage from Anderson Reservoir to achieve elevation 492 feet.	The rapid drawdown that occurred in 2022 was the result of the Anderson valves being operated fully open until the reservoir reached deadpool. Valley Water agrees that ramping should be included to avoid and minimize impacts to steelhead. Valley Water has added in a procedure from gradual ramping into the Drawdown Plan Amendment. As revised, the flow rates would be reduced by 50% with 12-hour steps between flow reductions to reduce the risk for stranding.
Santa Clara Valley Habitat Agency				
V-1				No comments provided.
State Water Resources Control Board				
W-1	4	5	Valley Water proposes to maintain additional water above deadpool elevation "that would allow Valley Water to use local water storage to respond to an imported water outage that can occur from a variety of reasons, such as a prolonged power outage at the Pacheco Pumping Plant, a pipeline leak or failure, and for routine maintenance of the pipeline system." We support these objectives. However, although the proposed Drawdown and Water Operations Plan Amendment (Amendment) may protect the groundwater recharge (GWR) beneficial use of Coyote Creek, it is unclear whether other beneficial uses (such as cold freshwater habitat (COLD) and protection of rare and endangered species (RARE)) of waters of the State would be degraded or protected. Accordingly, the Amendment should be revised to clarify and characterize water quality in Anderson reservoir under near-deadpool conditions (e.g., at El. 492 NAVD88), including temperature, dissolved oxygen, pH, and turbidity. This is necessary to characterize the discharges and the potential effects of the discharges to Coyote Creek, such as a potential for increased water temperature that could harm steelhead and other native biota and beneficial uses such a COLD and RARE. The Amendment should also be revised to include appropriate avoidance and minimization measures to mitigate for potential adverse effects, such as (but not limited to) water	The Amendment is being proposed for the sole purpose of being protective of beneficial reuses in Coyote Creek, especially for endangered species (RARE). If implemented, the additional storage would not likely be sufficient to create a cold pool within Anderson Reservoir because the two feet of storage would likely continue to be warm surface-influenced water, however, the presence of this local storage is supportive of maintaining a wetted stream immediately downstream of the dam, where the cold freshwater habitat (COLD) is typically found. Once the chillers are operational, the habitat downstream of Anderson Dam will be a cold water habitat, but will still depend on the continuous availability of imported water supplies being delivered to Coyote Creek. The Amendment has been revised to reiterate the water quality monitoring that is already in place, per the Water Quality Certificate Condition 2 plan and its associated QAPP, which characterize the water quality parameters in Anderson Reservoir and Coyote Creek. Furthermore, the project has acknowledged the potential for impacts to water quality in Coyote Creek and steelhead and has developed a Habitat Mitigation and Monitoring Plan that includes 2,600 linear feet of stream restoration to

Agency Consultation on FOCP Drawdown Plan Amendment 1
Federal Energy Regulatory Commission Order Compliance Project (P-5737-007)

Distributed July 19, 2023; Comments Requested: August 18, 2023

Comment No.	Section No.	Page(s)	Agency Comment	Valley Water Response
			quality monitoring, rescue and relocation of steelhead and other native biota, and flow ramping rates. Valley Water framed a basis of the Amendment’s discharge effects by using National Marine Fisheries Service’s (NMFS’) evaluation of the *Santa Clara Conduit Inspection and Rehabilitation and Pacheco Conduit Sectionalizing Valve and Acoustic Fiber Optic Repair Project* (Conduit Project) (letter to U.S. Bureau of Reclamation from NMFS, April 11, 2022), included as enclosure 2 in the Amendment. The Amendment (p. 5, section 4), states that because NMFS found that the Conduit Project would not likely cause adverse effects, neither would implementation of the Amendment. This conclusion is based on an incomplete representation of NMFS’ evaluation of the Conduit Project. Moreover, NMFS’ evaluation for the Conduit Project was used out of context for purposes of the proposed Amendment. Specifically, maintaining a steady flow rate of 10 cfs is only one of many management measures required in the Conduit Project. For example, the Conduit Project also has discharges occurring only during a seasonally cool period and includes temperature criteria, such as the following criteria in NMFS concurrence letter, page 4: “Conduit dewatering would occur between November 1 - 16 during each phase of the Project. In the four steelhead streams, discharges would be managed to avoid changes in the temperature of receiving waters greater that 2°F (1.1°C) and overall receiving waters shall not exceed 68°F (20°C). Turbidity, dissolved oxygen, and pH levels would also be monitored in receiving waters at discharge sites, and managed to not exceed the thresholds specified in Conservation Measure 5 (see Section 3.4 of the BE).” This excerpt from NMFS’ concurrence letter is an example of the detailed requirements for the Conduit Project that led NMFS to determine that that project would not likely have adverse impacts to steelhead in Coyote Creek. The proposed Amendment, however, has only a commitment to the 10 cfs flow rate management measure, which may protect the GWR beneficial use, but other measures for protection of other beneficial uses of waters of the State were not included. As noted earlier in this comment, additional information is needed for Valley Water to clarify how the proposed discharges in the Amendment could affect Coyote Creek’s beneficial uses and avoidance and minimization measures that would be implemented to prevent adverse impacts to the creek’s beneficial uses and water quality	improve COLD and RARE beneficial uses downstream of Anderson Reservoir. As originally written, the Proposed Amendment is an avoidance and minimization measure to prevent stream dry back and fish stranding if/when an imported water outage were to occur. Implementing the Proposed Amendment could prevent the need for a fish rescue and relocation effort in response to an imported water outage. Further, Valley Water has revised the Proposed Amendment to include a more gradual ramp-down rate as recommended by NMFS. Valley Water did not intend to misrepresent NMFS’ statements. The intention was simply to make the connection that the proposed Amendment is supportive of maintaining 10 cfs in Coyote Creek. We have learned from the last three years of experience that without a small amount of water storage in Anderson Reservoir, the local water being released from Coyote Reservoir through Anderson Reservoir is difficult to control. With the Anderson valves wide open all the time, the flow downstream can be variable and it is difficult to maintain a steady 10 cfs flow rate. Implementing the Proposed Amendment in advance of the planned imported water outage will help Valley Water carefully manage the limited local water supply so that the pipeline, that is critical to keeping Coyote Creek sustained while Anderson is under construction, can undergo routine maintenance. As mentioned above, the sole purpose of the Proposed Amendment is to avoid and minimize impacts to beneficial uses in Coyote Creek, in response to the FERC Order to keep Anderson Reservoir at deadpool. Valley Water acknowledges that it is extremely difficult to maintain beneficial uses when local water is not available in Anderson Reservoir. While imported water has been relatively reliable, so far, Valley Water would like to implement the Proposed Amendment as a means for dealing with an unexpected outage of imported water.
San Francisco Bay Regional Water Quality Control Board				
S-1				No comments provided.
U.S. Army Corps of Engineers				
A-1				No comments provided.
Santa Clara Department of Parks and Recreation				
P-1				No comments provided.

Appendix K

FERC Order Compliance Project

FERC Approval of Final

Drawdown and Operations Plan

Proposed Amendment

Appendix K

FERC Order Compliance Project

Final Drawdown and Operations

SANTA CLARA VALLEY WATER DISTRICT

FERC Order Compliance Project

P-5737-007

FINAL

RESERVOIR DRAWDOWN AND OPERATIONS PLAN

07/24/2020, Version #2

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Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

List of Acronyms and Abbreviations

ADSRP	Anderson Dam Seismic Retrofit Project
ADTP	Anderson Dam Tunnel Project
AF	acre foot
BCDC	Bay Conservation and Development Commission
°C	degrees Celsius
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act of 1970
CESA	California Endangered Species Act
cfs	cubic foot per second
CM	Conservation Measure
CNDDB	California Natural Diversity Database
CPUE	catch per unit effort
CVP	Central Valley Project
CWMZ	Cold Water Management Zone
DPS	Distinct Population Segment
DSOD	Division of Safety of Dams
DWR	California Department of Water Resources
EA	Environmental Assessment
eDNA	Environmental DNA
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
El.	Elevation
ESA	Federal Endangered Species Act
ESU	Evolutionarily Significant Unit
FAHCE	Fish and Aquatic Habitat Collaborative Effort

FERC	Federal Energy Regulatory Commission
FOCP	FERC Order Compliance Project
IRRM	Interim Risk Reduction Measure
LWD	large woody debris
MCE	maximum credible earthquake
mg	milligram
mg/L	milligrams per liter
NMFS	National Marine Fisheries Service
NTU	Nephelometric Turbidity Unit
PMF	probable maximum flood
ppt	parts per thousand
SBSPRP	South Bay Salt Pond Restoration Project
SEV	severity of ill effects
SFEI	San Francisco Estuary Institute
SSC	suspended sediment concentration
SS/L	suspended sediment per liter
SWRCB	State Water Resources Control Board
UC Davis	University of California, Davis
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VHP	Valley Habitat Plan

1 INTRODUCTION

Anderson Dam and Reservoir, constructed in 1950 on Coyote Creek, is a critical water supply facility for Santa Clara County and is Santa Clara Valley Water District's (Valley Water's) largest owned and operated reservoir (storage capacity of 89,073 acre-feet). Operations involve reservoir water releases for multiple purposes, including water supply, groundwater recharge, incidental flood control, power generation, downstream aquatic habitat, maintenance, and emergency purposes. Anderson Dam is located near the junction of Cochrane Road and Coyote Road in Santa Clara County, California, 0.8 mile east of U.S. Highway 101 (Cochrane Road exit), 18 miles southeast of downtown San Jose, and 2.5 miles northeast of downtown Morgan Hill (Figure 1-1).

In 2012, with oversight from the Division of Dam Safety and Inspections Federal Energy Regulatory Commission (FERC) and the California Department of Water Resources, Division of Safety of Dams (DSOD), the Anderson Dam Seismic Retrofit Project (ADSRP) was initiated to address seismic deficiencies present at Anderson Dam. Further studies and investigations also identified that the spillway at Anderson Dam does not meet modern safety standards because it lacks the capacity to safely pass flood flows associated with the probable maximum flood (PMF). Additionally, the dam outlet does not have the capacity to efficiently draw down the reservoir during an emergency and is vulnerable to a seismic event. The proposed ADSRP involves retrofitting and upgrading Anderson Dam and associated facilities to meet FERC and DSOD requirements. Throughout 2019 and into early 2020, project staff and consultants had been preparing the 90% design plans, specifications, and supporting environmental and permitting documents for the ADSRP. Construction of the ADSRP was scheduled to start in the fall of 2022.

On February 20, 2020, under Part 12 of the Federal Power Act, FERC ordered Valley Water to implement interim risk reduction measures (IRRMs) associated with the Anderson Dam Seismic Retrofit Project immediately, due to limited existing outlet capacity at Anderson Dam (the existing outlet has a maximum capacity of 500 cfs) and the presence of densely populated areas downstream of the dam, in order to reduce the risk of dam failure from an earthquake as much as possible until the ADSRP can be fully implemented (referred to herein as the FERC Order).

The FERC Order directed Valley Water to implement IRRMs, namely to maintain the reservoir no higher than elevation 565[1] feet effective immediately; to start safely lowering Anderson Reservoir to an elevation of 488 feet, deadpool, beginning no later than October 1, 2020 and maintain the reservoir at deadpool. In addition, Valley Water was ordered to expedite design and construction of a new, low-level outlet tunnel that will allow the reservoir to be drawn down much more quickly during heavy rains. FERC also stated that Valley Water should attempt to secure alternative emergency water supplies and work with Commission staff, and federal, state and local resource agencies to minimize environmental impacts.

Pursuant to FERC's Order, Valley Water immediately restricted the reservoir to 565 feet elevation and began planning what is now referred to as the FERC Order Compliance Project (FOCP or Project). Also, with FERC, Valley Water initiated emergency consultation processes with regulatory agencies, as appropriate.

[1] All elevations in this document refer to North American Vertical Datum of 1988.

Figure 1-1: Project Location Overview

The FOCP will implement FERC's February 20, 2020 Order while also seeking to minimize potential adverse environmental impacts. In response to FERC's recognition that Valley Water should seek to minimize environmental impacts, the FOCP includes several important avoidance and minimization measures (AMMs). These AMMs are designed to minimize public health and safety and environmental impacts of complying with the FERC Order, including impacts to water supply, groundwater recharge, reservoir and dam bank stability, reservoir and downstream aquatic resources, and downstream flood risks (Figure 1-2).

While the FOCP and the ADSRP are two separate, independent projects with independent utility,[2] FOCP infrastructure is being designed to be compatible with future ADSRP infrastructure and facilities. CEQA compliance and regulatory approval processes for the ADSRP will continue in parallel with the FOCP.

1.1 PROJECT PURPOSE

The underlying purpose of the FOCP is to comply with the FERC Order, requiring immediate implementation of IRRMs to protect the public from risk of dam failure due to seismic activity, and development and implementation of necessary AMMs.

Primary objectives of the FOCP are to construct improvements and implement operational activities necessary to:

- Allow Valley Water a way to safely, reliably, and expeditiously draw down Anderson Reservoir to deadpool and maintain lower reservoir elevations to comply with the FERC Order:
- Minimize risks associated with exceeding the restricted reservoir level and undersized outlet structure by designing and constructing a new, low-level outlet tunnel (also known as the Anderson Dam tunnel);
- Prioritize the interim downstream protection of residents and property by decreasing immediate potential risks related to fault rupture from the maximum credible earthquake on the Coyote Creek–Range Front Fault Zone and the number of days that the reservoir elevation exceeds the restricted reservoir level by operating the new Anderson Dam tunnel; and
- Minimize the public health and safety and environmental impacts of reservoir draw down, Anderson Dam tunnel construction, and operations necessary to maintain the reservoir at the FERC ordered elevation through the implementation of AMMs. This includes lessening potential adverse impacts on reservoir and dam bank stability, the existing outlet, reservoir and downstream aquatic resources, downstream flood risks, and water supply and groundwater recharge, including downstream subsidence that may result from reductions in recharge.

1.2 PROJECT OVERVIEW

The FOCP consists of four broad categories of actions (items 1 through 4), and ten main project components (items 1 through 3, and 4a through 4g; Figure 1-2, Appendix H):

1. *Reservoir Drawdown to Deadpool.* Safe drawdown of Anderson Reservoir to deadpool, and wet and dry weather reservoir operation and management measures to maintain deadpool via the existing outlet and to augment surface water for groundwater recharge and in-stream

[2] The FOCP would continue to achieve its objectives even if the ADSRP is not constructed.

environmental flows within Coyote Creek until Anderson Dam tunnel is operational (see item 3).

2. *Anderson Dam Tunnel Construction.* Construction of a new outlet system that includes a new low-level outlet tunnel, 8-foot-diameter lake tap, outlet structure, discharge channel, and reopening of the original Coyote Creek channel (northern channel) downstream of the existing dam (see item 4(b) below), allowing for a reliable and efficient drawdown of the reservoir. The new outlet system, collectively called the Anderson Dam Tunnel Project (ADTP), will be constructed at the base of Anderson Dam, through the right (looking downstream) abutment, along the southern side.

3. *Anderson Dam Tunnel Operation and Maintenance.* Wet and dry weather operation of the existing outlet and the Anderson Dam tunnel anticipated to occur after construction of the ADTP to maintain elevation 488 ft (or a higher reservoir elevation if approved by FERC) and to provide surface water augmentation for groundwater recharge and environmental in-stream flows within Coyote Creek until seismic deficiencies can be fully mitigated at Anderson Dam (i.e., ADSRP).

4. *Avoidance and Minimization Measures.* Implementation of measures to secure alternative water supplies and minimize environmental effects, including:

   a. *Bank and Rim Stability Improvements*. Geotechnical investigations and installation of monitoring devices for areas of known landslides along Anderson Reservoir rim to address potential impacts of reservoir drawdown. If additional measures are determined necessary, the Project would include the installation of necessary structural improvements to protect against potential landslides and/or make repairs if damage occurs.

   b. *Existing Intake Structure Modifications*. Geotechnical investigations and installation of monitoring devices near the intake structure to address potential geotechnical impacts of dewatering on the existing outlet structure. If additional measures are determined necessary, the Project would include the installation of necessary structural improvements to reinforce the existing Anderson Dam intake structure and/or make repairs if damage occurs.

   c. *Creek Channel and Bank Erosion Control Modifications.* This measure includes modifications to the channel to avoid erosion impacts within Coyote Creek that are anticipated as a result of the combined flow releases through the existing Anderson Dam outlet and the new ADTP once constructed.

   d. *Imported Water Releases and Cross Valley Pipeline Extension.* To protect against potential risks to groundwater recharge and water supply reliability for the Coyote Valley and South San Jose, Valley Water proposes imported water releases to Coyote Creek via the Coyote Discharge Line immediately downstream of Anderson Dam, at the top of Coyote Creek cold water management zone (CWMZ), as it currently does, throughout the FOCP. Secondarily, this measure proposes to construct a new spur off the Cross Valley Pipeline that would convey imported water releases downstream of the County of Santa Clara-owned Ogier Ponds. Once the pipeline extension is operational, chilled imported water will be released to Coyote Creek at the top of the cold water management zone, and additional imported water will be released downstream of Ogier Ponds to maintain the full groundwater recharge program, while reducing impacts to aquatic wildlife in the CWMZ. This will require chillers to be installed near the turnout for the Coyote Discharge Line, so that up to 10 cfs can be cooled prior to releasing it to the CWMZ

e. *Coyote Percolation Dam Replacement*. This measure proposes to replace the existing flashboard dam at the Coyote Percolation Pond with an inflatable bladder dam that can be deflated (lowered) to allow flows in excess of 800 cfs to pass safely. The existing dam is not designed to withstand flows greater than 800 cfs and removing the structure altogether would substantially impair groundwater recharge in a sensitive groundwater basin. The bladder dam would facilitate passing the higher flows that are likely to occur after construction and during operation of the ADTP.

f. *Coyote Creek Flood Management Measures*. Acquisition or elevation of up to ten structures on nine parcels, construction of up to six spans of off-stream floodwalls, and construction of a levee is needed to reduce flood risks arising from higher maximum Anderson Dam tunnel flows combined with outflows from the existing outlet and Coyote Creek inflows resulting from storm events.

g. *Steelhead and Fish Avoidance and Minimization Measures.* In addition to the releases of water to Coyote Creek described above (d), fish avoidance measures include spring pulse flows, Coyote Creek fish rescue and relocation, Anderson Reservoir fish rescue and relocation, fyke trap installation and operation, normal operation of Coyote Reservoir, augmenting streamflow downstream of Anderson Dam, re-opening a historical Coyote Creek channel, cold water management zone monitoring, and water quality monitoring. [3]

h. *Implementation of Additional Project-specific Avoidance and Minimization Measures* . The Project will implement project specific best management practices (BMPs) and other environmental protection measures to protect water quality and biological resources, including Santa Clara Valley Habitat Conservation Plan measures to protect listed species.

1.3 PURPOSE AND SCOPE OF PLAN

This Reservoir Drawdown and Operations Plan's (Plan's) primary purpose is to describe Valley Water's proposed approach to comply with the FERC Order and support the efforts of FERC, the Federal Lead Agency, to develop an Environmental Assessment (EA) for the FOCP. The Plan will also address FERC's information requests regarding dewatering,[4] and will support emergency Endangered Species Act (Section 7) consultations, particularly regarding FOCP potential adverse impacts to special status species and critical habitat within Coyote Creek and Anderson Reservoir. This plan will describe Valley Water's approach for the drawdown of the reservoir to deadpool and subsequent dry and wet weather operations through the existing outlet, dry and wet weather operations of the new Anderson Dam Tunnel in combination with the existing outlet) until construction of the ADSRP begins, anticipated releases Coyote Creek throughout construction, and other FOCP activities such as dewatering work areas during the construction of the ADTP and proposed erosion control channel modifications, and implementing avoidance and minimization measures.

In addition to supporting FERC's EA and emergency Section 7 consultation with National Marine Fisheries Service (NMFS) to address potential impacts to the listed Central Coastal California steelhead (*Oncorhynchus mykiss)* DPS, the plan will also provide support for an emergency Section

[3] These include measures that would be defined as "conservation measures" under the Endangered Species Act.

[4] FERC requested specific background information and a dewatering plan in correspondence dated April 23, 2020

7consultation with the U.S. Fish and Wildlife Service (USFWS) and an emergency California Endangered Species Act (CESA) consultation with the California Department of Fish and Wildlife to address potential impacts to the listed species within their jurisdiction in accordance with the Santa Clara Valley Habitat Conservation Plan (VHP). It is anticipated, based on information in Appendix C that potential impacts of the FOCP impacts to listed species within the jurisdiction of USFWS and CDFW can be fully avoided, minimized and mitigated through FOCP compliance with the requirements of the VHP. Finally, the plan will also provide support for emergency applications for a U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 permit for the ADTP, a State Water Resources Control Board Section 401 certification for the ADTP, and a California Department of Fish and Wildlife (CDFW) Section 1602 Streambed Alteration Agreement. Valley Water anticipates that this document will be reviewed and commented upon by the consulting and permitting agencies, and will be supplemented by July 24th, 2020 .This document reflects the currently known information responsive to FERC's April 23, 2020 request for information and includes only limited effects analyses (other than those for the VHP covered species in Appendix C). The effects analyses will be continued to be developed through emergency consultation with FERC, as well as state and federal agencies and provided by July 24, 2020.

Figure 1-2: FERC Order Compliance Project Overview

2 EXISTING CONDITIONS

Anderson Reservoir is an impoundment on Coyote Creek created by Anderson Dam (Figure 2-1). Coyote Creek originates on the slopes of Mount Sizer near Henry Coe State Park and flows generally south and west to Santa Clara Valley. Before it reaches Anderson and Coyote reservoirs, the creek turns northward, flowing through the two reservoirs and then the Santa Clara Valley before it enters the southern San Francisco Estuary near Dixon Landing Road and Mud Slough. The main stem of Coyote Creek is approximately 42 miles long, and the creek has approximately 10 primary tributaries (Leidy et al. 2005). The total Coyote Creek watershed area is about 320 square miles (USGS 2019a). This section provides descriptions of existing conditions as they pertain to Valley Water infrastructure and operations, the physical environment, and briefly discusses biological resources. See Appendices C and D for additional information on Santa Clara Valley Habitat Conservation Plan Evaluation and Fish Assemblage Information, respectively.

2.1 ANDERSON RESERVOIR

Anderson Reservoir is a critical water supply facility for Santa Clara County and Valley Water's largest owned and operated reservoir (storage capacity of 89,073 acre-feet [AF]). Operations involve reservoir water releases for multiple purposes, including water supply, groundwater recharge, flood control, power generation, downstream aquatic habitat, maintenance, and emergency purposes. Anderson Dam is located near the junction of Cochrane Road and Coyote Road in Santa Clara County, California, 0.8 mile east of U.S. Highway 101 (Cochrane Road exit), 18 miles southeast of downtown San Jose, and 2.5 miles northeast of downtown Morgan Hill (Figure 2-1). The dam is situated on Coyote Creek, a tributary to San Francisco Bay, and creates Anderson Reservoir.

2.1.1 Infrastructure and Operations

From Anderson Dam, a full Anderson Reservoir would extend more than 3 miles northwest up the Las Animas Creek (or northern) arm of the reservoir, and nearly 4 miles southeast up the mainstem of Coyote Creek or southern arm of the reservoir. Of the approximately 195 square miles of drainage area upstream of Anderson Dam, approximately 62 square miles drain into the northern arm of the reservoir and 133 square miles drain into the southern arm (USGS 2019a). Flow into the northern arm from the Las Animas Creek and Packwood Creek is uncontrolled; flow into the southern arm is comprised of both uncontrolled inflows from Otis Canyon Creek, and controlled inflows from Coyote Reservoir. The spillway crest of Anderson Dam is at El. 627.8 feet.

Anderson Dam is a rockfill and earthfill dam constructed in 1950 (HDR 2016). It is approximately 1,400 feet long, 40 feet wide at the dam crest, and 240 feet tall. When full, Anderson Reservoir has a capacity of 89,073 AF. However, since 2010, the maximum water surface elevation and storage in Anderson Reservoir have been restricted by the DSOD to reduce the likelihood of dam failure during a large earthquake. Since 2017, Valley Water has operated Anderson Reservoir to maintain storage below 51,766 AF (58 percent full), or El. 592 feet, for seismic safety (Schaaf & Wheeler and Black & Veatch 2019a). Since the FERC Order, Valley Water has operated Anderson Reservoir to maintain storage below 31,694 AF (approximately 35 percent full), or El. 565 feet.

Anderson Reservoir has historically been operated for water supply and groundwater recharge. Incidentally, it also provides releases to the Coyote Creek's CWMZ when the creek might otherwise be dry, as noted by San Francisco Estuary Institute, "under natural conditions most of Coyote Creek was seasonally dry (2006)". Watershed inflows are captured and stored in Anderson Reservoir in accordance with two water rights. The first water right, License 7212, allows for up to 71,100 AF of local runoff to be collected between December 1 and May 1 for irrigation, domestic, minor industrial, and incidental recreational uses (SWRCB 1984). The second water right, License 10607, allows for up to 20,180 AF of local runoff to be collected between October 1 and July 1 for domestic, industrial, and recreational uses (SWRCB 1971). In addition, some years Valley Water stores imported water from San Luis Reservoir via the Santa Clara Conduit and Anderson Force Main in Anderson Reservoir for later release into Coyote Creek or delivery to water treatment plants (see following paragraph, Figure 2-2). Water is released to Coyote Creek, from Anderson Reservoir or from imported sources via the Coyote Discharge Line, which is located just downstream of the dam and at the upstream end of the CWMZ, to augment surface water primarily to recharge the groundwater supply in the Santa Clara Subbasin (both the Coyote Valley and Santa Clara Plain basins) and the Llagas Subbasin via infiltration in Coyote Creek, Coyote Percolation Pond, Madrone Channel, and Main Avenue Ponds. These releases are made year-round, but releases are generally higher in the summer. Depending on the hydrologic conditions, a full groundwater recharge program requires 20-60 cfs to be released below Anderson in order to meet the groundwater supply needs for portions of Morgan Hill and South San Jose who users who are completely dependent on groundwater for municipal, domestic, and agricultural purposes. Water from Anderson Reservoir is also used to supply water directly to the raw water distribution system, including deliveries and to the water treatment facilities for drinking water supply, via the bidirectional Anderson Force Main and Cross Valley Pipeline (Figure 2-2).

Water is also released to provide in-stream environmental flows for the CWMZ and to provide connectivity between the Creek and San Francisco Bay. Flows for the reservoir's "cold pool" are released primarily summer and fall months to augment flows and to provide cooler temperature flows than would otherwise be present in the CWMZ to benefit steelhead. In addition, Valley Water is required to maintain a flow of 2.5 cfs past Edenvale streamflow stations (SF58), which marks the end of the groundwater recharge zone. Such flow is required to keep the creek wet all the way to the San Francisco Bay per the Lake or Streambed Alteration Agreement that Valley Water has with CDFW.

Anderson Reservoir is part of Valley Water's raw water distribution system, and various infrastructure allows for operational flexibility of reservoir and the system. Anderson Reservoir can deliver water to the Anderson Hydroelectric facility below Anderson Dam, which then discharges the water to Coyote Creek. In addition, Anderson Reservoir stores local runoff, as well as imported water allocations from the Central Valley Project (CVP), which originates from outside of the watershed. CVP water comes from the United States Bureau of Reclamation's San Felipe Division via San Luis Reservoir and the Pacheco Pumping Plant. Water from San Luis Reservoir is transferred to Anderson Reservoir through the Santa Clara Conduit. As noted above, water from San Luis Reservoir can also be discharged directly to Coyote Creek at the Coyote Discharge Line turnout, which is a 30-inch polyjet, near the Anderson Hydroelectric facility, about 1,300 feet downstream of Anderson Dam. Due to its operational flexibility, size, and location Anderson Reservoir is also the Santa Clara Valley's most important source of emergency water supply and it the reservoir is operated to reserve 20,000 AF in the event a water emergency water, such as a pipeline disruption, a prolonged power failure at the Pacheco Pump Plant, and/or a severe drought.

Water supply operations and releases to Coyote Creek vary from year to year, based on watershed inflows, availability and quality of imported water, pipeline outages, groundwater supplies, and water demand. Valley Water has provided a summary of Anderson operations over that last 5 years below (Table 2-1).

Table 2-1: Anderson Reservoir Operations Summary

Calendar Year	Reservoir Min. El (feet)	Reservoir Max. El (feet)	Water Year Type (Sacramento River Index)	Reservoir Inflows	Releases to Coyote Creek	Other Remarks
2014	567.1	602.1	Critical	Minimal inflows from the watershed, except for the month of December 2014; San Felipe Division, Central Valley Project water were imported and stored in Anderson for dry season releases for groundwater recharge and to supply water treatment plants	Minimal releases to Coyote Creek from Anderson Reservoir. Some releases of imported water to Coyote Creek from the Coyote Discharge Line, but total releases were less than stream capacity and resulted in significant reaches of dry stream channel downstream of Coyote Creek Golf Drive.	Drought conditions
2015	562.1	584.4	Critical	Minimal inflows from the watershed; San Felipe Water Project Water was imported and stored in Anderson for dry season releases for groundwater recharge and to deliver water treatment plants	Minimal releases to Coyote Creek from Anderson Reservoir. Maintained dry season stream flows and groundwater recharge with imported water released from the Coyote Discharge Line.	Drought conditions
2016	562.0	596.1	Below Normal	Below average inflows from the watershed; San Felipe Water Project Water was imported and stored in Anderson for dry season releases for groundwater recharge and to deliver water treatment plants	Significant releases to Coyote Creek from Anderson Reservoir, including pulse releases up to 170 cfs from late-March to mid-April created a sustained connection to San Francisco Bay; this was followed by reduced releases for groundwater recharge, which did not re-establish a connection to San Francisco Bay until October, but returned groundwater levels in Coyote Valley to pre-drought levels; imported water released from the Coyote	Drought conditions

Calendar Year	Reservoir Min. El (feet)	Reservoir Max. El (feet)	Water Year Type (Sacramento River Index)	Reservoir Inflows	Releases to Coyote Creek	Other Remarks
					Discharge Line supplemented releases to Coyote Creek;	
2017	551.5	632.1	Wet	Large storms filled the reservoir completely	Anderson Reservoir releases to Coyote Creek. Uncontrolled release via spillway 2/19/17 thru 3/1/17.	Flooding occurred in San Jose on 2/21/17. Reservoir exceeded DSOD interim level for 84 days. In May, DSOD further lowered the interim reservoir level to 592.3 feet.
2018	547.2	579.5	Below Normal	Minimal inflows from the watershed; San Felipe Division, Central Valley Project water imported and stored in Anderson for dry season releases for groundwater recharge and to deliver water treatment plants	Anderson Reservoir releases to Coyote Creek during the summer for groundwater recharge and environmental flows, although most of this water was imported water put into Anderson in March-May	A lower Anderson-Coyote Combined Flood Rule Curve was adopted by the Valley Water Board of Directors for 2017-18 winter operations; this rule curve is based on the 40% inflow exceedance probability
2019	547.7	588.7	Wet	Above average inflows from the watershed; no imported water was added to Anderson	Significant winter releases from Anderson Reservoir to Coyote Creek in February-March to maintain storage in Anderson and Coyote reservoirs below the combined flood rule curve and DSOD restrictions; Anderson Reservoir releases to Coyote Creek during the summer for groundwater recharge and environmental flows; no imported water releases necessary during summer	The lower Anderson-Coyote Creek Combined Flood Rule Curve adopted by the Valley Water Board of Directors for 2017-18 winter operations continues in effect

Calendar Year	Reservoir Min. El (feet)	Reservoir Max. El (feet)	Water Year Type (Sacramento River Index)	Reservoir Inflows	Releases to Coyote Creek	Other Remarks
2020	555.2 and dropping	557.3	TBD	Minimal inflows	Pulse release to Coyote Creek, to promote steelhead outmigration performed in May, with a peak release of 120 cfs; Anderson Reservoir releases to Coyote Creek during the summer for groundwater recharge and environmental flows	FERC Order to lower reservoir to elevation 565 feet and drawdown to deadpool beginning October 1.

Anderson Reservoir's water surface elevation is controlled through the existing 49-inch-diameter outlet works. The maximum possible release from Anderson Reservoir using the existing outlet works depends on the water surface elevation in Anderson Reservoir and the hydraulic head driving the release. Based on a recent update to the discharge rating curve (Valley Water, unpublished data), the maximum release when Anderson Reservoir is completely full is 500 cubic feet per second (cfs) and is reduced to about 295 cfs as the reservoir is lowered to near its deadpool at El. 488 feet .(Table 2- 2). Releases are not possible when the water surface drops below El. 488 feet, the invert elevation of the deepest intake port to the outlet of Anderson Reservoir. The reservoir has been emptied twice since initial filling and has spilled 11 times (Schaaf & Wheeler and Black & Veatch 2019a). Uncontrolled spill occurs when reservoir storage exceeds roughly 90,000 AF.

Table 2-2: Estimated Discharge Capacity of the Existing Anderson Reservoir Outlet

628	500
614	483
586	448
566	421
540	383
524	358
509	333
500	318
490	299
488	295

cfs = cubic feet per second

2.1.2 Physical Conditions

The combined inflow to Anderson Reservoir from the northern tributaries and from Coyote Reservoir to the south varies based on time of year and water year type. Below Table 2-4 and Table 2-5 explain expected inflows into Anderson Reservoir from tributary inflows and from Coyote Reservoir releases. Combined inflows range from 14 AF per month in a dry year to 37,141 AF per month in wet year (Valley Water 2020, unpublished data).

Table 2-3: Estimated Tributary Inflow into Anderson Reservoir (excluding Coyote Reservoir outflows) based on water year types[5]

Maximum Monthly Volume	215	2,489	11,070
Minimum Monthly Volume	0	8	129

Table 2-4 Estimated Inflows into Anderson Reservoir from Coyote Reservoir based on water year types

Maximum Monthly Volume	109	3,721	26,071
Minimum Monthly Volume	14	116	472

Valley Water has been collecting water quality profile data in Anderson Reservoir near Anderson Dam since 2001 and URS began collecting continuous water temperature profile data in Anderson Reservoir in 2019 (Valley Water 2019b, URS unpublished data). To summarize these data, temperatures collected from 2001 to 2020 were averaged by month, with depths rounded to the nearest meter (Table 2-5).

Anderson Reservoir water temperatures averaged between 10 and 24 degrees Celsius (°C). Water temperatures deeper in the reservoir are cool; below 14 meters in depth, temperatures were generally less than 18°C year-round. Anderson Reservoir water temperatures become stratified during the late spring summer and early fall; surface temperatures reached as high as 24°C, while deeper water remained around 11 to 12°C. The reservoir is more uniform in temperature in the winter and early spring; temperatures recorded in winter and early spring were around 10 to 14°C, and there was little change in temperature as depth increased

.

[5] Water year types are calculated by exceedance probabilities, with a dry year having a 90% probability exceedance, an average year having a 50% probability exceedance, and wet year having a 10% probability exceedance.

Table 2-5: Average Water Temperature (°C) in Anderson Reservoir, 2001 through 2020

Note: The August temperature average near the bottom of Anderson Reservoir includes errors, likely due to measurement equipment malfunction.
Source: Valley Water 2019b, URS unpublished data

Stratification generally begins in April and persists until mixing occurs in October-November. During this time, dissolved oxygen is depleted from the water column by bacteria. Anderson Reservoir has three portals, at elevations 563 feet, 528 feet, and 488 feet (shown as horizontal lines on Figure 2-1 below), that release water to Coyote Creek and/or send water to treatment plants via the Anderson Force Main. The lower and middle portals generally release anoxic water from June-October, and in some years, dissolved oxygen concentrations are low (<2 mg/L) at the depth of the upper portal. The average elevation where anoxic (no oxygen) conditions begin during stratification is 525 ft (depth of middle portal). Stratification and oxygen depletion vary with many factors such as water storage capacity, outlet portal used, outlet discharge rate, water residence time, and climate. We can expect that water discharged from the lower and middle portals will be hypoxic during the summer, however when the reservoir is at elevation 488 feet and releasing surface water we expect that there will be more mixing in surface water, compared to releasing water from lower ports. Additionally, Valley Water has observed from water quality spot checks in Coyote Creek that dissolved oxygen is not usually the limiting factor in moving water. However, dissolved oxygen impacts would be anticipated if Coyote Creek were to dryback to warm isolated pools.

Figure 2-1: Temperature and Dissolved Oxygen Profiles

Source: Valley Water 2009 unpublished data

Anderson Reservoir retains all coarse sediment that enters the reservoir. Although some fine sediment is passed through the reservoir, the reservoir is assumed, due to its large size, to have a buffering effect on runoff-induced increases in suspended sediment that would otherwise be translated directly to downstream reaches of Coyote Creek. During storm-related runoff events, highly turbid water entering Anderson Reservoir mixes with a large volume of stored water, and the suspended sediment concentrations (SSCs) can be diluted before flow is passed downstream of Anderson Dam.

The amount of fine sediment reaching the reservoir's outlet varies depending on particle size, density of sediment in the inflow, amount and rate of inflow, distance traveled through the reservoir, reservoir release operations, and suspended sediment transported during large storms that may reach the outlet at a higher concentration than during smaller storms. Although some of the suspended sediment settles from the water column in Anderson Reservoir, like other San Francisco Bay Area reservoirs (Kittleson et al. 1996), Anderson Reservoir can prevent some of the turbid water from moving quickly through the system and may prolong the release of mildly turbid water to Coyote Creek downstream of Anderson Dam for weeks following a storm

Sediment mapping and characterization has been completed for Anderson Reservoir (URS 2020a), based primarily on the geotechnical borings drilled in the reservoir near the dam to support ADSRP design, and a comparison of historical topography with the latest available bathymetry. Results have revealed an average of about 8 to 20 feet of accumulated fine sediment in the former stream channels in Anderson Reservoir, and 1 to 6 feet on the former terraces adjacent to those historical channels. This accumulation reflects decades of sediment trapping in the reservoir. The accumulation of some coarse sediment can be seen in aerial photographs at the southern end of the reservoir, extending into Anderson Reservoir to downstream of the East Dunne Avenue bridge. The majority of the accumulated sediments consist of cohesive fines described as medium to highly plastic clays. Preliminary estimates indicate that the volume of accumulated sediment in Anderson Reservoir is 2.9 million cubic yards. The volumes of accumulated sediment above the new restricted level (El. 488 feet) in the northern and southern arms of Anderson Lake are approximately 1,011,000 and 532,000 cubic yards, respectively.

2.2 COYOTE CREEK DOWNSTREAM OF ANDERSON DAM

This section describes the existing conditions downstream of Anderson Dam most likely to be affected during reservoir drawdown, localized dewatering, and by Anderson Reservoir in wet weather flow management and surface water augmentation activities during the implementation of the FOCP.

2.2.1 Infrastructure and Operations

Valley Water owns and operates two facilities below Anderson dam that influence Coyote Creek conditions, including the raw water pipeline outlet of the Coyote Discharge Line and the Coyote Percolation Pond and Percolation Dam (also known as the Metcalf Ponds). As mentioned above, Valley Water releases imported sources via the Coyote Discharge Line, to Coyote Creek to recharge groundwater supply in the Santa Clara Subbasin via instream infiltration through Coyote Creek and the Coyote Percolation Pond system. Depending on the hydrologic conditions, a full groundwater recharge program requires 30-60 cfs to be released below Anderson in order to meet the groundwater supply needs for portions of, Morgan Hill, and South San Jose.

2.2.1.1 Coyote Discharge Line

As mentioned above, imported water from San Luis Reservoir via the Santa Clara Conduit can be released to Coyote Creek via the Coyote Discharge Line (Figure 2-3). Water is released to Coyote Creek, from Anderson Reservoir or from imported sources via the Coyote Discharge Line, which is located approximately 1,200 feet downstream of the dam and at the upstream end of the CWMZ. Releases from the discharge line are used to augment surface water, primarily to recharge the groundwater supply in the Santa Clara Subbasin (both the Coyote Valley and Santa Clara Plain groundwater management areas) and the Llagas Subbasin via infiltration in Coyote Creek, Coyote Percolation Pond, Madrone Channel, and Main Avenue Ponds. These releases are made year-round, but releases are generally higher in the summer. Depending on the hydrologic conditions, a full groundwater recharge program requires 20-60 cfs to be released below Anderson in order to meet the groundwater supply needs for portions of Morgan Hill and South San Jose with users who are completely dependent on groundwater for municipal, domestic, and agricultural purposes (Figure 2-3).

2.2.1.2 Coyote Percolation Dam

Groundwater percolation is also increased by the operation of the Coyote Percolation Dam, which is a steel flashboard dam installed on a concrete apron that was constructed in 1937. The dam is used to impound water in the Coyote Percolation Pond just north of Metcalf Road. (Figure 2-4). The Coyote Percolation Dam is rated to safely handle flows up to 800 cfs. Prior to large storm events, Valley Water must drain the impounded water behind it and physically take the flashboards out with an excavator. Following large flow events, Valley Water must then replace the flashboards to continue to implement its full groundwater recharge program.

At the south side of the dam are two 10-foot wide by 11-foot high radial gates that can be raised or lowered to control flow releases from the percolation pond. The diversion dam is laddered to provide fish passage through the facility. The fish ladder extends upstream (south) of the existing steel dam for 30 feet and extends downstream (north) of the dam for approximately 39 feet. The fish ladder consists of 11 approximately 8.5-foot wide by 9- foot long concrete pools and one 23 foot by 12 foot semi-circular turning pool. The maximum differential between the pools is one foot, and the change in elevation over the dam structure for all twelve pools combined totals approximately 13 feet. The percolation pond is managed and the water level is not constant. To maintain a maximum of one foot of water flowing over the pools, pools 10, 11, and 12 are separated by adjustable weirs and are adjusted daily, as necessary to conform the water surface elevation in the fishway to the pond impoundment at an acceptable step height. Adjustments are performed from the control systems located on the south side of the dam structure. Remaining pools are separated by non-adjustable weirs (Figure 2-4). A Vaki fish monitor is used to detect passage through the facility during the salmonid migration season, September 16 - May 31. The Vaki is installed at the apex of the turn near the downstream end of the fish ladder. A portion of the Vaki is underwater and is designed so that fish will pass through the structure.

The facility diverts up to 5,000 acre feet of local water between April 1 and December 31 (State Water Resources Control Board License #2210). The facility is also used to percolate a fraction of the 20,000 acre-feet rediverted from storage appropriated under upstream water rights (Coyote Reservoir, SWRCB License 7211; and Anderson Reservoir, SWRCB Licenses 7212 and 10607) at any time of year.

2.2.2 Physical Conditions

Several stream habitat assessments have been completed for Coyote Creek downstream of Anderson Dam (Entrix 2000, Buchan and Randall 2003, FAHCE unpublished data, URS unpublished data). These assessments have subdivided the creek into reaches and classified the stream habitat type (e.g., riffle, pool, run) in each reach. In addition, Buchan and Randall (2003) assessed other physical and biological stream features like hydrologic processes and channel dynamics, riparian and aquatic habitat condition, landscape connectivity, water quality, and fish and macroinvertebrate community. We have collapsed the reaches from these assessments into four reaches that are relevant to the special-status species addressed in this Plan and described them in this section, from upstream to downstream.

The first reach corresponds with the Cold Water Management Zone (CWMZ) described in the 2003 Fish and Aquatic Habitat Collaborative Effort (FAHCE) Settlement Agreement. The FAHCE Settlement Agreement defines the CWMZ as, “the reach from the outlets of Anderson Dam to approximately Golf Course Drive" (FAHCE 2003)[6]. The intersection of Coyote Creek with Golf Course Drive (also labeled Coyote Creek Golf Drive on some maps) occurs downstream of the Ogier Ponds, approximately 5 miles downstream from Anderson Dam. However, since the Ogier Ponds do not provide cold water habitat, the CWMZ effectively ends at the upstream end of Ogier Ponds, 4 miles downstream from Anderson Dam. In this Plan, the CWMZ refers to the reach between Anderson Dam and the Ogier Ponds. The upper portion of the reach is incised with little floodplain area, and the lower portion of the reach has a meandering channel with numerous gravel bars (Buchan and Randall 2003). The reach has perennial flow, which supports a wide riparian corridor. This reach contains a relatively low density of pools (42 percent) and a relatively high density of riffles (9 percent) (Buchan and Randall 2003).

The second reach is approximately 6 miles long and extends from the downstream end of the Ogier Ponds to the upstream end of the Coyote Percolation Ponds. The Ogier Ponds, created from past gravel quarry operations, are wide and deep and are surrounded by a narrow band of vegetation. This reach has perennial flow, a meandering channel, abundant floodplain access, and a relatively wide riparian corridor (Buchan and Randall 2003). This reach contains a higher portion of riffle habitat (8 percent) and a lower portion of pool habitat (69 percent) compared to the downstream habitat (Entrix 2000, Buchan and Randall 2003). The portion of pool habitat in this reach is higher than in the upstream reach (69 percent versus 42 percent) (Buchan and Randall 2003). The percent of fine substrate and embeddedness was high when the site was assessed in 2003.

The third reach is an approximately 21-mile stretch of Coyote Creek from the upstream end of the Coyote Percolation Ponds to the Highway 237 Bridge. This reach begins at the Coyote Percolation Ponds, which contain deep, slow-moving water and is surrounded by a narrow band of riparian vegetation (Buchan and Randall 2003). The creek is constrained by earthen levees, limiting floodplain availability (Buchan and Randall 2003). The degree of urban development and the percent of fine substrate generally increase moving downstream. This reach contains a relatively high density of pool habitat (80 percent) and a relatively low density of riffle habitat (4 percent).

A major tributary to Coyote Creek, Upper Penitencia Creek, joins Coyote Creek in this third reach, approximately 10 miles upstream of San Francisco Bay. The Upper Penitencia Creek watershed drains approximately 24 square miles and includes Upper Penitencia Creek and one major tributary, Arroyo Aguague (Stillwater Sciences 2006). From its headwaters, Upper Penitencia Creek flows through the Diablo Range for 2.5 miles before reaching Cherry Flat Reservoir. For the first 2.5 miles downstream of Cherry Flat Dam, Upper Penitencia Creek is a steep, naturally confined perennial stream with a step-pool configuration that is associated with bedrock (Buchan and Randall 2003). Arroyo Aguague joins Upper Penitencia Creek approximately 2.4 miles downstream of Cherry Flat Dam (Stillwater Sciences 2006). After about 2.5 miles, Upper Penitencia Creek becomes less confined and more sinuous, with greater floodplain access (Buchan and Randall 2003). Approximately 5 miles downstream from Cherry Flat Dam, just downstream of Alum Rock Park, Upper Penitencia Creek becomes intermittent; however, releases from the percolation ponds about 0.3 mile downstream cause Upper Penitencia Creek to become perennial again (Smith 2013). Those imported water releases are conveyed from the South Bay Aqueduct, which has occasional outages that prevent percolation pond releases from entering the creek. Around 7 to 8 miles downstream from Cherry Flat Dam, earthen levees confine the channel, narrowing and

[6] Coyote Creek began flowing through Ogier Ponds after storm flows in January 1997; the FAHCE Settlement Agreement assumed that the levee would be restored to re-establish the separation between Coyote Creek and the ponds.

straightening the channel and limiting floodplain access (Buchan and Randall 2003). The lowest portion of the creek is highly incised, narrow, and straight due to urbanization.

The fourth reach of Coyote Creek, which is outside of the FOCP action area, is tidally influenced, rather than influenced by Anderson Reservoir operations, is mostly flooded during high tides, and supports salt marsh. This reach extends from the Highway 237 Bridge to the outlet of Coyote Creek into Alviso Slough.

2.2.2.1 Hydrology

In the early 1900s, prior to construction of Anderson Dam, Coyote Creek was intermittent in much of the reach below what is now the location of Anderson Dam (FAHCE 2000, SFEI 2006, NMFS 2016a). Coyote Creek was likely intermittent from about the location of the Ogier Ponds downstream to between Montague Expressway and Berryessa Road, a reach that could be 20 or more miles long, depending on the year (SFEI 2006). The intermittent period likely lasted from late spring through summer and early fall (FAHCE 2000).

Since the construction of Anderson Dam, in 1950, high flows in Coyote Creek have been attenuated and uncontrolled release events occur only every 9 years (on average). Due to regulated flows, Coyote Creek is mostly perennial, generally with higher summer flows and lower winter flows than would occur naturally. Figure 2-5 presents the median of daily flows by month for five Valley Water and USGS stream gages from the reach between Coyote Dam and Anderson Reservoir to Coyote Creek at Highway 237 from Water Years 2000 to 2019.

During summer months, Valley Water typically releases a combined flow rate of between 20 and 60 cfs into Coyote Creek from Anderson Reservoir and from the Coyote Discharge Line turnout and Santa Clara Conduit, which carries CVP water from San Luis Reservoir (Figure 2-2). These flows, which are much higher than the watershed would naturally produce in the summer, are released to replenish the Santa Clara and Llagas groundwater subbasins via Coyote Creek and the Coyote Percolation Ponds. Of the water released downstream of Anderson Dam, approximately 8 to 9 cfs is typically lost to groundwater in the CWMZ during the summer months (Valley Water, unpublished data). Flow loss downstream of Ogier Ponds and in Coyote Percolation Ponds is also apparent in Figure 2-3, which shows summer median flows beginning at 40 to 50 cfs downstream of Anderson Dam, dropping to around 15 cfs just upstream of the Coyote Percolation Ponds (which includes losses in the CWMZ, Ogier Ponds, and especially the reach between the Ogier and Coyote Percolation Ponds, where substantial infiltration is known to occur), then dropping again to about 7.5 cfs downstream of the Coyote Percolation Ponds. Summer flows at the gage at Highway 237 increase to around 15 cfs due to groundwater emergence and inflow from Lower Silver Creek and Upper Penitencia Creek (Figure 2-3).

During the winter months, Valley Water refills Anderson Reservoir and reduces flows into Coyote Creek to around 15 to 40 cfs (Figure 2-3). From the outlet of Anderson Dam to Gage SF07, less than 1 mile upstream of the Coyote Percolation Pond, percolation and evaporation reduce winter flows to around 7 to 10 cfs. Percolation in Coyote Creek and the Coyote Percolation Pond further reduces winter flows to around 5 to 6 cfs downstream of the Coyote Percolation Pond (Figure 2-3). Inflows from Lower Silver Creek and Upper Penitencia Creek increase winter flows to around 22 to 28 cfs at Highway 237 (Figure 2-3). Winter storms cause brief spikes in flow that are typically between about 50 and 1,000 cfs, which are significantly lower than the storm flows that would occur in the absence of Anderson and Coyote reservoirs.

Upper Penitencia Creek is an important tributary to Coyote Creek because it contains steelhead spawning and rearing habitat (Appendix B Draft Fish Rescue and Relocation Plan). Hydrology in the

Upper Penitencia Creek Watershed is affected by the Penitencia Creek percolation ponds and by Cherry Flat Dam, a 500 AF dam that detains water from 2.4 square miles of the 24-square-mile Upper Penitencia Creek Watershed. Releases from Cherry Flat Dam are not monitored, but releases from Cherry Flat Reservoir provide most of the summer flow in Upper Penitencia Creek (Moore et al. 2008b, Smith 2013). Upper Penitencia Creek is perennial for approximately 5 miles downstream of Cherry Flat Dam, after which point it becomes intermittent just downstream of Alum Rock Park (Smith 2013). Releases from the percolation ponds 0.3 mile downstream from the intermittent reach cause Upper Penitencia Creek to be perennial again, and the creek remains perennial to the confluence with Coyote Creek. During most years, the creek becomes intermittent in June; in dry years, it can become intermittent as early as April.

Figure 2-2: Coyote Creek Managed Recharge

Figure 2-3: Anderson Reservoir Raw Water Connections

Figure 2-4: Coyote Percolation Dam and Fish Ladder

Figure 2-5: Monthly Median of Daily Flow (cfs) Recorded in Coyote Creek at Five Stream Gages, Water Year 2000 through 2019

2.2.2.2 Temperature

To understand spatial and seasonal temperature patterns and trends in Coyote Creek from upstream of Anderson Reservoir downstream through the reaches downstream of Anderson Dam to San Francisco Bay (including the tidally influenced reach) temperature data has been summarized below. Existing temperature data were grouped into seven reaches and averaged by month. Reach A covers several miles of intermittent and perennial reaches of Coyote Creek. Reach B is a 1.5 mile reach between Anderson and Coyote reservoirs. To more accurately represent temperatures in the effective CWMZ, this section was divided into two reaches. Reach C covers a 0.2 mile reach from the dam outlet to the Coyote Discharge Line input, and Reach D spans 3.7 miles from the Coyote Discharge Line input to the inlet of Ogier Ponds. Reach E is a 4.7 mile reach from the outlet of Ogier Ponds to the inlet of the Coyote Percolation Pond, Reach F is a 14.9 mile reach from the outlet of the Coyote Percolation Pond to the confluence with Upper Penitencia Creek, and Reach G covers the final 16.7 miles to the San Francisco Bay. Valley Water maintained temperature loggers at numerous locations on Coyote Creek, both upstream and downstream of Anderson Reservoir, between 2000 and 2012 (Valley Water, unpublished data). In 2019, Valley Water redeployed temperature loggers in Coyote Creek downstream from Anderson Dam and has been collecting data since May 2019. URS deployed temperature loggers both upstream and downstream of Anderson Reservoir in 2019 and is continuing to collect temperature data. The San Francisco Bay Regional Water Quality Control Board has also been collecting water temperature data in Coyote Creek downstream of Anderson Dam since 2019. The period of deployment for each temperature logger varied widely, with some loggers deployed for as little as 2 months and others deployed for several years. Aggregating the data into seven reaches provided a more complete period of record for each reach. The reaches from Anderson Dam to the Coyote Percolation Ponds have more data points than the other reaches.

Table 2-6 summarizes the data evaluated; the green shading indicates cool temperatures and red shading indicates warmer temperatures, to allow for visual comparison of trends from upstream to downstream and across months at individual locations. The clearest pattern to emerge from these data are the seasonally warmer temperatures that occur throughout the watershed around the summer months. .

From late spring through early fall, water is released from the deep, cold water pool in Anderson Reservoir for groundwater recharge, which also helps to maintain cooler water temperatures in the CWMZ. At that time of year, water from the Anderson Reservoir cold pool is 3.1°C to 5.3, or an average of 4.3°C cooler than flows above the watershed. Immediately downstream of the CWMZ, water flows through the Ogier Ponds; farther downstream, water flows through the Coyote Percolation Ponds. These ponds slow the flow of water and spread water over a large surface area, which results in warming. Average temperatures downstream of the CWMZ were up to 6.2°C warmer than the CWMZ during summer months. Farther downstream, past the confluence with Lower Silver Creek and Upper Penitencia Creek, summer water temperatures varied by up to 0.8°C from the reach upstream due to groundwater emergence and inflow from these tributaries. During the winter, average water temperatures throughout Coyote Creek ranged from 9.0 to 12.3°C and temperatures above Anderson Reservoir were generally 1.7 to 2°C cooler than downstream of Anderson Dam (Table 2-6, Figure 2-6).

Table 2-6: Average Water Temperatures (°C) in Coyote Creek Watershed, 2000 through 2020

Month	Reach						
	Reach A: Above Coyote Reservoir	Reach B: Between Coyote Dam and Anderson Reservoir	Reach C: CWMZ - Upstream of CVP Outfall	Reach D: CWMZ - Downstream of CVP Outfall	Reach E: Between Ogier Ponds and Metcalf Ponds	Reach F: Metcalf Ponds to Upper Penitencia Creek Confluence	Reach G: Upper Penitencia Creek to San Francisco Bay
January	8.5	9.0	11.0	11.0	10.9	10.4	11.1
February	10.1	9.9	10.6	10.8	12.2	12.0	11.8
March	12.1	11.4	10.8	11.2	14.3	13.7	13.5
April	13.6	13.6	11.5	12.3	16.1	15.8	15.1
May	17.7	16.5	12.1	13.7	18.6	18.4	18.3
June	19.4	19.2	12.5	14.7	20.5	20.8	20.9
July	20.2	21.3	13.5	16.4	21.9	21.9	21.1
August	20.0	21.4	14.5	16.7	21.5	21.7	21.2
September	17.6	20.2	15.9	17.2	20.2	19.9	19.9
October	12.6	17.0	14.8	15.8	17.4	16.8	17.1
November		13.8	14.2	14.4	14.2	13.6	13.7
December	9.1	10.0	12.5	12.3	11.0	11.2	11.6

Sources: Valley Water, unpublished data; Regional Water Quality Control Board, unpublished data; URS, unpublished data.

Figure 2-6: Coyote Creek Temperature Logger Reaches (as shown in Table 2-6)

2.2.2.3 Sediment

Prior to impoundment in the early 1900s, the Coyote Creek Watershed would have experienced large sediment transport events during winter and spring storm events and little sediment transport during summer months. First Coyote Dam, then Anderson Dam blocked sediment transport from the upper watershed; as a result, Coyote Creek immediately downstream from Anderson Dam is sediment-limited. As described in Section 2.1.2, Anderson attenuates flow and turbidity pulses associated with storm events; therefore, Coyote Creek downstream from Anderson Dam is exposed to storm-related turbidity pulses that are lower in magnitude and possibly greater in duration than pre-dam conditions. Sediment transport downstream of Anderson Dam is also affected by urbanization, flood control projects, and the altered hydrology associated with reservoir operations, especially a reduction in the recurrence of peak flows (NMFS 2016a). Accumulated fine sediments in lower Coyote Creek likely limit salmonid spawning habitat and invertebrate prey production in Coyote Creek downstream from Anderson Dam (NMFS 2016a).

Suspended sediment and turbidity measurements have been collected only sporadically in Coyote Creek downstream of Anderson Dam. Turbidity point measurements collected in 2007 and 2008 between Montague Expressway and Anderson Dam ranged from 2 to 35 Nephelometric Turbidity Units (NTUs) (Moore et al. 2008a, Moore et al. 2008b). Seventeen turbidity measurements in Coyote Creek downstream from Anderson Dam collected in March 2019, when flows ranged from 430 to 610 cfs, ranged from 32 to 55 NTUs (HDR 2019). Five suspended sediment samples collected in Coyote Creek downstream from Anderson Dam from 2011 through 2015 ranged from 7 to 65 mg/L (CEDEN 2019). Suspended sediment samples collected at 17 sampling sites in Coyote Creek downstream from Anderson Dam from December 2019 to March 2020 ranged from 0 to 111 mg/L (Light, Air, and Space Construction, unpublished data). The range of typical SSCs and the effects of seasons, storm events, and location in the watershed on SSCs are largely unknown.

3 PROPOSED RESERVOIR AND STREAM MANAGEMENT DURING FOCP

The FERC Order directs initial dewatering using the existing outlet must begin October 1, 2020 and continue in a safe manner until Anderson Reservoir reaches El. 488 ft. The FERC Order also directs that elevation 488 must be maintained, at least until the ADTP is constructed and operations, at which time a higher elevation may be approved for the reservoir. Further, the FERC Order directs expedited construction of the ADTP, which is expected to take three years (Figure 3-1), as well as identification and implementation of avoidance and minimization measures to minimize impacts to groundwater recharge and the environment. The following list summarizes the generalized FOCP construction activities by construction year:

- Current Year: The reservoir would be operated at a maximum El. 565 feet or lower until October 1 when the reservoir would begin to be drawn down to deadpool El. 488 feet (the invert elevation of the inlet to the existing outlet works, approximate storage of 2,820 AF). In preparation for the drawdown and loss of cold pool storage, pulse flows will be released to encourage outmigration of steelhead. Through the summer, the remaining cold pool water would be monitored in order to coordinate a fish rescue and relocation effort Leading up to October 1, reservoir releases would be used for beneficial uses such as groundwater recharge and providing water to the treatment plants. Then on October 1, the reservoir would be operated to release a net rate of 100 cfs, until you reach an inflow rate of 501 cfs, at which point the reservoir will begin theoretically storing water at the rate of 1 cfs. A sufficient rate of outflow will be maintained such that outflow exceeds inflow up to the 500 cfs design capacity of the existing outlet when full (See Table 2-2), until deadpool is reached. No material dry weather reservoir releases for surface water augmentation can occur when the reservoir is at deadpool because the reservoir elevation is too low. Dry weather surface water augmentation releases from the reservoir during this period will be minimal until deadpool is reached.

- Years 1 through 3: The reservoir would be operated to maintain El. 488 feet with releases being made through the existing outlet works, at net rate of 100 cfs until reservoir rim stability improvements can be made. Once all existing mapped landslide risks are mitigated, the outlet valve will be left wide open to capacity (500 cfs when the reservoir is full—See Table 2-2 to maintain elevation 488 feet to the maximum extent feasible). Ongoing monitoring of the reservoir rim will continue to ensure that new and unmapped landslides are not mobilized during reservoir lowering cycles. ADTP would be constructed during these 3 years (Section .3.1.1.) Due to the limited capacity of the existing outlet works, the reservoir water surface elevation would fluctuate in wet weather and would rise above El. 488 feet in winter when inflow exceeded the outlet's design capacity for outflow. Also during ADTP construction Years 2 and 3, localized dewatering will be needed to construct erosion control improvements and outlet channels to accommodate operation of the existing outlet and the ADTP outlet. The ponded area that currently exists between the southern channel and the dike that was constructed to abandon a stretch of the historical northern Coyote Creek channel would be dewatered. For a shorter period, during Year 2, water from this ponded area would be diverted around the location where a flow control weir will be constructed in the southern channel, allowing this area to also be dewatered for construction and biotechnic stabilization work on the outlet channels. Other Avoidance and Minimization Measures (AMMs) would also be constructed during this period, such as the Cross Valley Pipeline extension, the Coyote Discharge Line Chillers, the Coyote Creek Flood Protection Measures, and Coyote Percolation Dam Replacement Dry weather surface water augmentation releases from the reservoir during this period will not occur through the Coyote Discharge Line.

Year 4 (Post ADTP): After completion of the ADTP, the reservoir would be operated at El. 488 feet, or if approved by FERC, a higher elevation that avoids or minimizes downstream flooding while maintaining the reservoir in a safe condition. Subject to FERC's approval, a reservoir elevation of greater than 488 feet may be allowed once the ADTP is fully operational and can provide greater emergency drawdown capacity, assuring the ability to drawdown quickly in the event of a seismic event or very large storm event. The ability to operate the reservoir at a higher elevation would also facilitate incidental retention of local surface water inflows during precipitation events, potentially reducing the potential for downstream flooding that is anticipated to be associated with flows passing through the existing outlet and the ADTP at full capacity when combined with local inflows. The operation of the reservoir at a higher elevation than deadpool would also allow retention of a greater volume of imported and local water supply to facilitate groundwater recharge, and would allow for a deeper reservoir pool with colder temperatures, better facilitating flow releases to the CWMZ at temperatures appropriate for steelhead.

The following sections describe the FOCP activities and how each of those project components will be connected operationally.

3.1 RESERVOIR DRAWDOWN

Valley Water plans to maximize beneficial uses of the water stored in Anderson Reservoir leading up to the drawdown. Over the summer of 2020, reservoir levels will be maintained as high as possible to facilitate in-reservoir geotechnical borings and maintaining a cold water pool ahead of the fish rescue and relocation effort tentatively planned for August (Appendix B).Once the geotechnical investigations and fish rescue are completed, Valley Water will increase beneficial uses of release water by sending it to the treatment plants and providing groundwater recharge to Coyote Creek and the Coyote Percolation Pond.

Table 3-1 shows Valley Water's projected Anderson Reservoir storage and approximate water surface elevation for the first day of each remaining month in 2020 and January 2021. Based on analyses by Valley Water, the reservoir level on October 1, 2020 is estimated to be El. 518 feet and the reservoir will be lowered at a rate of 100 cfs greater than reservoir inflows, so that the reservoir is lowered by up to 200 AF per day (in the absence of significant precipitation), through the existing outlet. The exact duration of the initial drawdown will be influenced by the reservoir elevation on October 1, the size and frequency of storm events during the winter, and what rate is required to minimize remobilization of landslides around the reservoir rim, particularly in the vicinity of Holiday Estates (Section 4.1) and near the intake structure (Section 4.2). These landslides are currently under study to determine potential for remobilization and measures that could be taken to mitigate movement.

Releases would be made through the existing 49-inch diameter existing outlet pipe to Coyote Creek or to Valley Water's raw water distribution system. The 42-inch outlet valve on the downstream side of Anderson Reservoir is a butterfly valve. Butterfly valves are typically not throttled below 16% open to prevent damage to the valve. When it reaches El. 488 feet, Anderson Reservoir would cover approximately 150 acres, with storage of 2,852820 AF, with a water depth at the lower intake port of the existing outlet of 38 feet.

Table 3-1: Projected Anderson Reservoir Storage and Water Surface Elevations Leading up to the ADTP

July 2020	25,134	554
August 2020	21,565	547
September 2020	15,427	534
October 2020	9,492	518
November 2020	3,354	491
December 2020	2,820	488
January 2021	2,820	488

Note:
AF= acre-feet

Runoff from storm events would influence the rate of drawdown during the current year ADTP Year 1 winter, and would influence the ability of Valley Water to maintain Anderson Reservoir at El. 488 feet once drawn down, with a high likelihood of the reservoir level increasing during wet winters due to the relatively small discharge capacity of the existing outlet works. Based on stochastic analyses (Schaaf & Wheeler and Black & Veatch 2020- Unreviewed Draft), during the three winters that would occur while construction of the ADTP is underway (the current year/ADTP Year 1, the ADTP Year 1/2, and the ADTP Years 2/3 precipitation seasons, see Figure 3 1), assuming that the existing outlet is operated to release the maximum flow based on its design capacity (500 cfs when the reservoir is at the spillway elevation and less at lower reservoir elevations—See Table 2-2 above) there is an annual 90 percent probability that flows downstream of Anderson Dam will exceed 335 cfs, an annual 50 percent probability that flows will exceed 377 cfs, and an annual 10 percent probability that flows will exceed 421 cfs. Assuming an average precipitation year as reflected in the stochastic analysis, and barring unusually wet weather and high inflows, drawdown to the El. 488 feet deadpool is expected to be safely completed by or before April 2021

3.2 ANDERSON DAM TUNNEL CONSTRUCTION AND CONSTRUCTION PERIOD OPERATIONS

The ADTP includes a new low-level outlet tunnel, downstream diversion tunnel, 8-foot-diameter lake tap, outlet structure, discharge channel, and reopening of the original Coyote Creek channel (northern channel) downstream of the existing dam (Figure 3-2). The low-level outlet tunnel and downstream diversion tunnel would be constructed at the base of Anderson Dam, through the right (looking downstream) abutment, along the southern side of the spillway. The outlet structure would include valves to control flow through the tunnels, and energy dissipation chambers to reduce the erosive power of the diverted flows before reentering Coyote Creek. Construction of the outlet structure and discharge channel would require relocation (deepening) of approximately 500 feet of the Anderson Force Main. A sloping faced trash rack with bars on a 6-inch spacing would be installed at the upstream end of the diversion system to prevent entry of debris large enough to damage the system. The ADTP would be constructed during Years 1 through 3 while the reservoir water surface elevation is maintained at elevation 488 feet, or as close to that as feasible during wet weather given limited capacity of the existing outlet.

During Year 1 , wet weather, releases from the reservoir to Coyote Creek downstream of the dam would continue to be made through the existing outlet at a net rate of 100 cfs, up to the maximum outlet capacity. For example, if Anderson is receiving inflows of 10 cfs, then approximately 110 cfs will be released; this maintains a drawdown rate of 200 AF per day (absent precipitation). During

Years 2 and 3, once the landslides risks have been mitigated, wet weather releases will no longer be managed for a net rate of 100 cfs and the outlet will be allowed to operate fully open at all times to release its maximum capacity and maintain elevation 488 feet to the maximum extent feasible. The maximum capacity of the outlet is 500 cfs when the reservoir is completely full, and 295 cfs when the reservoir is near El. 488 feet, so wet weather releases at full capacity of the existing outlet will range between 300 cfs and 500 cfs. The estimated releases from Anderson Reservoir (based on anticipated inflows by water year type) are described in Table 3-2 below

During this period of the FOCP, no imported water would be stored in Anderson Reservoir and no water would be sent to from Anderson Reservoir to the treatment plants.

Table 3-2: Proposed Wet Weather Releases from Anderson Reservoir to maintain FERC Ordered El. 488 feet (through existing outlet during construction of Anderson Dam Tunnel)[7]

December	6	6	176.8
January	4.9	49.5	300.0
February	4.9	165.9	350.0
March	6.2	58.1	400.0
April	6.8	56.6	300.0
May	3.2	20.7	64.5
June	2.7	18.8	49.0
July	2.6	17.4	20.1
August	3.0	17.1	24.5
September	2.4	17.1	21.1
October	2.7	17.7	30.4
November	2.7	18.3	36.6

3.2.1 Reopening of the Northern Channel

The Coyote Creek channel would be modified to accommodate post-ADTP releases of up to 2000 cfs from the tunnel and 500 cfs from the existing outlet. This would involve reopening the reach of Coyote Creek (northern channel) that was decommissioned during original dam construction. The alignment of the reopened northern channel would be in approximately the same location as it was prior to the dam being constructed in 1950. The reopened northern channel of Coyote Creek will be designed with erosion control measures to accommodate wet season flows of up to the full capacity of the ADTP (2,000 cfs) to maintain El. 488 feet after construction of the Anderson Dam tunnel, because this is the largest flow release that could occur due to the regulation of flow through a valve on the downstream end of the tunnel (please refer to Appendix G for additional justification on why this design criteria was selected to maintain the FERC Ordered reservoir level of 488 feet. The probability of occurrence for a release to the maximum capacity of the ADTP will be reduced in the

[7] Estimated releases based on modeled Anderson Head-Discharge curve (Valley Water unpublished data)

event that FERC approves maintenance of the reservoir at a higher elevation than 488 feet after the ADTP becomes operational.

In total, the reopened northern channel and existing southern channel will be designed to safely pass maximum releases from the Anderson Dam tunnel during the FOCP. Releases will be split between the channel through a system of weirs (Table 3-3, Figure 3-3).

Table 3-3: Proposed Releases between Southern and Northern Channels

6	6	0
100	100	0
1,000	170	830
2,000	272	1,728
4,000	385	3,615
6,000 (maximum release during ADSRP construction)	1017	4,884*

*In the event that a release of up to 6,000 cfs is required to maintain dam safety during ADSRP dam embankment construction, some flow will pass through Live Oak Group Area and is not included in either channel total.

Construction within the creek channel will require that flow in Coyote Creek be temporarily diverted around the work area. At the start of construction, a dike will be installed to separate the existing Coyote Creek flows from the backwater area within Coyote Creek. The backwater area will then be dewatered to allow for construction within the creek. Groundwater seepage into the dewatered pond will be pumped to the on-site water treatment system, treated, and released back into Coyote Creek. The dike will be removed after completion of the modifications. Additionally, construction of the 5-foot-wide weir in southern channel will require temporary bypassing of flows being released from Anderson Reservoir by pumping around the location of the weir. Creek discharges, from dewatering the north channel and the weir bypass flows will be monitored for turbidity per conditions of the required 401 Water Quality certification that is needed prior to commencing this work. Construction Water Management

Nuisance groundwater will be generated during portal and tunnel excavations, dewatering of the backwater area formed following installation of the dike within Coyote Creek, relocation of the Anderson Force Main, and re-opening of the northern channel. Nuisance groundwater will be collected and pumped to an on-site water treatment system and treated before being released back into Coyote Creek. The volume of groundwater that will be produced during tunneling is anticipated to be approximately 100 gallons per minute. Groundwater inflows into the northern channel of Coyote Creek may be greater. The contractor will be required to provide a water treatment system capable of treating up to 400 gallons of water per minute.

3.3 ANDERSON DAM TUNNEL OPERATIONS

When construction of the ADTP is complete, the ADTP outlet and existing outlet works would be operated so that combined releases of up to 2,500 cfs or less could occur to maintain the an elevation that provides sufficient dam safety, while avoiding or minimizing downstream flooding that might otherwise result from high flow releases from the reservoir. Proposed release rates to maintain FERC's order of elevation 488 feet (based on anticipated inflows by water year type) are described in Table 3-3. Table 3-3 assumes combined releases of a maximum of 2,500 cfs because these flows may occur for relatively high frequency storm events, unless FERC approves maintenance of an elevation higher than 488 feet or allows the temporary exceedance of 488 feet while the reservoir is drawn back down after a storm event.

Flows from the ADTP outlet structure would be split, with most of the flow passing to the north of the Anderson County Park Live Oak Picnic Area through the reopened, original Coyote Creek channel, and the remainder passing through an approximately 1,200-foot-long section of Coyote Creek (southern channel) that passes through the Anderson County Park Live Oak Picnic Area, to where it rejoins Coyote Creek. The distribution of flow between the two channels would be achieved by construction of a 72-foot-wide sharp-crested weir at the head of the northern channel and a 5-foot-wide u-shaped channel invert at the head of the southern channel. The weirs would be designed to split releases up to 2,500 cfs that could occur during construction and operation of the ADTP so that the southern channel would operate with flow rates at or less than historical release rates, with the remainder of releases passing through the northern channel.

Table 3-4: Proposed Wet Weather Releases from Anderson Reservoir to maintain FERC Ordered El. 488 feet (through new Anderson Dam Tunnel)

December	6	12.5	179.6
January	8	81.6	387.3
February	8.1	219.4	578.5
March	9.5	41.7	330.5
April	10.2	54.0	159.8
May	6.8	11.7	41.3
June	6.4	10.1	38.8
July	6.3	8.7	9.9
August	6.4	8.2	14.3
September	6.6	8.1	10.7
October	6.7	8.5	19.7
November	6.9	9.0	25.8

Figure 3-1: Reservoir Water Surface Elevations and Flow Paths for Drawdown and ADTP Years 1 through 3

Figure 3-1: Plan and Profile of ADTP

Figure 3-3: Reservoir Water Surface Elevations and Flow Paths for Drawdown and ADTP Years 1 through 3

Figure 3-4: Localized Dewatering Areas Downstream of Anderson Dam

4 FOCP AVOIDANCE AND MINIMIZATION MEASURES

Implementation of interim risk reduction measures project components and other environmental protection measures have been identified as needed for the FOCP to avoid and minimize adverse impacts to the environment.

4.1 BANK AND RIM STABILITY IMPROVEMENTS

Five major landslides exist along the southern portion of Anderson Reservoir. Initial dewatering of the reservoir, and keeping the reservoir drained for a prolonged period of time, may reactivate areas of inactive landslides Landslide monitoring will commence prior to October 1 and will continue throughout the FOCP. The reservoir will be lowered at a net rate of 100 cfs greater than reservoir inflows, so that the reservoir is lowered by 200 AF per day, a rate that has been established to reduce the potential for activating existing and any new/unmapped landslides.. If impacts to private property are observed, dewatering rates may be tapered down or ceased, allowing time for additional evaluations. The need for stabilization measures or improvements will be evaluated as the drawdown occurs and for the duration of the Project. If determined to be necessary, once stabilization measures have been completed, reservoir releases will no longer be limited to 200 AF per day.

4.2 EXISTING INTAKE STRUCTURE MODIFICATIONS

Similar to the landslide areas mentioned above, slopes in the vicinity of the existing intake structure are vulnerable to slope movements when the reservoir is being drawdown and operated at restricted elevation levels, such as elevation restrictions required by the FOCP. Sliding of fills above the boat ramp could potentially affect the utility trench and hydraulic piping that operates the existing intake gates. A monitoring program will be implemented and structural stabilizations may be carried out. Once this risk has been mitigated, reservoir operations reservoir releases will no longer be limited to 200 AF per day..

4.3 CHANNEL MODIFICATIONS

Flows in the portion of Coyote Creek from the downstream toe of the dam through County Park's Live Oak Picnic Area (referred to herein as the southern channel) could be significantly greater following construction of the ADTP than under existing conditions, in part because of the limited capacity of the existing outlet works (URS 2019b). An emergency drawdown of the reservoir following construction of the ADTP through both the existing and ADTP outlets, if needed, would also result in flows significantly greater than can be currently released through a single channel . The southern channel was built during construction of the dam and is not the original stream channel. Releases from the spillway currently flow through the northern channel, a section of the original Coyote Creek channel that is currently separated from Coyote Creek at its upstream end by a dike that was constructed during construction of the dam. The two channels converge approximately 2,200 feet below the current outlet works discharge. The maximum flow that is released into the southern channel is about 500 cfs (see Section 2.1.1 for a description of release capabilities), but flows through this approximately 1,200 foot-long southern channel released after the ADTP is constructed, could be up to 2,000 cfs greater than historical releases (URS 2019b).

Valley Water and URS investigated alternatives to accommodate the additional flow (URS 2019b). To accommodate the increased flow rates through the southern channel, the channel would need to be hardened, or lined with riprap or concrete, resulting in a loss of valuable stream habitat and removal of riparian vegetation. To avoid hardening the 1,200 foot southern channel, Valley Water proposes an alternative that involves reopening and restoring the historical, northern channel.

Reopening of the northern channel would increase the total stream habitat available downstream of Anderson Dam and avoid hardening the southern channel. The reopened portion of Coyote Creek is being designed to provide environmental benefits, where possible, while meeting the need to convey the increased flows from the new outlet works to be completed during the ADSRP. The reopened channel bed would be lined with an engineered fill suitable for fish migration, and the channel banks would be lined with a biotechnical lining that will allow the growth of vegetation (URS 2020b). Following completion of the ADTP, the channel would need to pass high flows that could occur during the ADSRP. Therefore, linings in the northern channel would be designed to remain stable during a flow of 6,000 cfs that has a low probability of occurring during construction of the ADSRP. A revegetation plan will be prepared that will include details on planting in the channel banks and riparian zone, as well as the installation of habitat improvement features, where possible. This approach has been incorporated into the ADTP design to benefit biological resources.

Distribution of flow between the southern and northern channels would be achieved by construction of a sharp-crested weir at the head of each channel (URS 2020b). The weirs would be designed so that low flows would be split between the channels in a manner that would provide environmental benefits to each channel and would not increase the existing potential for fish stranding. High flows would be split in a manner that minimizes the potential for erosion of the southern channel. Releases to Coyote Creek during future normal operation of the reservoir are expected to be in the range of 20 to 90 cfs. The weirs are designed in such a way that the lowest flows would be split evenly between the two channels, then as flows approach 90 cfs, flow would be gradually split so that about 30 cfs enters the southern channel and about 60 cfs enters the northern channel. The weirs were also designed to split high flows so that during reservoir releases of up to 4,000 cfs, the southern channel would operate with flow rates at or less than historical release rates (450 cfs), with the remainder of releases passing through the northern channel. This would minimize the potential for erosion of the southern channel, given that no new erosion protection will be provided in the southern channel.

4.4 IMPORTED WATER RELEASES

After the initial dewatering to elevation 488 feet and before completion of Anderson Dam tunnel, reservoir storage will be diminished, and surface water elevation will be lower. Releases from Anderson Reservoir are, therefore, expected to be insufficient to meet the groundwater recharge capacity requirements during many months of each year. Further, during prolonged drought periods, groundwater recharge capacity requirements may not be achieved for one or more entire years. Without adequate recharge, groundwater supplies in this basin will lower rapidly, causing several undesirable effects, including the potential for reduced water quality, increased energy costs to pump groundwater, a need to dig deeper wells, potential for overdraft, and renewed land subsidence in the northern part of the basin. In addition, reductions in Anderson Reservoir releases during dry summer and fall months would be expected to adversely affect sensitive species and habitat within Coyote Creek, including *O. Mykiss.* This water shortage will be addressed by augmenting the releases of local water using another source of supply.

Imported water supplies will not only support Coyote Creek recharge system requirements, but will also support in-stream environmental flows to minimize dryback conditions. Valley Water is required to maintain a flow of 2.5 cfs past Edenvale streamflow station (SF58), which marks the end of the groundwater recharge zone. Such flow is required to keep the creek wet all the way to the San Francisco Bay, per the Lake or Streambed Alteration Agreement that Valley Water has signed with the California Department of Fish and Wildlife (CDFW). Additionally, with respect to in-stream flows, releases are necessary to maintain the Cold Water Management Zone (CWMZ) below

Anderson Dam. Imported water supply releases will support maintaining consistent environmental conditions within the CWMZ.

During the initial dewatering (beginning and continuing through fall of 2020), existing reservoir releases will provide flow augmentation for purposes of meeting both recharge requirements and providing in-stream environmental flows. After initial dewatering and prior to construction of the Anderson Dam tunnel, imported water from the Cross Valley Pipeline will be released into Coyote Creek just below the dam via the Coyote Discharge Line. The amount of flow released from the Coyote Creek Discharge Line will depend on the time of year, the temperature of the flow, the amount of native water available for release from the reservoir to mix with the imported water, and actual hydrology at the time of the release (Figure 4).

4.4.1 Cross Valley Pipeline Extension

Valley Water will also extend the Cross Valley Pipeline to discharge downstream of the County of Santa Clara-owned Ogier Ponds (Figures 2-1, Figure 4). By discharging imported water below Ogier Pond more reaches of the creek would stay wetted, which would enable recharge of the Coyote Valley and South San Jose (Santa Teresa area) throughout the construction period and support the maintenance of aquatic habitat for wildlife and riparian vegetation. The Coyote Valley and South San Jose areas recharged by Coyote Creek are part of the larger Santa Clara Subbasin. Groundwater provides nearly all water supply in these areas, which are dependent upon in-channel percolation to maintain sustainable groundwater supplies. Augmented releases of imported water would also reduce potential subsidence in downstream lands.

The pipeline will be designed to have a capacity to carry 50 cfs of imported water. However, on average, it is expected to deliver about 30 cfs during the dry season and 20 cfs during the wet season to ensure managed recharge in Coyote Creek and the Coyote Percolation Pond. Expedited planning, design, and construction processes to implement the proposed pipeline extension would be expected to take approximately 15 months to complete.

4.4.2 Chillers

Streamflow in Coyote Creek through construction and operation of the FOCP would result in elevated water temperatures relative to the existing condition, for two reasons. Summer releases from Anderson Reservoir are typically made through one of the submerged inlets to the existing outlet, which draw cooler water from deeper in the reservoir. Once the reservoir is drawn down to El. 488 feet, all releases during the ADTP will be from the surface of the reservoir because 488 feet is the elevation of the lowest inlet to the dam’s outlet works. Even if cooler water were available deeper in the reservoir during construction and operation of the ADTP, dry-season releases would be from the warmer water surface. Additionally, summer flow during construction and operation of the ADTP would rely more on releases of imported water, relative to the existing condition.

Based on estimates generated from temperature records from 1999 to 2019, the average temperature of imported water that would be discharged to Coyote Creek downstream of Anderson Dam reaches nearly 18°C before the end of June and exceeds 20°C from July through October (Valley Water, unpublished data). Prior to implementation of Cross Valley Pipeline extension, downstream of Ogier Ponds, the large volume of imported water that would need to be released into the CWMZ would make it impractical to reduce water temperatures to near existing conditions. However, once the new pipeline extension is operational and imported water can be released downstream of the Ogier Ponds, the volume of imported water released into the CWMZ could be reduced. At that time, in coordination with NMFS and CDFW, Valley would release imported water when available to the CWMZ, and would chill any water that is unsuitably warm to 18°C prior to release. Please refer to Appendix E for analysis regarding the temperature modelling during FOCP.

Imported water would be routed from the Coyote Creek Discharge Line to the Anderson Hydroelectric Facility, where it would pass through electric chillers before being releases to Coyote Creek. Multiple chillers would be used, with some redundancy to provide a factor of safety. Based on conceptual vendor design and estimates obtained by Valley Water, four chillers with approximate dimensions of 12 feet wide by 32 feet long by 13 feet high would be needed, where one chiller would be redundant in case any of the others malfunctioned. They would have an operating weight of 55,000 pounds each and would require a substantial concrete pad.

4.5 COYOTE PERCOLATION DAM REPLACEMENT

The current Coyote Percolation Dam is a flashboard dam used to impound water in the Coyote Percolation Pond, an in-stream pond in Coyote Creek just north of Metcalf Road. Operation of the proposed Anderson Dam tunnel would result in flows well beyond the safe operating capabilities of Coyote Percolation Dam, which is not rated to handle flows higher than 800 cfs. The maximum release capacity of 2,500 cfs (new tunnel and existing outlet capacity combined) would overwhelm the Coyote Percolation Dam and removing the dam altogether to accommodate higher flows would further compromise Valley Water's ability to recharge the groundwater basins. According to Valley Water's analysis (unpublished data, 2020), releases of 1,000 cfs have a 94.6% annual probability of occurring to maintain the FERC directed reservoir level of 488 feet. Once the tributary inflows are added in, we can conservatively estimate that the bladder dam would need to be deflated at least once a year due to flows that exceed 800 cfs. To protect against potential risks to groundwater recharge and water supply reliability for the Coyote Valley and South San Jose residents in the Santa Teresa area, Valley Water proposes to replace the existing flashboard dam with an inflatable bladder dam that could quickly be deployed when inflows are low (to facilitate percolation) and then released to allow higher flows to pass safely.

The increased operational flexibility of a bladder dam would also reduce the impacts from sediment settling within the percolation zone, which would improve affected groundwater recharge capacities. Incidentally this also lessens sedimentation impacts to critical spawning and rearing habitats for O. mykiss.

Also, deflating the dam more frequently could benefit native aquatic species by reducing competition pressures and predation from non-native fish species. By occasionally draining the warm water pond behind the percolation dam, the stronghold of the non-native warm water adapted species will be disrupted and opportunities for native fish to utilize this habitat may arise.

Completion of the bladder dam facilities would be required by 2023, when the Anderson Dam outlet tunnel would be finished, to minimize the impacts to water supply, groundwater recharge, land subsidence, and aquatic species and habitats.

Figure 4-1: Schematic of Proposed FOCP AMMs

4.6 COYOTE CREEK FLOOD MANAGEMENT MEASURES

Valley Water has identified areas within Coyote Creek where flooding would occur as a result of implementing the FOCP, namely from the operation of the Anderson Dam Tunnel. As a result, completion of some elements of flood management measures are needed along Coyote Creek as avoidance and minimization measures to prevent flooding within urbanized areas of Coyote Creek. Three flood protection measures will be constructed by the end of 2023, the same time the Anderson Dam tunnel construction is completed. The measures will be implemented along Mid-Coyote Creek in San Jose, between Highway 280 and Oakland Road, and will include: floodwalls, a levee, and acquiring or elevating low-lying residences.

4.7 EROSION AND SEDIMENT MANAGEMENT

Sediment movement associated with the FOCP is primarily a function of erosion of exposed sediment by inflows to the reservoir as the reservoir is lowered, or during high flow events while the reservoir is lowered. Although coarse sediment would settle in the deadpool, not all fine sediment would settle before passing downstream of the dam. Due to the flow rates and volumes involved, it is not practical to construct a large enough settling pond to capture all the sediment that would be entrained in the flows occurring during drawdown or during the winters when the reservoir is to be maintained at El. 488 feet, or such other approved Post-ADTP reservoir elevation. During these periods, suspended sediment that does not settle in Anderson Reservoir's deadpool would pass through the existing outlet or Anderson Dam tunnel.

It is not be feasible to filter, capture, or otherwise retain the fine sediment on site. The potential measures are limited by the large volume of sediment and the large volume of the potential high flow events that will pass through the reservoir. Therefore, measures to minimize the effects of the drawdown on downstream suspended sediment, especially during periods of high flow, are limited.

However, sediment impacts will likely be mitigated by implementation of other project components, such as the construction and operation of the Anderson Dam Tunnel (Sections 3.2 and 3.3), channel modifications below the dam (4.3), replacement of the Coyote Percolation Dam with a more flexible bladder dam (Section 4.5), and Coyote Creek Flood Control Measures (4.6). Collectively, these project components will accommodate higher flows that have the potential to flush small particulates out that may have settled in slower moving areas of Coyote Creek.

4.8 FISH PROTECTION MEASURES AND MONITORING

Coyote Creek from the San Francisco Bay to Anderson Dam is designated critical habitat for the federally threatened Central California Coast steelhead, O. mykiss. Reduction of Anderson Reservoir to elevation 488 feet would result in a loss of the reservoir's coldwater pool volume, with a consequent effect of decreased flows available for release into Coyote Creek, and increased water temperatures during the summer. The lack of a reliable coldwater pool from which to draw would impact steelhead and their habitat, particularly through the recognized CWMZ. Fish protection measures and monitoring of the CWMZ are included as part of the FOCP to address anticipated impacts, particularly to steelhead, and are described in detail below.

4.8.1 Spring Pulse Flow

Valley Water released "pulse flows" in May 2020 to encourage the outmigration of steelhead rearing in Coyote Creek downstream of Anderson Dam in advance of the FOCP and the Anderson Dam tunnel construction, before the creek begins to dryback. Prior to releasing the pulse flows, Valley Water drained the Coyote Percolation Pond to displace predatory fish species living in the pond in order to make a clearer migratory path for outmigrating smolts. Pulse flows occurred over a five-day period beginning with an initial release of 120 cfs on the first day, ramping down to 90 cfs for 24 hours, and then down to 60 cfs for days three through five.

4.8.2 Coyote Creek Fish Rescue and Relocation

During initial reservoir drawdown, fish rescue and relocation efforts will be conducted in Coyote Creek CWMZ from Anderson Dam downstream to the Ogier Ponds. Due to the extensive area and complex fish habitat in this section of Coyote Creek, fish rescue efforts will use a multi- phased approach to maximize capture efficiency while minimizing handling and environmental stress that could result from dewatering activities. Fish that will be rescued from the CWMZ include the federally threatened steelhead, and Pacific lamprey and blackfish per California Department of Fish and Wildlife's (CDFW) recommendations. Each phase will occur during a different flow release rate.

All O. mykiss captured during the Coyote Creek rescue and relocation effort will be relocated to Upper Penitencia Creek. All other fish species captured will be released into the nearest critical pool habitat location. See Appendix B for additional details on the fish rescue and relocation plan.

4.8.3 Anderson Reservoir Fish Rescue and Relocation

To minimize potential impacts to fish during initial reservoir drawdown, efforts will be made to capture and relocate resident trout and per CDFW's recommendations other recreationally important gamefish species that occur in Anderson Reservoir.

Rapid dewatering of Anderson Reservoir may induce stranding of native fish and non-native game fish species important to local anglers. All trout captured from the reservoir during reservoir drawdown will be released in suitable pool habitat within tributaries upstream of Anderson Reservoir. All other fish species will be released in the remaining wetted portion of Anderson Reservoir. See Appendix B for additional details on the fish rescue and relocation plan.

4.8.4 Fyke Trap Installation and Operation

Following relocation of fish from the CWMZ but prior to drawing down Anderson Reservoir, a fish trap, known as a fyke trap, will be installed in Coyote Creek downstream of the Anderson Reservoir outlet to capture fish passing through the existing reservoir outlet and reduce the risk of native trout in the reservoir entering the Coyote Creek CWMZ during the FOCP. Captured trout will be relocated to Anderson Reservoir. See Appendix B for additional details on the fish rescue and relocation plan.

4.8.5 Normal Operation of Coyote Reservoir

Valley Water will operate Coyote Reservoir normally throughout drawdown of Anderson Reservoir and construction and operation of the Anderson Dam tunnel. Through releases from Coyote Reservoir, a minimum streamflow of 5 cfs at Gage SF12 (downstream of Coyote Reservoir) would occur. Minimum streamflow would persist during the interim time period until ADSRP construction commences, as long as water is available for release. This will continue to benefit the native fish and wildlife, wetlands and riparian habitat within this inter-reservoir reach.

4.8.6 Augment Streamflow Downstream of Anderson Dam

As discussed in Section 4.4, when the reservoir is drawn down to, and operating at or near, deadpool (including during Anderson Dam tunnel construction and operation), Valley Water will augment dry-season streamflow in Coyote Creek (downstream of Anderson Dam) for water supply, groundwater recharge, and subsidence minimization. This effort will also benefit native fish and aquatic and riparian habitats. Once the Cross Valley Pipeline extension is operational, 5 to 30 cfs of imported water will be released to Coyote Creek, via the Coyote Discharge Line, to maintain dry-season connectivity (assuming sufficient amounts of imported water are available for release). If the releases are determined to be too warm for *O.mykiss*, chillers would be installed to cool up to 10 cfs of imported water prior to its release into Coyote Creek (See section 4.4.2 for additional details) and additional imported water would be released via the pipeline extension to continue to provide groundwater recharge below the CWMZ. Streamflow augmentation releases occur throughout the year. This measure is intended to maintain suitable aquatic habitat for native species, and to provide habitat sufficient for *O. mykiss* survival within the CWMZ during the implementation of the FOCP.

As described above in Section 4.4.1, a Cross Valley Pipeline Extension would augment streamflow downstream of Ogier Ponds and recharge groundwater supplies. Imported water would be discharged from the CVP extension below Ogier Ponds, downstream of the CWMZ to enable all the reaches of Coyote Creek to stay wet. This measure provides necessary water to maintain riparian and wetland habitats and provides some refuge for native aquatic species in Coyote Creek downstream of Ogier Ponds. In addition, this measure minimizes groundwater recharge reductions and potential subsidence issues associated with implementation of the FOCP.

4.8.7 Re-open Historical Coyote Creek Channel

The re-opening of Coyote Creek's northern channel to supplement the south channel and accommodate outflows without creating the potential for erosion, as described in Section 3.2.1, would increase stream habitat available downstream of Anderson Dam and avoid potential hardening of the south channel.

4.8.8 CWMZ Monitoring

As described above, Valley Water would augment dry-season streamflow in Coyote Creek by releasing imported water to maintain flows for water supply, groundwater recharge, subsidence minimization, and benefit of native fish. Habitat conditions (e.g., water temperature, dissolved oxygen and flow) and species distribution within the CWMZ will be monitored through summer 2021 to determine if conditions are suitable for O. mykiss. If O. mykiss are documented to occur in Summer 2021 (Section 3.5.2), and if conditions within the CWMZ appear unsuitable, then additional fish rescue and relocation efforts may be conducted, in coordination with the agencies. See Appendix B for additional details on the fish rescue and relocation plan.

4.9 VHP-COVERED SPECIES MANAGEMENT

Please refer to Appendix C for a thorough description of Santa Clara Valley Habitat Conservation Plan Evaluation, which includes landcover mapping, baseline surveys information, and recommendations for monitoring.

Although the FOCP does not include complete dewatering of Anderson Reservoir, the VHP's summary of potential effects of dewatering associated with dam seismic retrofit projects is useful in guiding Valley Water's consideration of potential effects of the FOCP. For example, with respect to the effects of dewatering associated with dam seismic retrofit projects, the VHP determined that dewatering activities could potentially affect three VHP-covered species: the California red-legged frog, foothill yellow-legged frog, and western pond turtle. Acknowledging that foothill yellow-legged frogs are more likely to occur above dams, the VHP further clarified that reservoir-specific dewatering plans to minimize impacts on VHP-covered species should focus in particular on the California red-legged frog and western pond turtle (ICF 2012). The VHP also indicated that, because the effects of dewatering on VHP-covered reptiles and amphibians are poorly understood, the effects of dewatering events should be monitored to provide some insight on how the changes in water level and flow may affect habitat quality and these species' various life stages.

As indicated previously, the FOCP does not include complete dewatering of Anderson Reservoir; rather, the reservoir will be drawn down to deadpool. Nevertheless, Valley Water has considered the potential effects of FOCP-related drawdown in the spirit of these VHP statements.

Initial reconnaissance surveys were conducted in 2016 to identify locations where each of the three VHP-covered species mentioned above, as well as California tiger salamander, might be most likely to occur in areas that could potentially be adversely affected by changes in dam releases associated with drawdown or dewatering (H. T. Harvey & Associates 2016). Based on the results of those initial reconnaissance surveys, full baseline surveys were conducted from April to June of 2019 in four reaches of Coyote Creek, a subset of the Ogier Ponds, and Coyote Ranch Pond between Anderson Dam and Metcalf Road (H. T. Harvey & Associates 2019) . These sites were chosen because they possess the highest likelihood of supporting the four VHP-covered species, and because they have the highest likelihood of being affected by ADSRP dewatering (or FOCP drawdown). As described in Appendix C, the baseline status of these species in the study area is as follows:

- No foothill yellow-legged frogs were recorded during baseline surveys, and foothill yellow-legged frogs are not expected to occur in the reach of Coyote Creek below Anderson Dam.
- No California tiger salamanders were recorded during baseline surveys, and California tiger salamanders are expected to occur in areas that could be inundated by drawdown-related high flows very infrequently and/or in very low numbers, if at all. If present at all, such individuals would be in subterranean refugia where effects of higher flows during drawdown could not be feasibly monitored.
- No California red-legged frogs were recorded during baseline surveys. Although California red-legged frogs may occur as possible rare and infrequent dispersants, they would occur so infrequently and in such low numbers that abundance is not quantifiable, and it would not be feasible to monitor effects of drawdown on this species. However, California red-legged frogs were also recently observed (June 2020) in ponded areas of the unlined spillway chute, upslope of ADTP limits of work.
- Western pond turtles are present in low numbers along Coyote Creek. Despite these low numbers, western pond turtles were detectable during the baseline surveys and can be visually surveyed relatively easily.

Drawdown of Anderson Reservoir to deadpool will reduce the extent of available habitat for the western pond turtle. The deadpool will still, however, provide a large waterbody that can be used by western pond turtles, and no adverse effects of the drawdown on the other VHP-covered species are expected to occur. Therefore, no conservation measures related to the reservoir drawdown and VHP-covered species are necessary.

4.9.1 Conduct Environmental Awareness Training

Although the VHP does not require environmental awareness training of construction personnel for covered activities, such training is typically required as a Valley Water Best Management Practice, and this would help reduce adverse effects on VHP-covered species. Environmental awareness training will be performed, prior to the initiation of construction activities associated with the ADTP to reduce the potential for adverse effects on western pond turtles or other species during

FOCP implementation. Such training is typically required as a Valley Water Best Management Practice, and this would help reduce adverse effects on VHP-covered species. Prior to the initiation of construction activities associated with the FOCP, a qualified biologist would conduct worker awareness training for all construction personnel. The training would include descriptions of the western pond turtle and other VHP-covered species that occur in the Anderson Reservoir vicinity, their habitats, the legal status and protections afforded the species, and the measures being implemented to avoid and minimize effects to the species.

4.9.2 Monitor Effects of Drawdown

Valley Water will carry out monitoring of the potential effects of the riparian and ground water dependent ecosystems downstream of Anderson Dam throughout the FOCP. As discussed with the Valley Habitat Agency, Valley Water will prepare a plan to monitor wetland and riparian habitats along Coyote Creek to determine whether there are adverse effects on these sensitive habitats resulting from the FOCP drawdown. This plan will describe monitoring methods (which may include aerial documentation of the extent of such habitats using drones and groundwater monitoring), how effects of FOCP activities (as opposed to the effects of natural drought conditions, if present) will be determined, and how mitigation (via payment of VHP impact fees) will be quantified and provided if FOCP-related impacts are detected.

Drawdown activities effects on the California red-legged frog, foothill yellow-legged frog, and California tiger salamander would be infeasible to assess because the likelihood of detecting these species is too low for any effects on abundance to be measured. However, monitoring of western pond turtles after drawdown is more feasible, because this life stage of the species is present in sufficient abundance to be detectable. Such monitoring is technically required by the VHP only for dewatering events associated with dam seismic retrofit projects, not for the drawdown that would occur under the FOCP. Nevertheless, in the spirit of the VHP's monitoring requirement for dewatering events, Valley Water has elected to perform monitoring of western pond turtles downstream from Anderson Dam. The effects of drawdown on western pond turtles would be monitored and reported to the USFWS and CDFW. Surveys for western pond turtles would be conducted between Anderson Dam and Metcalf Road, following the methods used for the baseline surveys (H. T. Harvey & Associates 2019), to assess any changes in abundance and distribution of adult western pond turtles in response to changes in flow regimes resulting from reservoir drawdown.

Prior to initiating VHP-related monitoring, Valley Water will seek concurrence on the monitoring approach with CDFW, USFWS, and the VHA.

5 NEXT STEPS

Valley Water recognizes the urgency of the FOCP and is taking all necessary steps to comply with the FERC Order, notwithstanding the confluence of Covid 19 and other emergency circumstances. Valley Water deems the FOCP essential, and has instituted a variety of emergency and urgency measures to implement the FERC Order on a timely basis. Valley Water, concurrently with its efforts of further engineering, design, safety, operations and environmental analyses and assessments, will implement the IRRMs in the most responsible manner feasible to protect the public from risk of dam failure due to seismic activity, and to avoid and minimize adverse impacts to water supply, groundwater recharge, land elevation, and environmental to the extent feasible.

This Plan's primary purpose is to describe Valley Water's proposed drawdown and wet and dry weather operations that will comply with the FERC Order, support FERC development of an EA for the FOCP, and support emergency Endangered Species Act (Section 7) consultations. This Plan also sets forth additional information to comply with FERC's April 23, 2020 request for information, and, together with the Preliminary Project Description and Screening Assessment for Environmental Effects, constitutes Valley Water's completed response to that request. The more detailed information in this Plan, together with the general project description provided in the Preliminary Project Description represents Valley Water's most up to date understanding of the way that many components of the FOCP will be implemented, including the manner in which Anderson Reservoir wet weather and surface water augmentation operations for groundwater recharge, water supply and in-stream flows will be managed through each phase of the FOCP. This Plan remains subject to approval by FERC Division of Dam Safety.

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Appendix K

Anderson Dam Seismic Retrofit Project

Construction Operations Technical Memorandum

Anderson Dam Seismic Retrofit Project

ADSRP Construction Operations

Technical Memorandum

Project No. 91864005

FERC Project No. 5737-000

February 2025

Prepared by:
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Anderson Dam Seismic Retrofit Project Construction Operations Memorandum

Post-ADTP through ADSRP construction

Prepared by Raw Water Operations Unit

Last Update: 08/18/23

1. Introduction

On February 20, 2020, the Federal Energy Regulatory Commission (FERC) ordered the Santa Clara Valley Water District (Valley Water) to begin lowering Anderson Reservoir by October 1, 2020, to "elevation 488 feet (deadpool)" (which corresponds to approximately three percent of the full reservoir capacity), to maintain deadpool to the maximum extent feasible, and to immediately move forward with the design and construction of a new, low-level outlet tunnel. Valley Water complied with the order and the reservoir reached deadpool in mid-December 2020.[1] Valley Water continues to maintain the reservoir at deadpool to the maximum extent feasible. The design of the Anderson Dam Tunnel Project (ADTP) was completed in January 2021, the construction contract was awarded in April 2021, and groundbreaking occurred in July 2021. Valley Water is currently working on implementing a suite of Avoidance and Minimization Measures (AMMs) to prevent and reduce impacts of the reservoir drawdown, and construction and operation of the ADTP, such as securing alternative water supplies and reducing impacts to the environment. These collective actions are referred to as the FERC Order Compliance Project (FOCP).

Valley Water prepared three Technical Memorandums (TMs) to describe three phases of reservoir operations, which include: FOCP Reservoir Drawdown and Operations Plan (Drawdown Plan), ADSRP Construction Operations TM, and the Post-ADSRP Operations TM. The Drawdown Plan was submitted to FERC on July 24, 2020, and FERC approved and ordered Valley Water to implement the Drawdown Plan in two parts on October 1, 2020, and on February 2, 2021.[2] Appendix A of the Drawdown Plan, entitled "FOCP Operations TM," covered the operations of Anderson Reservoir and other facilities on Coyote Creek from the initial drawdown of Anderson Reservoir until the completion of ADTP, scheduled for mid-2025. This TM is being developed and covers reservoir and creek operations from completion of the ADTP through completion of construction of ADSRP. The third TM focuses on post-ADSRP operations, which will be implemented upon completion of the dam retrofit.

1.1 Content and Organization of the Technical Memorandum

This TM is organized into five sections. Sections 1 and 2 cover the introduction and background of the FOCP, Coyote Creek facilities, and ADTP. Section 3 describes the ADTP and ADSRP facilities and construction schedule. Section 4 describes operations during ADSRP construction after completion of the ADTP utilizing the Stage 1 Diversion System and after completion of the

[1] Since the issuance of the FERC Order, technical work reveals that deadpool is actually approximately elevation 490 feet NAVD 88, and Valley Water's request to correct the FERC Order definition of deadpool is pending.

[2] FERC Order Approving, In Part, Reservoir Drawdown and Operations Plan, 173 FERC ¶ 62,0001, paragraph 1 (October 1, 2020); FERC Order Approving, in Part, Reservoir Drawdown and Operations Plan 174 FERC paragraph 62065 (February 2, 2021).

Stage 2 Diversion System. Section 5 briefly describes proposed FOCP facilities other than the ADTP and Stage 1 and 2 Diversions systems once the ADTP is completed.

2. Background

Anderson Dam is located near the junction of Cochrane Road and Coyote Road in Santa Clara County, California, 2.5 miles northeast of downtown Morgan Hill, California. A location map of Anderson Dam is shown in Figure 1a. Valley Water operates Coyote Reservoir, Anderson Reservoir, Cross Valley Pipeline outfall, and the Coyote Percolation Ponds. These four facilities affect flows in Coyote Creek upstream of Stream Gage 58 (located near Edenvale approximately 15.4 miles downstream of Anderson Dam) and, in non-drought years, ensure a minimum environmental flow downstream of Stream Gage 58 that marks the end of the groundwater recharge area. Without these facilities, Coyote Creek would return to being an intermittent stream and many reaches would dry out for long periods of time every year. These four facilities are considered to be the significant managed flow facilities along the creek upstream of Stream Gage 58. However, several other facilities not owned by Valley Water also have the ability to affect the flows in the creek, such as Ogier Ponds (owned by Santa Clara County). Locations of the existing Coyote Creek facilities are shown on Figure 2.

Anderson Dam is under the jurisdiction of the FERC and California Department of Water Resources, Division of Safety of Dams (DSOD), and must meet their dam safety design standards, in addition to those adopted by Valley Water. FERC has jurisdiction over Anderson Dam safety measures and operations due to issuing Valley Water an exemption from the Federal Power Act licensing for a small Anderson Dam hydroelectric facility.

On February 20, 2020, Valley Water received the FERC Order requiring Valley Water to implement the following interim risk reduction measures for Anderson Dam:

(a) immediately lower and maintain the reservoir operating level no higher than elevation 565 feet;

(b) lower the reservoir to deadpool beginning no later than October 1, 2020, as safely and quickly as possible, and maintain deadpool to the greatest extent feasible;

(c) immediately design and construct the low-level outlet tunnel (Anderson Dam Tunnel) to more reliably and quickly drawdown the reservoir after an earthquake and/or to better maintain deadpool during significant precipitation;

(d) expedite design and construction of the larger ADSRP to withstand the maximum probable earthquake event and maximum probable flood event; and,

(e) implement the interim dam safety directives, including design and construction of the proposed low-level outlet, while securing alternative water supplies and working with FERC staff, and federal, state and local resource agencies to minimize environmental effects.

2.1 FERC Order Compliance Project

To comply with the FERC Order, Valley Water developed the FOCP. The FOCP is a suite of mandated interim risk-reduction measures as set forth in the FERC Order that were immediately implemented, together with avoidance and minimization measures, during the interim time period prior to construction and operation of the ADSRP. The FOCP consists of four broad categories of actions as identified below. Within these broad categories are ten main Project features.

1. Category I. Reservoir Drawdown and Maintenance
2. Category II. Anderson Dam Tunnel Construction
3. Category III. Anderson Dam Tunnel Operation and Maintenance
4. Category IV. Avoidance and Minimization Measures

A key component of the FOCP is the construction of the Anderson Dam Tunnel through the dam's right abutment. The tunnel will house components of new outlet works designed and installed to allow more rapid drawdown of Anderson Reservoir. Construction of the tunnel and outlet works is collectively called the ADTP.

3. ADTP and ADSRP Facilities

The information for this section is from the "Anderson Dam Seismic Retrofit Project, Diversion Basis of Design Technical Memorandum" prepared by URS and dated April 30, 2020. Upon completion of the ADTP, Valley Water must begin ADSRP construction to comply with FERC orders. During ADTP and ADSRP construction, a two-phased temporary reservoir dewatering and diversion system will be implemented.

3.1 ADTP - Stage 1 Diversion System

The Stage 1 Diversion System is designed for a maximum discharge capacity of 2,500 cfs when used in conjunction with the existing outlet works. The Stage 1 Diversion System is being constructed for use during ADTP construction and before the ADTP is fully functional. The Stage 1 Diversion System is intended to help maintain the reservoir at the restricted level (deadpool) during the wet season when inflows to the reservoir exceed the discharge capacity of the existing outlet works. The Stage 1 Diversion System would be used during ADTP construction to facilitate reservoir dewatering, and then, as the ADTP is completed, the system would be converted into the larger capacity Stage 2 Diversion System. After completion of the ADTP, the Stage 2 Diversion System would be used in conjunction with the ADTP to maintain reservoir drawdown and minimize overtopping risk as ADSRP construction proceeds to removal and replacement of the existing embankment dam. The ADTP construction contract was awarded in April 2021 and construction is scheduled to be completed by the mid-2025.

Tunnel and pipeline arrangements for the Stage 1 Diversion System, from upstream to downstream, are listed below:

1. A 374-foot long, 8-foot diameter steel "lake tap" pipe with trash rack installed at the upstream;
2. A 975-foot long, 19-foot diameter horseshoe-shaped reinforced concrete lined tunnel;
3. A 53-foot long transition section; and,
4. A 375-foot long, 13-foot diameter steel pipe.

The 13-foot diameter steel pipe would bifurcate into two parallel 70-foot long, 11-foot-diameter pipes that terminate with 11-foot fixed-cone valves housed in a reinforced concrete energy dissipation structure that discharges into an 86-foot wide, 400-foot long, riprap-lined channel leading into Coyote Creek. The outlet control structure would also include a 24-inch diameter sleeve valve for small releases. The Stage 1 Diversion System is shown in Figure 3.

3.1.1 ADTP Project Schedule

The critical path for construction of the ADTP through completion of the ADTP and completion and operation of the Stage 1 diversion system consists of the following major work items:

- Year 1: Construction of the downstream diversion portal
- Year 2: Construction of the 18.5-foot tunnel and part of the 24-foot tunnel
- Year 3: Complete construction of the 24-foot tunnel and construction of the MTBM launch chamber, driving of the MTBM, installation of the reinforced concrete lining, installation of the 13-foot steel pipe in the diversion tunnel, installation of the bifurcation piping, and testing of the diversion system

A high-level construction sequence table for both the ADTP and the ADSRP is shown in Figure 4.

3.2 ADSRP - Stage 2 Diversion

The Stage 1 Diversion System would be converted into the Stage 2 Diversion System during ADSRP Year 2. The Stage 2 Diversion System is designed for a maximum release capacity of approximately 6,000 cfs. The Stage 2 Diversion System is intended to help minimize overtopping risks as the dam is lowered for seismic retrofit during the four wet seasons between the five construction seasons required to remove and replace the existing embankment dam, from ADSRP Year 2 to ADSRP Year 6. The Stage 2 Diversion System would be decommissioned during ADSRP Year 6 and releases from the reservoir would be made using the LLOW or HLOW the following wet season. The LLOW consists of a 78-inch outlet pipe with its own 3 intake ports at different elevations and a 54-inch fixed cone valve (FCV) and a 42-inch sleeve valve (SV) with a combined flow range up to 1,315 cfs. The HLOW consists of a 13-foot concrete pipe with a maximum discharge of 5,300 cfs at the recommended maximum flow velocity of 40 fps.

ADSRP construction is currently scheduled to start at the beginning of 2026 and is scheduled to be completed at the end of 2030.

Conversion of the Stage 1 Diversion System into the Stage 2 Diversion System involves replacing the trash rack with a diversion intake structure, and replacing the 8-foot diameter steel “lake tap” pipe with a 160-foot long, 12-foot diameter steel pipe and a 115-foot long, 19-foot diameter horseshoe-shaped reinforced concrete lined tunnel. The Stage 2 Diversion System is shown in Figure 5.

3.2.1 ADSRP Project Schedule

ADSRP construction is planned to extend over a seven-year duration. Project activities are expected to commence in the spring of Year 1 and extend through the winter of Year 7. The following bullet points provide an overview of the construction activities projected to occur by calendar year:

- Year 1: Site mobilization; full dewatering of the reservoir from deadpool to El. 450 feet; and preparation of staging areas, access roads, in-reservoir stockpile areas, and borrow sites.
- Year 2: Full dewatering of the reservoir from deadpool feet to El. 450 feet; cofferdam and extension pipe construction; sediment check dam installation; conversion of existing Stage 1 Diversion System into Stage 2 Diversion System; dam excavation to interim dam with crest of El. 565 feet (Stage 1a Dam Excavation); and tunneling for high-level outlet works.
- Year 3: Dam excavation to interim dam with crest El. 556 feet (Stage 1b Dam Excavation); construction of high-level outlet works; and demolition of the existing spillway.
- Year 4: Dam excavation to a remnant core (Stage 2a Dam Excavation) and dam fill to interim dam with crest El. 556 feet (Stage 2b Fill); and construction of the spillway.
- Year 5: Dam fill to interim dam with crest El. 565 feet (Stage 3a Dam Fill); construction of the spillway; and construction of the low-level outlet structure.
- Year 6: Dam fill to new dam crest El. 657 feet (Stage 3b Dam Fill); completion of low-level outlet works, including sloping intake structure and outlet structure; completion of the spillway, including the unlined chute, and refilling of the reservoir.
- Year 7: Permanent roadways and site restoration; and repaving Cochrane Road.

4. Operations During ADSRP Construction

As one of nine reservoirs in Santa Clara County, Anderson Reservoir serves as the County's largest reservoir. Anderson Dam and Reservoir is a critical water supply facility with a storage capacity of 89,073 acre-feet. To meet water supply requirements of Santa Clara County, Valley Water prepares an annual water supply plan that includes all of the reservoirs within the County. The purpose of the water supply plan is to ensure daily operational decisions are consistent with the annual strategies to manage water supply and meet current demands. The plans are dynamic and are updated at least monthly to reflect actual operations, up to date water supply projections, and facility capacities. This process is used to establish reservoir releases and the release of imported supplies into creeks. Operations involve reservoir water releases for multiple purposes, including water supply, groundwater recharge, incidental flood protection, incidental support of downstream aquatic habitats, maintenance, and emergency purposes. Operation of Anderson Reservoir is dependent on annual water storage levels.

Throughout the ADTP and ADSRP construction periods, operations of Coyote Reservoir and Anderson Reservoir will be consistent with, and will be a continuation of the current operations described in Sections 2.5 and 2.6 of Appendix A of the Drawdown Plan, entitled "FOCP Operations Technical Memorandum."

4.1 Coyote Reservoirs Operations

Historical Operation of Anderson Reservoir and Coyote Reservoir

Since 1982, Anderson and Coyote Reservoirs were operated to a combined storage rule curve. During the management period of Anderson Reservoir, the full outlet capacity releases (approximately 425 cfs) were being made from Anderson Reservoir when the combined storage was above the combined storage rule curve.

In 1992, due to the proximity of the Calaveras earthquake fault to Coyote Dam, DSOD issued an amendment to the Certificate of Approval describing the criteria for operations of the Coyote and Anderson Reservoirs. The amended Certificate of Approval for Coyote Dam stated that, whenever Anderson Reservoir was not full, the full capacity of Coyote outlet (approximately 450 cfs) would have been used to lower the water elevation in Coyote Reservoir to 11,843 AF when conditions downstream were safe to do so.

When Anderson Reservoir became "full" and its natural inflow exceeded 40 cfs, no releases from Coyote Reservoir were required. At that time, the term for Anderson Reservoir "full" was defined as the capacity of the reservoir less a buffer storage. Subsequently, the term "full" has further been defined to mean the current DSOD restriction less the buffer storage.

Formerly Coyote Reservoir was brought below 11,843 AF within 30 days after the natural inflow to Anderson Reservoir went below 40 cfs. At that time, the 30-day clock was set to zero or reset when Anderson Reservoir became "full" again and its natural inflow was 40 cfs or more. Due to the FERC order, Anderson Reservoir water levels are currently at deadpool and therefore, the operations described above are no longer being implemented.

Coyote Reservoir Operations

During completion of the ADTP and ADSRP construction, Valley Water would continue to follow the current four operating principles for Coyote Reservoir, listed below in order of priority:

1. DSOD Restriction Releases – If Coyote Reservoir is above the DSOD restricted level of 760.9 feet (NAVD 88), which corresponds to a storage of 11,843 AF, the outlet valve at Coyote Reservoir would be fully opened.
2. Water Rights Diversion Period – All inflow to the reservoir outside of the diversion time period of October 1 to July 1 must be released. That is, the inflow would be passed through to Coyote Creek downstream of Coyote Dam.
3. Coyote Releases to Keep the Creek Between Coyote Dam and Anderson Reservoirs Wetted – Coyote Reservoir would continue to operate as it normally does to maintain a wetted stream between Coyote Dam and Anderson Reservoir. Dry-season releases from Coyote Dam are anticipated to be between 3 and 5 cfs depending on actual inflows, available storage, and hydrologic conditions.
4. Coyote Releases to Provide Flow to Coyote Creek Downstream of Anderson Dam - Typically, a summer release of 3 to 20 cfs would be made from Coyote Reservoir, depending on the storage of Coyote Reservoir, to potentially provide for some pass-through flows downstream of Anderson Dam. However, releases of 3 cfs during critically dry years would likely infiltrate within the reservoir, and releases from the Anderson Dam may go to 0 cfs.

Coyote Reservoir storage levels and releases would continue to vary as they have historically based on inflows, the hydrologic year, and required releases. In a typical year, it is anticipated that the Coyote Reservoir levels would continue to be maintained as they have been historically, as follows:

- **Fall/Winter (December through April) –** Beginning of December storage level target: 4,000 AF – 5,000 AF. Storage level would increase during the rainy season up to the DSOD restriction (11,843 AF).

- **Spring/Summer (May through November) –** Reservoir levels would slowly decrease to a summer carryover target of 4,000 AF – 5,000 AF by end of November.

Table 1 shows projected average monthly releases from Coyote Reservoir into a drained Anderson Dam reservoir after the Stage 1 Diversion System is constructed and after the Stage 2 Diversion System is constructed. Coyote Reservoir would be operating similar to the historical operations, which had a wide range of releases. Table 1 and Table 2 shows the comparison between the historical (Pre-FERC Order) and proposed operations.

4.3 Anderson Reservoir Operations – Stage 1 Diversion System

After the completion of ADTP, the existing 42-inch Anderson Reservoir outlet valve would continue to be fully opened and the new Stage 1 Diversion System would be utilized as needed. The existing outlet works has a maximum release capacity of 500 cfs. The Stage 1 Diversion System would be operated to provide an additional maximum release capacity of 2,000 cfs. Combined, the existing outlet works and the Stage 1 Diversion System provide for a maximum release capacity of 2,500 cfs to help maintain the reservoir at deadpool (i.e., approximately elevation 490). The restricted level during Stage 1 Diversion operations is at deadpool, unless otherwise approved by FERC.

During the wet season, inflows will be passed through the existing outlet works to maintain the reservoir at deadpool. The Stage 1 Diversion System would be operated when the reservoir rises above approximately elevation 500, as needed. Anderson Reservoir Releases for given inflow exceedance probability are shown in Table 3. As shown in Table 3, the reservoir can be maintained at deadpool on an average monthly basis in dry, median, and wet years. The reservoir levels would vary based on the hydrologic year.

4.4 Anderson Reservoir Operations – Stage 2 Diversion

The Stage 1 Diversion System would be used to fully empty the reservoir at the beginning of ADSRP Year 1 and Year 2, resulting in El. 450 within the reservoir. Once the reservoir is fully emptied during ADSRP Year 2, the Stage 1 Diversion System would be converted into the Stage 2 Diversion System to provide additional capacity as described above in Section 3.2.

Anderson Dam releases prior to the FERC order were different than releases would be during Project construction operations. The pre-FERC order monthly average releases from Anderson Reservoir to Coyote Creek are shown on Table 4. Project releases would be the same as those shown in Table 3, and the reservoir would be maintained empty on an average monthly basis in dry, median, and wet years.

The Stage 2 Diversion System would be operated with the flow control valves fully open at all times. The Stage 2 Diversion System has a maximum release capacity of approximately 6,000 cfs. The increase in release capacity from the Stage 1 Diversions System to the Stage 2 Diversion System is a consequence to having the flow control valves fully open at all times and the conversion described above in Section 3.2. As shown in Table 3, however, monthly average releases are not expected even in wet years to approximate the flood flow release level of 6,000 cfs.The Stage 2 Diversion System is only intended to operate during embankment excavation and removal and replacement of the dam. Construction of the Stage 2 Diversion System would be completed in Year 2 of ADSRP construction. Operations of the Stage 2 Diversion System would occur from Year 2 to Year 6 of ADSRP construction. Once construction of the embankment, spillway replacement, and the high-level outlet works (HLOW) are completed, the Stage 2 Diversion System will be decommissioned. After the Stage 2 Diversion System is decommissioned, releases would be made from the LLOW or HLOW.

5. FOCP Facilities and Construction Period Operations

This section briefly describes proposed FOCP facilities other than the ADTP and Stage 1 and 2 Diversions systems once the ADTP is completed. Operations during ADSRP construction include releases from the Cross Valley Pipeline Extension (constructed during FOCP) and from the Coyote Creek Discharge Line Turnout just below Anderson Dam, operations of the Chillers installed as a part of FOCP, operations of the Phase 1 Coyote Percolation Dam Replacement (constructed during FOCP), and flood management provided by the Coyote Creek Flood Management Measures constructed as part of FOCP and the Coyote Creek Flood Management Measures pursuant to the Coyote Creek Flood Protection Project (CCFPP). Operations of these facilities are briefly described in this section, and are summarized in Table 6.

5.1 New Imported Water Turnout: Cross Valley Pipeline Extension

Valley Water is currently constructing the Cross Valley Pipeline Extension (CVPE) as an avoidance and minimization measure as part of the FOCP. The CVPE would allow Valley Water to release imported water for groundwater recharge in Coyote Creek to replace reductions in Coyote Discharge Line releases to the level necessary for the Coyote Discharge Line releases to be chilled to provide more suitable conditions for steelhead. In this way, groundwater recharge will not be impacted so severaly by reductions in Coyote Discharge Line releases as necessary to use the chillers to keep temperatures lower in the FCWMZ. The 1.25-mile pipeline extension would enable the release of imported water, which is pumped from San Luis Reservoir in Merced County, into Coyote Creek downstream of the creek reach that can be chilled. The CVPE outfall would be located between Coyote Creek Golf Drive and the most downstream pond of the Ogier Ponds complex, approximately 5 miles downstream of Anderson Reservoir. Construction of the CVPE is scheduled to be completed in September 2023 NMFS has limited construction phase releases from the CVPE in wet weather conditions to avoid impacts to migration cues. No releases from the CVPE will be implemented when flows exceed 65 cfs at streamflow station 5082, Coyote Creek at Madrone (operated as USGS 11170000), during the adult steelhead upmigration season (December 1 to April 30), unless there is less than 2.5 cfs at streamflow station 5058, Coyote Creek at Edenvale, which flow must be maintained per the requirements of the Streambed Alteration Agreement issued by the California Department of Fish and Wildlife for the Coyote Percolation Dam Diversion.

Once the CVPE is operational, 5 to 30 cfs of imported water may be released to Coyote Creek via the Coyote Creek Discharge Line Turnout, located just downstream of Anderson Reservoir, to supplement local water from the reservoirs. However, smaller chilled flows may also be released from the Coyote Discharge Line and may be supplemented downstream by CVPE releases. To keep flows in the functional cold water management zone (FCWMZ) requires a release of about 5 to 10 cfs, (depending on local water that may be bypassed through Anderson

Dam) to keep the creek wet from the base of Anderson Dam to approximately 5 miles downstream of the dam, just downstream of Ogier Ponds at Coyote Creek Golf Drive. CVPE releases downstream of Coyote Creek Golf Drive would supplement Coyote Discharge Line releases to keep flows in the Creek downstream of that point as necessary to meet LSAA requirements for flow at Stream Gage 58, to improve recharge during construction and to provide in-stream flow downstream of the FCWMZ. Table 5 shows the Pre-FERC operations of the Coyote Discharge Line.

In addition to determining release rates as necessary to maintain a wetted channel in the FCWMZ throughout construction of the ADSRP, Valley Water would also consider releases of chilled imported water from the Coyote Creek Discharge Line to provide in-stream temperatures within the FCWMZ that are sufficient for steelhead rearing and do not require fish rescue and relocation. Limiting Coyote Creek Discharge Line release rates to 10 cfs allow operation of the Chillers as discussed in section 5.2 to lower temperatures within the CWMZ. Therefore, during ADSRP construction, release rates for imported will ranges from 5 to 30 cfs depending on available water, unlesscolder water is needed to maintain temperatures suitable for steelhead within the FCWMZ, in which case at least 10 cfs would be released from the Coyote Discharge Line after chillers reduce the temperature of that release. In short, Valley Water would determine release rates for imported water from the Coyote Discharge line to ensure that the

- FCWMZ remains wet enough to provide construction phase aquatic habitat; and
- If in-stream FCWMZ temperatures require the operation of chillers, up to 10 cfs of chilled water from the Coyote Discharge line would be released to help maintain in-stream flow temperatures within the FCWMZ at 21 degrees C or less to avoid the need for fish rescue.[3]

5.2 Coyote Creek Chillers Project

As part of the FOCP, Valley Water is constructing the Coyote Creek Chillers Project (Chillers) to cool down imported water before discharging it via the Coyote Creek Discharge Line Turnout into the creek when necessary to provide suitable temperature for steelhead and avoid fish rescue and relocation. The Chillers would cool approximately 10 cfs of water to 14°C. The cooled water would be released into the Coyote Creek. The Chillers construction is expected to be complete by June 2024. The Chillers would allow for the provision of cooler flows to the FCWMZ as necessary to prevent dryback conditions throughout Coyote Creek. The chilled water would also continue to support aquatic species and suitable summer rearing habitat temperatures throughout the Stage 1 and Stage 2 construction of the ADTP, and through completion of ADSRP construction. Groundwater recharge and instream flows downstream of the FCWMZ would be maintained by supplemental releases of imported water from the CVPE.

5.3 Coyote Percolation Dam Replacement

As part of FOCP, Valley Water proposed the Phase 1 Coyote Percolation Dam Project to improve operations and fish passage at the Coyote Percolation Ponds (Figure 1b). These improvements consist of the installation of an inflatable rubber dam to replace the small, steel flashboard dam that is currently installed at the Coyote Percolation Pond. The existing flashboard dam is difficult to lower and raise, and is subject to damage from large flow events; also any flows that are greater than 800 cfs may overtop the flashboard dam at Coyote Percolation Pond and damage it, as happened in the large storm event of 2017, or create public health and safety issues.

Once the ADTP is constructed, the tunnel would allow for flows of up to 2,500 cfs to be released from Anderson Reservoir. During the Stage 1 Diversion System, with the existing outlet and spillway, minimum summer releases (May to October) would result in flows of approximately 7.5 cfs at the Coyote Percolation Pond facility. Minimum winter releases would also result in flows of 7.5 cfs at the Coyote Percolation Pond facility. The Coyote Percolation Dam Phase 1 project replaces the existing steel flashboard dam with an operable inflatable dam. Large winter flows exceeding 320 cfs would trigger deflation of the inflatable dam to avoid flooding of the adjacent neighborhood by passing flows safely through the facility. Following completion of the ADSRP Stage 2 diversion, releases from Anderson Reservoir of up to 6,000 cfs will be possible. Flows of this magnitude can be safely passed through the Coyote Percolation by deflating the dam.

The Phase 1 Coyote Percolation Dam Project consists of demolition of the existing dam which includes the steel flashboard panels, concrete sill, concrete slab, northern concrete abutment, concreted rock-rip rap, the concrete maintenance ramp, steel pile below the existing foundation, and adjustable weirs and flashboards in the existing fish ladder structure. The Phase 1 Coyote Percolation Dam Project also includes improvements to the existing fish ladder. The fish ladder improvements consist of installation of six new removable steel weirs, four raisable steel weirs, four adjustable steel weirs, and a new control panel to operate the fish ladder weirs. These project features would improve the operations of the existing steel flashboard dam, and enhance fish passage along Coyote Creek.

Pre-FERC order, flows of less than 320 cfs would be passed through the fish ladder and radial gates of the existing flashboard dam. The release through the radial gates and adjustment of the three upstream-most fish ladder panels would ensure fish passage through the ladder. Flows within the ladder were limited to 25 cfs with all other flow passing through the radial gates. When flows were expected to exceed 320 cfs, the pond behind the dam would be drained, and then the steel flashboards removed. Operations between Phase 1 and Phase 2 of the Coyote Percolation Dam Project are expected to remain the same because fish passage over the deflated bladder dam would be limited. Post-Phase 2 construction, the bladder dam will be deflated when flows exceeding 300 cfs are expected, allowing for more fish passage opportunities than existing conditions.

Replacement of the existing flashboard dam with an inflatable bladder dam would also allow Valley Water to impound water in the Coyote Percolation Ponds and deflate (lower) the bladder dam relatively quickly to allow flows in excess of 320 cfs to pass safely through the system. Unlike the existing flashboard dam, the bladder dam would be designed to pass high creek flows that are likely to occur in wet weather after construction and during the operation of the ADTP and Stage 2 diversion system. Furthermore, the bladder dam would offer increased flexibility in operations to regulate flows passing through the system to further protect aquatic resources and enhance water supply management by maintaining more consistent creek releases. This would support the groundwater recharge program in both Coyote Creek and the Coyote Percolation Pond to keep the Santa Clara Groundwater Subbasin sustainable. This would minimize the threat of subsidence that may occur from overdrawing the groundwater from the Coyote Valley that may occur if releases from the fully drained Anderson Reservoir tapered in the dry season.

The Coyote Percolation Dam would undergo a second phase of redesign, as a component of the ADSRP. The purpose of the second phase of redesign is to further enhance flows to support steelhead passage upstream and downstream of the dam in consultation with regulatory agencies. Pursuant to the Phase 2 Design, the bladder dam and fish ladder will be renovated to create a long, roughened ramp for access to the fish ladder, and to otherwise meet NOAA Fisheries WCR Anadromous Salmonid Design Manual (NMFS 2022) and provide safe, effective, and timely upstream and downstream passage of anadromous salmonids regardless of whether the bladder is either inflated or deflated. Fish migration will occur through the existing fish ladder when the dam is inflated. Fish migration will occur via roughened channel constructed during Phase 2 when the dam is deflated.

In addition, within 13 months of completion of the Phase 2 Coyote Percolation Dam design (completion of design anticipated in Year4, Valley Water will prepare in coordination with the regulatory agencies a Phase 2 Coyote Percolation Dam Operations Plan. The objectives of the Operations Plan will be to continue to provide sufficient groundwater recharge, while improving conditions for smolt migration. Key elements of operations will include the following:

- Operational flexibility to temporarily drain the Coyote Percolation Pond to improve smolt migration when logistically practicable given water supply demands and ecologically appropriate in terms of habitat management to protect steelhead and other listed and sensitive aquatic and riparian species.
- Upstream passage through the Coyote Creek Percolation Dam Facility will be provided at flows between 2.5 cfs and 320 cfs.
- Between October 16th through June 14th, the bladder dam will be inflated when Coyote Creek flows arriving at the dam are less than 275 cfs to facilitate upstream passage through the fish ladder.
    - When the dam is inflated , fish ladder flows will be maintained between 2.5 and 25 cfs, and flows above 25 cfs (and less than 275 cfs) will be released through the new bypass gates replacing the existing radial gates.
    - The bladder dam will be deflated when Coyote Creek flows arriving at the dam are greater than 275 cfs and upstream passage will be provided by the roughened channel. When the dam is deflated, Coyote Creek flow greater than 275 cfs arriving at the dam will go over the deflated dam, a portion of this flow will go into the roughened channel to provide upstream passage, and the Fish Ladder and bypass gates will be closed.
- During summer periods (June 15th through October 15th) outside of the steelhead migration season, the weir gates in the fish ladder may be raised to cut off flows to the fish ladder and allow inspection and maintenance activities to be conducted. VW will maintain the minimum required flows per the LSAA to Coyote Creek.
- The plan will include an evaluation of smolt migration conditions through the pond under Pre-FERC Order baseline conditions (including dam operations and instream flows) and will include measures to ensure an improvement in migration conditions through the percolation pond as compared to that baseline condition following implementation of Phase 2 designs, including water depth, velocity, and predation risk.

5.4 Coyote Creek Flood Management Measures

Valley Water has identified areas within Coyote Creek where higher flows and flooding could occur as a result of ADTP implementation. To protect the community against this potential risk, Valley Water has included facilities from the Coyote Creek Flood Management Measures (CCFMM) in the FOCP. These measures were originally a subset of the longer-term Coyote Creek Flood Protection Project (CCFPP), but are now included in FOCP as a separate and independent project to minimize potential impacts of higher creek flows throughout the Stage 1 Diversion System. The additional CCFPP measures are necessary for the operation of the Stage 2 diversion system. The additional CCFPP measures would need to be in-place prior to the larger releases during ADSRP construction.

The CCFMM improvements are being implemented as a part of FOCP along Mid-Coyote Creek in San José between Highway 280 and Oakland Road (Figure 6). The remaining measures of the CCFPP are planned to be implemented prior to the Stage 2 diversion system (end of Year 2) and would further increase the downstream flow capacity of Coyote Creek. Both the CCFMM and CCFPP are in different stages of design with various flood reduction elements proposed at different locations along the nine miles of Coyote Creek. The purposes of these two projects is to provide flood protection to the 2017 level of flooding.

The CCFMM is scheduled to be completed in October 2024. The CCFMM is located along Mid-Coyote Creek from Highway 280 to Oakland Road (Figure 6). The CCFMM consists of the acquisition of up to ten residential structures or nine parcels, and the construction of up to seven spans of off-stream floodwalls. The floodwalls are proposed along three reaches of Coyote Creek. A site map of the CCFMM is shown on Figure 5. Floodwalls are proposed along reaches 5, 6, and 7. The CCFMM are expected to be implemented prior to the start of the CCFPP. The CCFMM is expected to take approximately a year to complete.

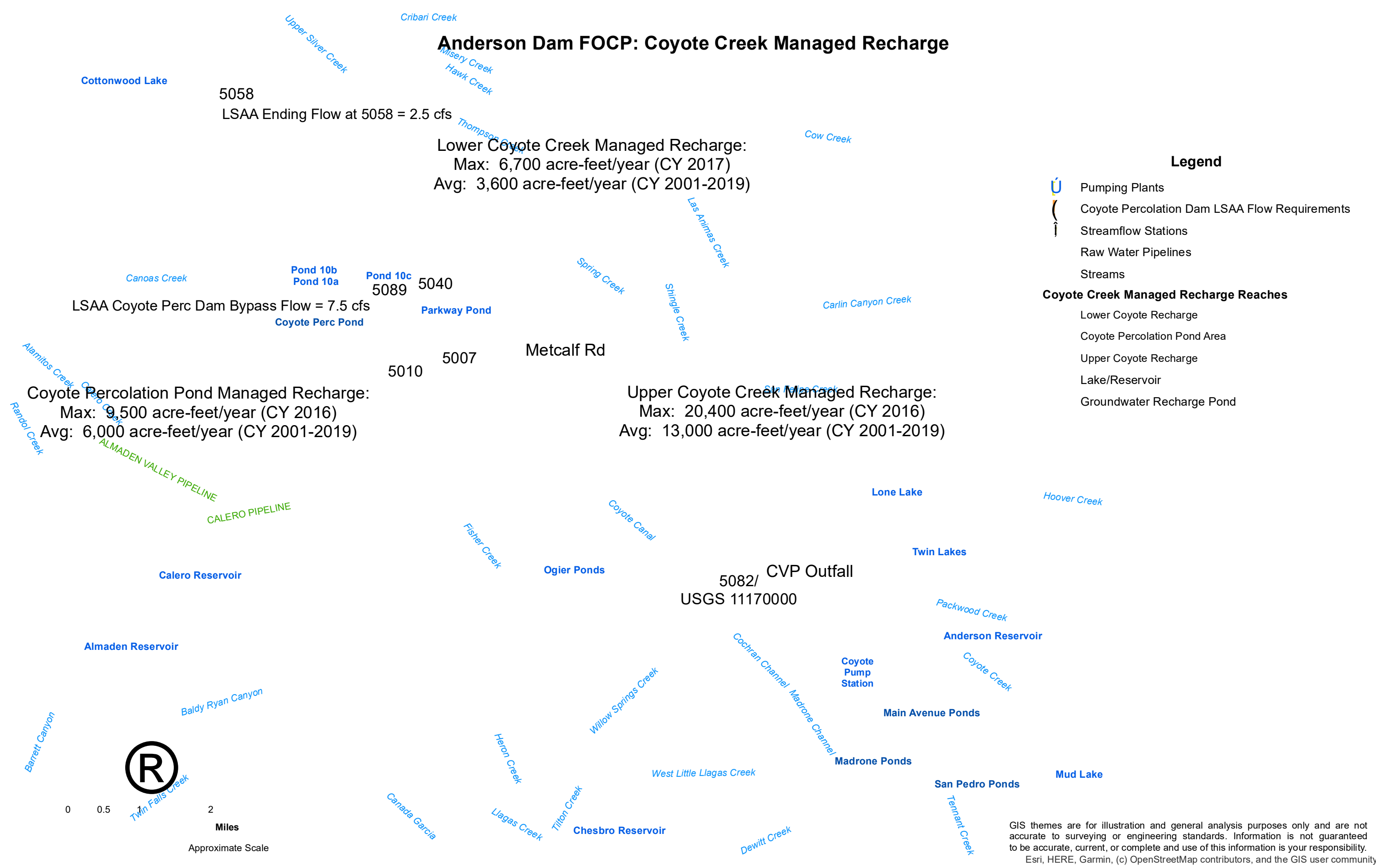
The CCFPP is planned to be completed by Year 2 of ADSRP construction and prior to the completion of the Stage 2 diversion system. The CCFPP would be constructed after the completion of the CCFMM. The CCFPP consists of floodwalls along five reaches of Coyote Creek A site map of CCFPP is shown on Figure 6.The floodwalls proposed as part of the CCFPP are located along reaches 4, 5, 6, 7, and 8 of Coyote Creek. The CCFPP is expected to take approximately two years to complete.

The Coyote Creek Flood Projects (CCFMM and CCFPP), when combined, have a minimum design capacity of 8,300 cfs. For context, flows observed during the February 2017 spill event ranged from 7,300 cfs to 7,600 cfs. These measures would accommodate releases from the existing outlet (up to 500 cfs) and Stage 1 diversion system (up to 2,000 cfs) prior to ADSRP Year 2 and Stage 2 diversion system (up to 6,000 cfs) subsequent to ADSRP Year 2.When completed, the combined CCFMM and CCFPP would provide protection from floods up to the level that occurred on February 21, 2017, equivalent to approximately a 20 year event, from Tully Road to Montague Expressway in the City of San José during the ADSRP construction period.

Figure 1a: Project Location

Figure 1b: Project Location

Figure 2: Existing Coyote Creek Recharge Facilities



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LSAA = Lake and Streambed Alteration Agreement, California Dept of Fish and Wildlife

Figure 3: Stage 1 Diversion System

Figure 4: Anderson Dam Construction Sequence

Figure 5: Stage 2 Diversion System

Figure 6: Coyote Creek Flood Management Measures and Coyote Creek Flood Protection Project Map

Table 1: Coyote Reservoir Storage and Releases for Given Inflow Exceedance Probability after Stage 1 and Stage 2 Diversion Systems Construction

			Dry Year (90% EP)		**Median Year (50% EP)**		**Wet Year (10% EP)**	
Beg. Month	Effective dead pool	DSOD Restriction	Beg Month Storage (AF)	Monthly Avg release (cfs)	Beg Month Storage (AF)	Monthly Avg release (cfs)	Beg Month Storage (AF)	Monthly Avg release (cfs)
1-Dec	3,248	11,843	4,500	7	4,500	7	4,500	125
1-Jan	3,248	11,843	4,067	5	5,027	31	5,027	239
1-Feb	3,248	11,843	4,097	5	8,252	124	8,252	333
1-Mar	3,248	11,843	4,665	5	11,787	30	11,787	193
1-Apr	3,248	11,843	5,297	5	11,837	38	11,837	137
1-May	3,248	11,843	5,956	5	11,843	19	11,843	21
1-Jun	3,248	11,843	5,679	5	11,293	19	11,843	21
1-Jul	3,248	11,843	5,213	5	10,116	19	10,879	21
1-Aug	3,248	11,843	4,729	5	8,942	19	9,460	21
1-Sep	3,248	11,843	4,274	5	7,884	19	7,994	21
1-Oct	3,248	11,843	3,876	4	6,799	19	6,631	21
1-Nov	3,248	11,843	3,570	4	5,572	19	5,694	21
1-Dec	3,248	11,843	3,389	4	4,500	7	4,500	125

Table 2: Pre-FERC Operations of Coyote Reservoir Storage and Releases Monthly Average Releases (cfs) [(1)]

Beg. Month	**Dry (90% EP)**	**Median (50% EP)**	**Wet (10% EP)**
1-Jan	3	3	175
1-Feb	3	130	390
1-Mar	3	55	200
1-Apr	3	35	135
1-May	3	10	15
1-Jun	3	3	4
1-Jul	3	3	3
1-Aug	3	3	3
1-Sep	3	20	20
1-Oct	3	30	35
1-Nov	3	30	35
1-Dec	3	30	50

Notes: (1) Coyote and Anderson Reservoir operated to the 2017 40% EP combined storage rule curve and associated DSOD restriction.

Table 3: Anderson Reservoir Releases for Given Inflow Exceedance Probability

	Dry Year (90% EP)		**Median Year (50% EP)**		**Wet Year (10% EP)**	
Beg. Month	Beg Month Storage (AF)(1)	Monthly Avg release (cfs)	Beg Month Storage (AF)(1)	Monthly Avg release (cfs)	Beg Month Storage (AF)(1)	Monthly Avg release (cfs)
1-Dec	-	6	-	13	-	180
1-Jan	-	8	-	82	-	387
1-Feb	-	8	-	219	-	579
1-Mar	-	9	-	42	-	331
1-Apr	-	10	-	54	-	160
1-May	-	7	-	12	-	41
1-Jun	-	6	-	10	-	39
1-Jul	-	6	-	9	-	10
1-Aug	-	6	-	8	-	14
1-Sep	-	7	-	8	-	11
1-Oct	-	7	-	9	-	20
1-Nov	-	7	-	9	-	26
1-Dec	-	7	-	13	-	180

Notes:

(1) Able to maintain beginning month deadpool storage or drained throughout analysis

- Based on monthly time step analysis

Table 4: Pre-FERC Order Operations of Anderson Reservoir Baseline Monthly Average Release to Coyote Creek (cfs)[1]

			Wet[2] (10% EP)	
Beg. Month	**Dry (90% EP)**	**Median (50% EP)**	**Total Release**	**Est Release to Creek**
1-Jan	5	30	190	75
1-Feb	5	30	320	105
1-Mar	5	30	250	90
1-Apr	5	45	170	70
1-May	5	45	100	55
1-Jun	5	45	100	55
1-Jul	5	45	100	55
1-Aug	5	45	100	55
1-Sep	5	45	120	55
1-Oct	5	40	50	50
1-Nov	5	35	40	40
1-Dec	5	30	130	60

Notes:

(1) Coyote and Anderson Reservoir operated to the 2017 40% EP combined storage rule curve and associated DSOD restriction

(2) Releases to the creek would be for a full recharge program and as required to maintain storage below the combined storage rule curve. Table assumes 25% of the listed winter releases (above the amount required for recharge) could be conveyed to the distribution system.

Table 5: Pre-FERC Order Operations Coyote Discharge Line Showing Monthly Average Releases (cfs)[1]

Beg. Month	Dry (90% EP)[2]	Median (50% EP)	Wet (10% EP)
1-Jan	50	21	0
1-Feb	49	17	0
1-Mar	49	22	0
1-Apr	49	8	0
1-May	50	9	0
1-Jun	50	10	0
1-Jul	50	10	0
1-Aug	50	10	0
1-Sep	50	10	0
1-Oct	50	15	3
1-Nov	50	20	8
1-Dec	50	24	0

Notes:

(1) Assumes 55 cfs recharge capacity for the Coyote Creek recharge system and an estimate of utilized accretion

(2) Assumes imported allocations in the dry year would be enough for full recharge program in the Coyote Creek Recharge system.

Table 6: Facility Operations by Project Phase

Facility	Stage 1 Diversion, existing outlet and spillway	Stage 2 Diversion, no spillway (ADSRP Year 2 through Year 6)
Coyote Reservoir		
Summer release (May-Oct)	3 to 21 cfs depending on storage	3 to 21 cfs depending on storage
Winter release[(1)]	8, 8-177, 128-386 cfs; matching inflow when storage is near DSOD restriction – max. 450 cfs release	8, 8-177, 128-386 cfs; matching inflow when storage is near DSOD restriction – max. 450 cfs release
Anderson Reservoir		
Target storage	Deadpool	Empty
Summer release (May-Oct)	Existing outlet valve open-bypassing flows from Coyote Res. – approx. 2-20 cfs	Existing outlet valve open-bypassing flows from Coyote Res. – approx. 2-20 cfs
Winter release[(1)]	6-10, 13-219, 160-579 cfs; Existing outlet valve open-bypassing flows from Coyote Res. Tunnel outlet flow control valves opens up to 2,000 cfs	6-10, 13-219, 160-579 cfs; Tunnel outlet flow control valves opens up to 6,000 cfs
Imported Water Release at Base of Anderson Dam		
Summer release (May-Oct)	Augment creek flow to meet temperature requirements and wet creek to just upstream of Ogier – chilled as needed	Augment creek flow to meet temperature requirements and wet creek to just upstream of Ogier – chilled as needed
Winter release	Augment creek flow to meet temperature requirements and wet creek to just upstream of Ogier	Augment creek flow to meet temperature requirements and wet creek to just upstream of Ogier
Imported Water Release downstream of Ogier Ponds		
Summer release (May-Oct)	Release as needed for recharge to meet 2.5 cfs goal at Stream Gage 58 – typically 40 cfs	Release as needed for recharge to meet 2.5 cfs goal at Stream Gage 58 – typically 40 cfs
Winter release	Release as needed for recharge to meet 2.5 cfs goal at Stream Gage 58 – typically 30 cfs when not raining	Release as needed for recharge to meet 2.5 cfs goal at Stream Gage 58 – typically 30 cfs when not raining
Coyote Percolation Pond Release		
Summer release (May-Oct)	7.5 cfs	7.5 cfs
Winter release	Bypass very large flows by deflating dam; min. 7.5 cfs	Bypass very large flows by deflating dam; min. 7.5 cfs

Notes:
(1) Releases are estimated based on Coyote Reservoir operational rules. Estimated releases are based on monthly time step analysis for dry, median, and wet conditions corresponding to 90%, 50%, and 10% inflow exceedance probabilities, respectively. Actual releases will depend on hydrology and could be less than or greater than those shown here for inflow distributions outside this range or other reasons.

Appendix K

Anderson Dam Seismic Retrofit Project

Post-ADSRP Operations Technical Memorandum

Anderson Dam Seismic Retrofit Project

Post-ADSRP Operations Technical Memorandum

Project No. 91864005

FERC Project No. 5737-000

February 2025

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TABLE OF CONTENTS

1 INTRODUCTION

On February 20, 2020, the Federal Energy Regulatory Commission (FERC) ordered the Santa Clara Valley Water District (Valley Water) to begin lowering Anderson Reservoir by October 1, 2020, to elevation 488 feet (NAVD 88[1], which corresponds to three percent of the full reservoir capacity), to maintain elevation 488 feet to the maximum extent feasible, and to immediately move forward with the design and construction of a new, low-level outlet tunnel.[2] Valley Water complied with the order and the reservoir reached deadpool in mid-December 2020. The design of the Anderson Dam Tunnel Project (ADTP) was completed in January 2021, the construction contract was awarded in April 2021, and groundbreaking occurred in July 2021. Valley Water is currently working on implementing a suite of Avoidance and Minimization Measures (AMMs) to prevent and reduce impacts of the drawdown, construction, and operation of the ADTP, such as securing alternative water supplies and reducing impacts to the environment. These collective actions are referred to as the FERC Order Compliance Project (FOCP).

The FOCP's Reservoir Drawdown and Operations Plan (Drawdown Plan) was submitted to FERC on July 24, 2020, and FERC approved and ordered Valley Water to implement the Drawdown Plan in two approvals, an Order issued on October 1, 2020, and an Order issued on February 2, 2021.[3] Appendix A of the Drawdown Plan, entitled "FOCP Operations Technical Memorandum (TM)," covered the operations of Anderson Reservoir and other facilities on Coyote Creek from the initial drawdown of Anderson Reservoir until the completion of ADTP, scheduled for December 2023. A second Operations TM has been developed and covers reservoir and creek operations from completion of the ADTP through completion of construction of the Anderson Dam Seismic Retrofit Project (ADSRP). This third TM focuses on post-ADSRP operations which will be implemented upon completion of the dam retrofit. This memorandum addresses two alternatives for post-ADSRP dam and imported water releases: releases from Anderson Reservoir into Coyote Creek would conform to the Fish and Aquatic Habitat Collaborative Effort (FAHCE) Settlement Agreement (2003) or the modified operating rules, known as FAHCE-plus Modified, depending on which of the two alternatives the Board may select after certification of the ADSRP Final Environmental Impact Report (EIR).

2 EXISTING COYOTE CREEK FACILITIES AND PRE-FOCP OPERATIONS

Currently, Valley Water operates the following four facilities that impact the flow in Coyote Creek upstream of streamflow station 5058 located on Coyote Creek near Edenvale (Figure 1).

- Coyote Reservoir: This on-stream reservoir was constructed in 1936 and has a water right dating back to 1931. The water right entitles Valley Water to capture and put to beneficial use 24,560 acre-feet (AF) of local water from the upper Coyote Creek watershed. The reservoir storage capacity is 22,541 AF, per the most recent survey. A permanent seismic restriction to elevation 760.9 feet (NAVD 88) was imposed by the California Department of Water Resources, Division of Safety of Dams (DSOD) in 1992. The seismic restriction is equivalent to 11,843 AF in storage or

[1] North American Vertical Datum of 1988 (NAVD 88).

2 Since the issuance of the FERC Order, technical work reveals that deadpool is actually approximately elevation 490 feet NAVD 88, and Valley Water's request to correct the FERC Order definition of deadpool is pending

[3] FERC Order Approving, In Part, Reservoir Drawdown and Operations Plan, 173 FERC ¶ 62,0001, paragraph 1 (October 1, 2020);); FERC Order Approving, in Part, Reservoir Drawdown and Operations Plan 174 FERC paragraph 62065 (February 2, 2021).

52.5% of total capacity. No changes in operation of Coyote Reservoir and no seismic retrofit for the facility are planned during the FOCP, ADSRP construction, or post-ADSRP.

Coyote Reservoir is operated in a manner that is consistent with the criteria described in the amended Certificate of Approval for Coyote Dam, which was issued by DSOD in 1992. Due to the proximity of the Calaveras earthquake fault to Coyote Dam, DSOD requires that Valley Water maintain Coyote Reservoir water surface levels according to the conditions prescribed in the Certificate of Approval that remain in effect. Reservoir operations will continue to be consistent with these conditions. The Certificate of Approval also describes criteria by which Coyote and Anderson reservoirs are to be operated as a system to achieve the desired earthquake safety margin for Coyote Reservoir, as described in Section 3.4 below.

- Anderson Reservoir: Anderson Reservoir is an on-stream reservoir constructed in 1950 and has a storage capacity of 89,278 AF, which was restricted in 2017 by DSOD to 51,766 AF and was further restricted in 2020 by FERC to 3,050 AF. Anderson Reservoir has two water rights (dated 1949 and 1963) totaling 91,280 AF and can also store imported water delivered through the San Felipe Division of the federal Central Valley Project. Anderson Dam's existing outlet works consist of: (i) a sloping intake structure with three portals at different sill (invert) elevations of 487.8 feet, 527.8 feet, and 562.8 feet (NAVD 88); (ii) three inlet sluice gates (60 x 84 inches each); (iii) an outlet pipe of length 1,160 feet and 49 inches in diameter ; (iv) outlet valves consisting of a 42-inch Butterfly valve, a 20-inch Polyjet, and a 12-inch Polyjet; (v) a connection from the outlet pipe to the Anderson Force Main (AFM); and (vi) an emergency chute spillway with a weir length of 223 feet, a spillway crest at elevation 627.8 feet, and a freeboard of 19.3 feet to dam crest.

- Pipeline Outlet of the Coyote Discharge Line: The Coyote Discharge Line is owned by the U.S. Bureau of Reclamation and is operated by Valley Water. It discharges imported water from the terminus of the Santa Clara Conduit to Coyote Creek approximately 0.25 mile downstream of Anderson Dam.

- Coyote Percolation Pond: This on-stream groundwater percolation facility has a 5,000 AF local water diversion right on Coyote Creek dated 1935. It is located about 9.8 miles downstream of Anderson Dam. In the Pre-FERC Order condition, the Percolation Pond facility is controlled by a flashboard dam. The flashboard dam is operated to provide a minimum 7.5 cfs bypass flow/release; downstream flow of 2.5 cfs mean daily flow and 1 cfs minimum flow at streamflow station 5058, Coyote Creek at Edenvale; pass through flows greater than 800 cfs are accommodated by removing the dam. The flashboard dam is being replaced by the Phase 1 bladder dam design as a part of FOCP.

Although these four facilities are considered the significant managed flow facilities on the creek upstream of streamflow station 5058, other facilities and infrastructure not owned by Valley Water, such as Ogier Ponds (owned by Santa Clara County), significantly impact the flow in the creek. Figure 1 presents a schematic of existing Coyote Creek facilities upstream of streamflow station 5058, as well as the facility that would be constructed during FOCP (Section 3.7).

To maintain a wetted Coyote Creek, maximize managed aquifer recharge consistent with the District Act and Sustainable Groundwater Management Act (SGMA), and benefit the environment, a flow requirement of 2.5 cubic feet per second (cfs) at streamflow station 5058, is maintained per Valley Water's prior Lake and Streambed Alterations Agreement (LSAA) with the California Department of Fish and Wildlife (CDFW). This LSAA is associated with Coyote Percolation Pond and the minimum flow requirement is only in effect when the dam that creates the pond is in operation. Prior to the FERC Order, when it is not raining, a total release (from Anderson and imported water combined) of 30 to 55 cfs at the base of Anderson Dam is typically needed to maintain 2.5 cfs at streamflow station 5058, approximately 14.8 miles downstream. Releases in the range of 30-35 cfs are typical in the winter, whereas higher releases up to 55 cfs are typical in the warmer summer season, when water supplies are available. Additionally, total releases at the base of Anderson Dam above 60 cfs are typically more than what it is needed to meet water supply and current downstream environmental flow requirements, although higher releases may be necessary when recovering from a prolonged drought. Valley Water has generally maintained at least 2.5 cfs at streamflow station 5058 for the past 20 years, except during extreme drought periods. During the drought years 2014 to 2016 and beginning again in 2021, reduced flows led to observed adverse effects on the groundwater basin, instream sensitive habitats and species, and local water supplies. However, per the LSAA for the Coyote Percolation Pond, Valley Water met and conferred with CDFW and National Marine Fisheries Service (NMFS) multiple times to discuss the best course of action while there were not enough local supplies available for all beneficial uses.

3 POST-ADSRP OPERATIONS

This TM describes how Valley Water proposes to operate its existing and planned facilities after the completion of ADSRP under dry-year, median-year, and wet-year hydrology. These correspond to 90% exceedance probability[4] (EP) (dry year), 50% EP (median year), and 10% EP (wet year), respectively.

The Project proposed would incorporate post-ADSRP releases from Anderson Reservoir and/or of imported water into Coyote Creek that conform to the Fish and Aquatic Habitat Collaborative Effort (FAHCE) Settlement Agreement (2003) rules, but a Project alternative proposes that post-ADSRP releases from Anderson Reservoir and/or of imported water would follow the modified FAHCE operating rules, known as FAHCE-plus Modified. Both post-ADSRP operating scenarios are described in this memorandum because the operating scenarios that would be implemented depends on which of the two alternatives the Board may select after certification of the ADSRP Final Environmental Impact Report (EIR). Table 2 presents a summary of the proposed releases post-ADSRP. The releases from different facilities along Coyote Creek post-ADSRP are compared to existing releases (Baseline). Table 2 summarizes the effects of implementing operations in the post-ADSRP conditions pursuant to the FAHCE and FAHCE-plus Modified operating rules as compared to Baseline. FAHCE added winter base flows, migration pulses, and cold water

[4] The Exceedance Probability (EP) of inflow (*i.e.,* the surface water runoff from a watershed draining into a reservoir) is the frequency with which the annual inflow volume is met or exceeded. For instance, a 90% EP means that there is a high chance (90%) that a low yearly total inflow value is met or exceeded on any given year. Such inflow value represents a dry year that has nine in ten chances to be exceeded on any year. On the other hand, a 10% EP means that there is a low chance (10%) that a high yearly total inflow value is met or exceeded on any given year. This inflow value represents a wet year that has only one in ten chances to be exceeded.

management on selected streams. FAHCE-plus Modified revised the calendar period for migration pulses, as well as the magnitude, duration, and possible number of pulses.

- In addition to existing facilities, there will be a new facility called the Cross Valley Pipeline Extension (CVPE). Construction of this new pipeline will be completed by the end of September 2023. The new pipeline will allow for the discharge of imported water into Coyote Creek just downstream of Ogier Ponds. The CVPE is an AMM under FOCP that was proposed in the Drawdown Plan and is being constructed as a part of FOCP. Also, to provide benefits to fisheries, the Phase 1 bladder dam design for the Coyote Percolation Dam (implemented as a part of FOCP) will be revised to the Phase 2 Coyote Percolation Dam design, constructed as a part of ADSRP and then operated post-ADSRP in accordance with an operations plan that meets criteria described below.

3.1 EVAPORATION, SEEPAGE, AND OTHER LOSSES

Evaporation in Anderson Reservoir depends on the fluctuations in water temperature, whether it is a dry, median or wet year, and other factors including wind speed, water surface area, and ambient air temperature. Anderson Reservoir evaporation occurs at an average rate of approximately 3.3 inches per month. Valley Water estimates evaporation based on evaporation pan measurements and the surface area of the reservoir, which shrinks as the reservoir surface water level drops. When the reservoir is allowed to fill up post-ADSRP, its surface area will be about 1,253 acres at spillway crest level (El. 627.8 feet, NAVD 88).

Seepage through the dam's clay core and percolation into the mud at the bottom of the reservoir are assumed to be minimal. Other losses, like transpiration by plants, are considered minor relative to evaporation.

3.2 IMPORTED WATER INTO ANDERSON RESERVOIR

The pre-FERC Order operations, which allow for storing imported water in Anderson Reservoir, will continue post-ADSRP. Typically, imported water will be put into Anderson Reservoir, if necessary and available, in late winter and spring, while the temperature of that imported water is still relatively cold to enable Anderson to become deeper and therefore increase the volume of cold water in the reservoir.

In addition, imported water may be put into Anderson Reservoir at other times of the year, if necessary, to avoid losing Valley Water supplies stored in San Luis Reservoir or in anticipation of a planned shutdown in the conveyance system from San Luis Reservoir to Santa Clara County. However, any time water is imported and released for storage in Anderson Reservoir, the water will be placed into the Reservoir via the multi-port outlet (described in section 3.3.) in a way that does not negatively impact the cold water volume available for release to Coyote Creek with the goal of maintaining/maximizing the cold water pool volume in Anderson Reservoir. More specifically, the addition of imported water through the uppermost portal (at elevation 562.8 feet) during the warmer months of the year is not expected to have a negative impact on the cold water pool because the action will only increase storage in Anderson Reservoir, mainly at the uppermost, warmer level of the thermocline, thus the cold water pool is likely to become deeper and better insulated from solar radiation (direct sunlight) and elevated air temperatures in summer months.

Finally, the new outlet works (described in section 3.3) that will be constructed through ADSRP will enhance reservoir operations and offer flexibility for environmental benefits. Even if imported water needs to be delivered in a summer month to the upper, warmer layers of the reservoir, it would be later released to the distribution system and water treatment plants via the upper portal of the sloping intake structure and AFM. Releases to Coyote Creek could occur concurrently and would be from the lower, cold water pool via a 33-inch pipeline dedicated to managed recharge releases and environmental flows.

3.3 ANDERSON RESERVOIR OUTFLOW FACILITIES

The Pre-FERC Order Anderson Dam outflow facilities are:

- Sloping intake structure with three intakes at elevations 488, 528, and 563 feet (NAVD 88)
- 49-inch outlet pipe releases water to Coyote Creek through
    - 42-inch Butterfly Valve
    - 12-inch Polyjet Valve
    - 20-inch Polyjet Valve (at Anderson Hydroelectric Facility)
- 54-inch AFM releases Anderson Reservoir water to the Raw Water Distribution System and conveys imported water into Anderson Reservoir
- 36-inch Main Avenue Pipeline releases water from Anderson Reservoir to groundwater recharge facilities in Morgan Hill (Main Avenue Ponds and Madrone Channel)
- Coyote Pumping Plant (six pumps with associated valves and actuators)

After completion of ADSRP, the new Anderson Dam facilities will include a new 78-inch Low Level Outlet Works (LLOW), which replaces the current outlet pipe. In addition, a High Level Outlet Works (HLOW) and a Bypass Pipeline will be constructed.

Water from Anderson Reservoir may be delivered to the raw water distribution system through the LLOW, which will be connected to the existing 54-inch AFM, for use at water treatment plants, diverted to recharge facilities away from Coyote Creek[5], or temporary storage in Calero Reservoir. In addition, there will be a separate connection to the raw water distribution system from the 78-inch LLOW to the existing 36-inch Main Avenue Pipeline for delivery to groundwater recharge facilities in Morgan Hill. The 78-inch LLOW will have three intake portals at different elevations to allow water to be drawn from the desired level(s) to achieve water quality objectives. The three new portals elevations will match the levels of the existing portals (see Section 3.5.2 for details). These connections to the raw water distribution system will provide system flexibility and redundancy, as well as provide multiple ways to transfer Anderson water to

[5] Not only is Anderson Reservoir water released into Coyote Creek for percolation in the creek bed and the in-stream Coyote Percolation Pond, but water can be released into the Main Avenue Pipeline for managed groundwater recharge in Valley Water facilities in Morgan Hill, which currently consist of Madrone Channel, Main Avenue Ponds, and San Pedro Ponds. Releasing Anderson Reservoir water to additional recharge facilities is possible by sending water to the raw water distribution system via the AFM.

water supply and groundwater recharge beneficial uses. The new outlet works will allow for simultaneously releasing water from one of the lower portals on the Bypass Pipeline to the creek downstream of the dam to maintain the cold water management zone (CWMZ), and from a different, higher portal on the LLOW to the raw water distribution system. This operation will enable sending the warmer water for treatment at the water treatment plants, while the colder water will be released to Coyote Creek for groundwater recharge in Coyote Creek and also provide benefits to aquatic habitat in the CWMZ. (See additional details on Anderson outflow in Section 3.5.2 below).

3.4 COYOTE RESERVOIR OPERATIONS

Normal operations of Coyote Reservoir are based on a combined Anderson-Coyote storage. Pre-FERC Order operations will continue using the combined storage to guide releases per the Baseline, FAHCE, or FAHCE-plus Modified rule curves. Coyote Reservoir releases will remain within normal range of flows. Valley Water has established rules and processes for the winter period that require releasing water from Coyote Reservoir into Anderson Reservoir to comply with DSOD operating criteria for Coyote Reservoir.

The DSOD Certificate for Approval states, water in Coyote Reservoir may be impounded to the DSOD restriction of 760.9 feet (NAVD 88), which corresponds to 11,843 AF in storage. Anytime storage is available in Anderson Reservoir and storage in Coyote Reservoir exceeds the DSOD restriction, full capacity of the Coyote Reservoir outlet of 450 cfs should be used to lower Coyote Reservoir to the DSOD restriction. When Anderson Reservoir is full, storage in Coyote Reservoir above the DSOD restriction should be released within 30 days after the natural inflow into Anderson Reservoir drops below 40 cfs.

3.5 ANDERSON RESERVOIR OPERATIONS

Anderson Reservoir Pre-FERC Order operations are expected to change once ADSRP is complete. Table 2 provides a comparison of Pre-FERC Order operations (Baseline or pre-FERC Order operations) and proposed post-ADSRP operations under FAHCE and the FAHCE-plus Modified operating rules, while providing for continued adherence to the 1982 Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve. Although Anderson Reservoir was not designed or contemplated to provide flood protection, Valley Water developed the Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve to provide incidental flood protection so long as there would likely be no loss of water storage at the end of the wet season in April. The Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve is based on estimated monthly inflows into the reservoir. During the wet season when inflows from precipitation events are expected, Valley Water may release water from storage to avoid spilling from the reservoir. This results in no water supply impact since it is anticipated that the water released from storage will be replaced by water from the precipitation event.

3.5.1 Inflow into Anderson Reservoir

Anderson Dam is an on-stream reservoir on Coyote Creek. The inflow into Anderson Reservoir can be split into to two separate sub-watersheds:

1. Uncontrolled natural inflow from the tributaries surrounding Anderson Reservoir (such as Packwood Creek and Las Animas Creek), excluding flows from Coyote Reservoir; and

2. Flows from Coyote Reservoir (controlled releases from the dam outlet and uncontrolled flow when the Coyote Reservoir is spilling).

In normal water years (50% EP), monthly uncontrolled natural inflow to Anderson Reservoir ranges from 8 AF in the late summer (September) to 2,489 AF in the winter (February). In wet water years (10% EP), monthly natural inflow ranges from 129 AF in the late summer to 11,070 AF in the winter. In dry water years (90% EP), monthly inflow ranges from 0 AF in the late summer to 215 AF in the early spring (April). The natural inflow data based on water year type is presented in Table 3.

Controlled releases from Coyote Reservoir enter Anderson Reservoir as inflows after water losses in the reach of the creek between the two water bodies. The losses consist mainly of evapotranspiration. The losses average 1 to 2 cfs depending on the season. Table 4 shows the estimated monthly maximum and minimum inflows into Anderson Reservoir from Coyote Reservoir by water year type.

3.5.2 Outflow from Anderson Reservoir

Outflow from Anderson Reservoir after completion of ADSRP will occur in three ways: through the LLOW, Bypass Pipeline for managed recharge and environmental flow in the creek, and High Level Outlet Works (HLOW). These three major elements of the outlet works will be constructed as part of ADSRP.

a. LLOW (78-inch outlet pipe with its own 3 intake ports at different elevations; 54-inch fixed cone valve (FCV) alone with flow range up to 1,130 cfs

b. 42-inch sleeve valve (SV) alone with flow range of 2 to 540 cfs

c. 54-inch FCV and 42-inch SV combined have a flow range up to 1,315 cfs

d. 54-inch FCV and 42-inch SV and the Bypass Pipeline 30-inch SV (see below) combined have a flow range up to 1,485 cfs

e. Releases may be made to: (i) Coyote Creek, (ii) the raw water distribution system via the existing AFM, and/or (iii) the existing Main Avenue Pipeline

2. Bypass Pipeline (33-inch outlet pipe with its own three intake ports at different elevations;

    a. 30-inch sleeve valve (SV) with flow range of 2 to 170 cfs

    b. Used for releases to Coyote Creek only

    c. Capacity based on release requirements of FAHCE and FAHCE-plus Modified operating rules

    d. Separate system; can be operated independently of LLOW

3. HLOW (13-foot concrete pipe)

    a. Empty during normal operations

b. Absolute maximum discharge of 8,600 cfs; physical capacity, though not recommended for normal operation due to flow velocities greater than the recommended maximum flow velocity of 40 feet per second (fps)

c. Maximum discharge of 5,300 cfs at the recommended maximum flow velocity of 40 fps

d. 24-inch sleeve valve (SV) with maximum discharge of 250 cfs; recommend 60 cfs (20 fps through valve)

e. Used for releases to Coyote Creek only

In addition, in infrequent very high flow conditions, releases from the reservoir may occur via uncontrolled flow over the emergency spillway into Coyote Creek when the reservoir is spilling. A new spillway will be constructed under ADSRP to replace the existing spillway. The new spillway crest will maintain the same elevation of 627.8 feet as the existing spillway.

3.5.3 FAHCE and FAHCE-plus Modified Proposed Operations of Anderson Reservoir

Releases from Anderson Reservoir will be made according to the local water rights conditions establishing a diversion period, FAHCE or FAHCE-plus Modified operating rules, the 1982 Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve, water supply needs, emergency storage requirement, and Coyote Percolation Pond's LSAA with CDFW, which establishes instream environmental flows downstream of the pond. As specified in the Settlement Agreement and in accordance with state laws limiting use of imported water, imported water temporarily stored in Anderson Reservoir will not be included in volume calculations for habitat management programs, so comparisons of the combined storage in Anderson and Coyote reservoirs to the FAHCE and FAHCE-plus Modified rule curves does not include imported water stored in Anderson when determining releases to Coyote Creek. This is consistent with the FAHCE Settlement Agreement's (2003) requirement to maintain a cold water management zone, as well as the Delta Reform Act of 2009. As one goal of that legislation is to reduce reliance on Delta imported waters supplies, it would be inappropriate to use Delta waters to primarily enhance instream habitats locally (Water Code § 85021). Instead, local instream habitats will be supported with locally available water. Notwithstanding the foregoing, using imported water as part of Valley Water's groundwater management program is appropriate and does provide incidental benefits to instream habitats.

Winter and summer operations are described below:

1. **Winter Operations - November 1 through April 30**
   Anderson and Coyote reservoirs will be operated according to the FAHCE or FAHCE-plus Modified rule curves as shown in Figures 2 through 5. The curves consist of graduated operating rules based on available stored local water in Anderson-Coyote reservoirs (Figures 2 and 3 for FAHCE and Figures 4 and 5 for FAHCE-plus Modified, respectively) and will be utilized to provide winter baseflows while maintaining cold water storage for the summer release program.

   Winter baseflow will be released from Anderson Reservoir from November 1 through April 30 to support steelhead. The specific flow rate will depend on the combined storage of Anderson and Coyote reservoirs and where that storage volume falls within the range of the graduated curves

(Figures 3 and 5). If the storage is above the highest winter base rule curve, then 26 cfs or that flow rate required for recharge and downstream LSAA flow requirements[6] will be released. Releases to the raw water distribution system are also allowed when the reservoir storage is in this zone. Combined storage must exceed 24,000 AF approximately to initiate small baseflow releases of 5 cfs. Releases will be monitored and recorded below Anderson Dam, at streamflow station 5082, Coyote Creek at Madrone (operated by USGS as 11170000, COYOTE C NR MADRONE CA, beginning 02/01/2022), located approximately 1.2 miles downstream of Anderson Dam. The release determined from the combined storage may be made from Anderson Reservoir (typically from the Bypass Pipeline, but higher releases can be made from LLOW or HLOW) or the Coyote Discharge Line (which connects the Santa Clara Conduit to Coyote Creek) or some combination provided the total required release is made. The temperature of both Anderson Reservoir releases and imported water releases is typically 14 degrees Celsius (°C) or less during the period of November 1 through April 30, but imported water releases to Coyote Creek will not be made if doing so will cause the temperature of blended sources to exceed 14°C.

FAHCE-plus Modified Operating Rules:

i. Winter Base Rule Curves (shown in Table 5 and Figure 3)

- Active from November 1 through/including April 30
- All curves based on combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson)
- Releases of 5, cfs, 10 cfs, 15 cfs, 23 cfs, and the highest base release, which is a minimum of 26 cfs or the amount necessary for managed recharge and environmental release
- Releases will be monitored at streamflow station 5082/USGS 11170000 or outlet meter(s) at Anderson Dam

ii. Pulse Release (shown in Table 6 and Figure 2)

- Active from February 1 through/including April 30
- Release of 50 cfs for five days; up to two pulses during the entire pulse season
- Flood releases and spill events of at least 50 cfs for five consecutive days will also be considered a pulse flow event
- Triggered when combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson) equals 80,000 AF or greater, and it is safe to do so

[6] The LSAA bypass flow requirement is a minimum of 7.5 cfs at Coyote Percolation Pond and a minimum of 2.5 cfs at streamflow station 5058, Coyote Creek at Edenvale, located downstream.

- Ramping down of flows as described in the FAHCE Settlement Agreement
- Releases will be monitored at streamflow station 5082/USGS 11170000 or outlet meter(s) at Anderson Dam

iii. Summer Releases (see sub-Section 2 below)

FAHCE-plus Modified Operating Rules:

- Winter Base Rule Curves (shown in Table 5 and Figure 5)
    - Active from November 1 through/including April 30
    - All curves based on combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson)
    - Releases of 5, cfs, 10 cfs, 15 cfs, 23 cfs, and the highest base release, which is a minimum of 26 cfs or the amount necessary for managed recharge and environmental release
    - Releases will be monitored at streamflow station 5082/USGS 11170000 or outlet meter(s) at Anderson Dam
- Attraction Pulse (shown in Table 6 and Figure 4)
    - Active from December 1 through/including April 1
    - Release of 90 cfs for ten days; up to two pulses per month (up to one in April)
    - Flood releases and spill events of at least 90 cfs for ten consecutive days will also be considered a pulse flow event and back-to-back pulse events are possible
    - Triggered when combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson) equals 80,000 AF or greater, and it is safe to do so
    - Ramping down of flows as described in the FAHCE Settlement Agreement
    - Releases will be monitored at streamflow station 5082/USGS 11170000 or outlet meter(s) at Anderson Dam
- “Safeguard” Pulse (shown in Table 6 and Figure 4)
    - Active from January 15 through/including March 31
    - Applicable only if Attraction Pulse of 90 cfs for ten days has not occurred since December 1
    - Release of 90 cfs for five days; up to two Safeguard pulses may be performed and each counts toward the defined limit of two pulses per month; after the end of

the first pulse there would be a pause of at least seven days before another pulse would be initiated

- Triggered when combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson) equals 55,000 AF or greater, flow at streamflow station 5058 equals at least 30 cfs for two consecutive days, and it is safe to do so
- If the 30 cfs trigger is not met by March 1 and combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson) equals 55,000 AF or greater, then release a single pulse of 90 cfs for ten days
- If a Safeguard pulse initiates, but then combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson) increases to 80,000 AF or greater during the Safeguard pulse, then the duration of the pulse will be extended to ten days
- This pulse, though tailored for upmigrating adults, will also provide suitable depth for outmigration of juvenile steelhead as well
- Ramping down of flows as described in the FAHCE Settlement Agreement
- Releases will be monitored at streamflow station 5082/USGS 11170000 or outlet meter(s) at Anderson Dam

- Outmigration Pulse (shown in Table 6 and Figure 4)
    - Active from April 1 through/including May 31
    - Release of 60 cfs for three days; up to two pulses possible during period; after the end of the first pulse there would be a pause of at least seven days before another pulse would be initiated; no pause is necessary if following an Attraction Pulse or Safeguard Pulse
    - Flood releases and spill events of at least 60 cfs for three consecutive days will also be considered an Outmigration Pulse flow event
    - Triggered when combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson) equals 45,000 AF or greater, flow at streamflow station 5058 equals at least 10 cfs for two consecutive days, and it is safe to do so
    - If the 10 cfs trigger is not met by May 15 and combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson) equals 45,000 AF or greater, then release a single pulse of 60 cfs for seven days
    - Ramping down of flows as described in the FAHCE Settlement Agreement

- Releases will be monitored at streamflow station 5082/USGS 11170000 or outlet meter(s) at Anderson Dam

The pulse releases under FAHCE and FAHCE-plus Modified operations rules are summarized in Table 6.

2. **Summer Operations - May 1 through October 31**
Releases from Anderson Reservoir will be made from May 1 through October 31 to maintain a daily average water temperature not to exceed 18°C of the CWMZ available cold water storage. The official CWMZ, as defined in the FAHCE Settlement Agreement, is the reach of Coyote Creek from the outlet of Anderson Dam to Coyote Creek Golf Drive, although the Functional CWMZ (FCWMZ) under Pre-FERC Order conditions stretched from Anderson Dam to just upstream of Ogier Ponds because Coyote Creek currently flows through Ogier Ponds[7] (Figure 1). Between April 15 and 30 of each year, a temperature survey of Anderson Reservoir (and, if required, Coyote Reservoir) will be conducted to determine the available hypolimnetic volume within the reservoir with a temperature of 14°C or less (FAHCE Settlement Agreement operating rules) or 16°C or less (FAHCE-plus Modified operating rules). If required, additional reservoir temperature profiles will be established on a monthly basis from June through October and releases adjusted to correspond to changes in the measured hypolimnetic volume.

Local water stored in Anderson Reservoir and/or imported water from San Luis Reservoir will be released through the Anderson Reservoir outlet and/or Coyote Discharge Line outfall, respectively, at a rate sufficient to maintain a continuous flow of water with a daily average temperature of 18°C or less in the FCWMZ and a minimum flow of 1 cfs at the downstream end of the FCWMZ. When the Ogier Ponds CM has been completed, Valley Water will shift the temperature and flow objectives to maintain a continuous flow of water with a daily average temperature of 18° C or less and a minimum flow of 1 cfs at the downstream end of as much of the entire CWMZ as feasible based on available cold water storage. If there is not sufficient storage to satisfy this condition, the daily release rate will be equal to the total available cold water storage less estimated evaporation divided by 184 days (i.e. the time period from May 1 through October 31).

If imported water from the Coyote Discharge Line, if applicable when blended reservoir water, is 14°C or less and the combined reservoir storage is adequate for summer releases, then releases from the Coyote Discharge Line to Coyote Creek may be substituted for releases from Anderson Reservoir to meet the target of providing water with a daily average temperature of 18°C or less in and a minimum flow of 1 cfs at the downstream end of the FCWMZ, or, after completion of Ogier Ponds restoration project, throughout as much of the CWMZ as feasible given the cold water pool. This applies to both FAHCE and FAHCE-plus Modified. Storage in excess of the

[7] Valley Water has completed a feasibility study that assessed the configuration of Coyote Creek in the vicinity of Ogier Ponds and has recently embarked on a planning study to separate the ponds from the creek. This project is a proposed Conservation Measure that is intended to extend the functional CWMZ and facilitate flows, from upstream releases to Coyote Creek, in reaching the downstream end of the CWMZ as identified in the FAHCE Settlement Agreement.

requirements outlined above may be released to Coyote Creek or the raw water distribution system. This may be necessary in some years for multiple reasons including (i) exercising Anderson Reservoir's two water rights and putting the stored water to beneficial use, (ii) drawing down the reservoir storage prior to the following rainy season, and (iii) providing water supply during a planned shutdown or an unplanned outage of the San Felipe Division system of the Central Valley Project. The implementation of the Combined Incidental Flood Risk-Reduction Rule Curve post-ADSRP (Figure 2) will allow for capturing surface water runoff during the water rights diversion period of Anderson Reservoir and diverting local water to storage. In wet years, the Combined Incidental Flood Risk-Reduction Rule Curve will allow for building a larger cold water pool in the reservoir for later use in warm months in the FCWMZ.

3. **Main Differences Between FAHCE and FAHCE-plus Modified Operating Rules**
The main differences between the Baseline and FAHCE operating rules are that FAHCE includes specific storage-based winter base releases, storage-based pulse flows to facilitate fish migration (February 1 through April 30), and summer cold water releases from the reservoir and/or the Coyote Discharge Line of 14°C or less for rearing of juvenile steelhead. FAHCE-plus Modified is based upon the original FAHCE operating rules, but it has expanded the time window available for pulse releases (December 1 through/including May 31) and increases the magnitude, duration, and the possible number of the pulse releases. The increased magnitude and duration of the pulse releases under FAHCE-plus Modified is intended to increase passage opportunities for adult steelhead by increasing water depths through critical riffles in downstream reaches of Coyote Creek. The increased duration of pulse releases under FAHCE-plus Modified is intended to provide more time to complete passage between San Francisco Bay and upstream spawning and rearing areas. FAHCE-plus Modified also modified the FAHCE summer local cold water release temperature from the reservoir of 16°C or less for the rearing of juvenile steelhead. This reservoir release restriction is based on modeling and observed water temperatures showing that releases with a temperature of 16°C or less are usually sufficient to maintain temperatures of 18°C or less throughout the FCWMZ, and, after completion of Ogier Ponds restoration, throughout the CWMZ. In addition, increased pulse flows pursuant to FAHCE-plus Modified reduce the volume of water in the reservoir that is available for later release and has impacts on the volume of the cold pool that is less than 14°C. Increasing the temperature threshold for releases from Anderson Reservoir to 16°C or less increases the operational cold water volume in Anderson Reservoir, without adversely affecting anticipated temperatures downstream in the creek. The target temperature throughout the FCWMZ until Ogier Ponds restoration is complete, and then throughout the entire CWMZ remains 18°C or less for both the FAHCE and FAHCE-plus Modified operating rules. In addition, because increased pulse flows pursuant FAHCE-plus Modified rules reduce the volume of water in the reservoir that is available for release, releases from the Coyote Discharge Line become slightly more likely under FAHCE-plus Modified. To assure adequate temperatures and flows are maintained within the FCWMZ/CWMZ and provide a margin of safety notwithstanding the potential for Coyote Discharge Line releases to increase, releases from Coyote Discharge Line, together with any concurrent reservoir releases, will not exceed 14 degrees Celsius at the Coyote Discharge Line Outfall during the summer rearing period from May 1 through October 31..

3.6 COYOTE DISCHARGE LINE TURNOUT

The Coyote Discharge Line releases water conveyed from San Luis Reservoir through the Central Valley Project, San Felipe Division, to Coyote Creek approximately 0.25 mile downstream of Anderson Dam through a 30-inch Polyjet turnout at a maximum discharge rate of 75 cfs. Under existing conditions, imported water is released any time of the year to supplement releases of local water from Anderson and Coyote reservoirs for groundwater recharge and incidental in-stream flow and temperature benefits.

Under either the proposed FAHCE or FAHCE-plus Modified operations, during the fall, winter, and spring months (November 1 to April 30), native fish in Coyote Creek below Anderson Dam, including steelhead and Chinook salmon, generally benefit from higher streamflow conditions. If augmentation with imported water is performed during this period, releases would only be made from the Coyote Discharge Line to maximize the length of stream channel affected by the supplemental flow. During summer months (May 1 to October 31), imported water from the Coyote Discharge Line will only be released to Coyote Creek when its temperature, together with any concurrent releases from Anderson Reservoir, is 14°C or less at the outfall.

The expected imported water releases into Coyote Creek post-ADSRP will vary based on hydrologic year and season and may be impacted by reduced imported water allocations and any conditions placed on imported supplies, like the use of imported water solely for public health and safety uses during an extended drought. The flows will supplement the releases from Anderson Reservoir to reach the needed flows in the creek to ensure a minimum of 2.5 cfs downstream at streamflow station 5058 per the LSAA requirements related to Coyote Percolation Dam, and 1 cfs and the target average daily temperature of 18°C at the farthest downstream point of the FCWMZ until Ogier Ponds restoration is complete and then throughout as much of the CWMZ feasible.

3.7 CROSS VALLEY PIPELINE EXTENSION

As part of the FOCP, Valley Water has constructed an extension of the Cross Valley Pipeline to establish a new turnout for Cross Valley Pipeline water into Coyote Creek, just downstream of Ogier Ponds, and below the functional CWMZ to provide for groundwater recharge and meet LSAA flow requirements associated with Coyote Percolation Pond. If needed, operations are to commence in October 2023.

Post-ADSRP completion, Valley Water plans to resume its normal operations of Anderson Reservoir, along with the changes that come from the adoption of the FAHCE reservoir operation rule curves (FAHCE or FAHCE-plus Modified). Use of the CVPE does not alter or result in any changes to the proposed operations under FAHCE or FAHCE-plus Modified. As described below, use of the CVPE will only occur in severely dry years when releases from Anderson Reservoir are insufficient to maintain a wetted channel to the CVPE outfall.

In all water years, the flows in Coyote Creek in the summer rearing period (from about May 1 to about October 31) are expected to be released from the preserved local cold water pool volume in Anderson Reservoir. As directed by the FAHCE Settlement Agreement, the May 1 to October 31 release rate to Coyote Creek will be based on the available hypolimnetic volume with a temperature of 14°C or less in Anderson Reservoir. Under FAHCE-plus Modified, the hypolimnetic volume is expanded to include water up to 16°C. During the summer rearing period, imported water will only be released from the Coyote

Discharge Line to Coyote Creek if the temperature of imported water together with any reservoir released concurrently is 14°C or less.

In severely dry years, Anderson Reservoir storage may be very low and the cold water pool minimal. As in all years, Valley Water would release the calculated flow based on cold water pool volumes from Anderson Reservoir based on the FAHCE of FAHCE plus Modified rules curves. However, in extreme conditions, releases to Coyote Creek from Anderson Reservoir may be less than 10 cfs and lengths of dry stream channel in the downstream reaches may occur. During the summer period (May 1 to October 31), if the channel of Coyote Creek immediately upstream of the CVPE outfall is completely dry, Valley Water may release imported water to Coyote Creek from the CVPE for managed groundwater recharge and to maintain a wetted channel downstream of the release point with no temperature limitation. Flow will be monitored via a series of stream stations located upstream and downstream of the CVPE and by personnel in the field. The CVPE will not be operated during the Winter Base Flow period (November 1-April 30) at all, and will not be operated in the summer except as described in this paragraph.

Table 1 summarizes the operational scenarios when CVPE and the Coyote Discharge Line may be used for imported water releases after the completion of ADSRP.

3.8 PHASE 2 COYOTE PERCOLATION DAM

Upon completion other Phase 2 Coyote Percolation Dam and fish ladder renovations, the facility will meet fish passage criteria outlined in Part XII: Fish Passage Design and Implementation, California Salmonid Stream Habitat Restoration Manual (CDFW 2009) and the NOAA Fisheries WCR Anadromous Salmonid Design Manual (NMFS 2022) and provide safe, effective, and timely upstream and downstream passage of anadromous salmonids regardless of whether the bladder is either inflated or deflated. Fish migration will occur through the existing fish ladder when the dam is inflated. Fish migration will occur via roughened channel constructed during Phase 2 when the dam is deflated. Within 13 months of completion and approval of Phase 2 design, Valley Water will have a completed a Post-ADSRP operations plan for the facility. Key elements of the operations will include the following:

- Upstream passage through the Coyote Creek Percolation Dam Facility will be provided at flows between 2.5 cfs and 320 cfs.
- The bladder dam will be inflated when Coyote Creek flows arriving at the dam are less than 275 cfs and upstream passage will be provided through the fish ladder.
- When the dam is inflated, fish ladder flows will be maintained between 2.5 and 25 cfs between October 16th through June 14th and flows above 25 cfs (and less than 275 cfs) will be released through the new bypass gates replacing the existing radial gates.
- During summer periods (June 15th through October 15th) outside of the salmonid migration season, the weir gates in the fish ladder may be raised to cut off flows to the fish ladder and allow inspection and maintenance activities to be conducted. Valley Water will maintain the minimum required flows per the LSAA to Coyote Creek.
- The bladder dam will be deflated when Coyote Creek flows arriving at the dam are greater than 275 cfs and upstream passage will be provided by the roughened channel.

- When the dam is deflated, Coyote Creek flow greater than 275 cfs arriving at the dam will go over the deflated dam, a portion of this flow will go into the roughened channel to provide upstream passage, and the fish ladder and bypass gates will be closed.
- The plan will include an evaluation of smolt migration conditions through the pond under Pre-FERC Order baseline conditions (including dam operations and instream flows) and will include measures to ensure an improvement in migration conditions in terms of water depth, velocity, and predation risk through the percolation pond as compared to the Pre-FERC Order baseline conditions.

Table 1: Imported Water Operational Scenarios for Coyote Creek Flows Post-ADSRP

TIME OF YEAR			
Summer Rearing Period (May 1 to Oct. 31)	Releases conform with cold water pool management plan for summer releases.	Releases can be made from the Coyote Discharge Line if water temperature is under 14°C.	None
	Releases are sufficient to provide wetted channel conditions in Coyote Creek downstream as far as CVPE outfall.	Releases can be made from the Coyote Discharge Line if water temperature of imported water and any concurrently released reservoir water is under 14°C.	None
	Releases are insufficient to provide wetted channel conditions in Coyote Creek downstream as far as CVPE outfall and stream immediately upstream of CVPE outfall is completely dry.	Releases can be made from the Coyote Discharge Line if water temperature of imported water and any concurrently released reservoir water is under 14°C.	To mitigate the impacts on water supply (groundwater recharge) and ecosystem function, releases of CVPE water can be made to maintain wetted creek downstream of the CVPE outfall with no temperature limitation.
Winter Base Flow (Nov. 1 to Apr. 30)	Releases conform with winter base flow and pulse flow operational rules established by FAHCE or FAHCE-plus Modified.	If needed, supplement Anderson Reservoir releases with Coyote Discharge Line imported water to maintain a wetted creek and a full, managed groundwater recharge program. During the winter base flow period, imported water can be used in Coyote Creek in lieu of local water to maintain a larger cold water pool in Anderson Reservoir for summer releases.	None

Table 2: Baseline vs. Proposed Anderson Post-ADSRP Releases by Season

	Summer[2]	Winter[3]	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Baseline	as needed for beneficial use	combined flood rule curve and Coyote Reservoir Permanent DSOD Restriction	as needed for beneficial use	combined incidental flood risk-reduction rule curve and Coyote Reservoir Permanent DSOD Restriction	as needed for beneficial use	as needed for beneficial use	as needed for beneficial use; to mitigate effects of San Luis Reservoir Low Point Condition; to prevent loss of water stored in San Luis Reservoir	as needed for beneficial use; to prevent loss of water stored in San Luis Reservoir	N/A	N/A	minimum 7.5 cfs bypass flow/release	minimum 7.5 cfs bypass flow/release; pass through flows greater than 800 cfs by removing the dam
Post-ADSRP: FAHCE Settlement & Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve	as needed from cold pool (14°C or less) for beneficial use: 3 -55 cfs, while maintaining flow and temperature targets in FCWMZ prior to Ogier Ponds restoration, and CWMZ after Ogier Ponds restoration to the extent possible	combined flood rule curve; winter base rule curves; pulse release rule curve during February 1-April 30 and Coyote Reservoir Permanent DSOD	as needed for beneficial use, while maintaining sufficient storage to maintain FCWMZ prior to Ogier Ponds restoration, and CWMZ after Ogier Ponds restoration	as needed for beneficial use, while maintaining sufficient storage to meet releases required by rule curves, flow/temperature targets, and Coyote Reservoir Permanent DSOD	as needed for beneficial use: 0 -50 cfs, water temperature of releases and Coyote Discharge Water 14°C or less to maintain FCWMZ prior to Ogier Ponds restoration, and CWMZ after Ogier Ponds restoration	as needed for beneficial use: 0 -35 cfs	Introduced in a manner that does not interfere with reservoir cold pool as needed for beneficial use; to mitigate effects of San Luis Reservoir Low Point Condition; to prevent loss of water stored in San Luis Reservoir	as needed for beneficial use; as needed to store sufficient cold water for release in summer; to mitigate effects of San Luis Reservoir Low Point Condition; to prevent loss of water stored in San Luis Reservoir	When creek is dry at CVPE outfall, as needed for recharge and to meet LSAA requirement of daily average flow minimum of 2.5 cfs at streamflow station 5058		minimum 7.5 cfs bypass flow/release	minimum 7.5 cfs bypass flow/release; pass through flows greater than 800 cfs by deflating dam. New measures will be identified to improve migration water depths, velocities, and predation risks through the percolation pond as compared to the baseline condition following implementation of Phase 2 design as part of completing ADSRP.
Post-ADSRP: FAHCE-plus Modified and	as needed from cold pool (16°C or less) for	combined flood rule curve; winter base	as needed for beneficial use, while maintaining	as needed for beneficial use, while maintaining sufficient storage	as needed for beneficial use: 0 -50 cfs, water	as needed for beneficial	Introduced in a manner that does not interfere with	as needed for beneficial use; as needed to store sufficient	When Creek is dry at CVPE outfall, as needed		minimum 7.5 cfs bypass flow/release	minimum 7.5 cfs bypass flow/release; pass through

Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve	beneficial use: 3 -55 cfs, while maintaining flow and temperature targets in FCWMZ, and after Ogier Ponds Restoration, in CWMZ to the extent possible	rule curves; pulse release rule curve during December 1-April 15 and Coyote Reservoir Permanent DSOD	sufficient storage to maintain FCWMZ prior to Ogier Ponds restoration, and CWMZ to extent feasible after Ogier Ponds restoration	to meet releases required by rule curves, flow/temperature targets, and Coyote Reservoir Permanent DSOD Restriction	temperature of 14°C or less to maintain FCWMZ, and after Ogier Ponds Restoration, CWMZ	use: 0 -35 cfs	reservoir cold pool as needed for beneficial use; to mitigate effects of San Luis Reservoir Low Point Condition; to prevent loss of water stored in San Luis Reservoir	cold water for release in summer; to mitigate effects of San Luis Reservoir Low Point Condition; to prevent loss of water stored in San Luis Reservoir	for recharge and to meet LSAA requirement of daily average flow minimum of 2.5 cfs at streamflow station 5058		flows greater than 800 cfs by deflating dam. New measures will be identified to improve migration water depths, velocities, and predation risks through the percolation pond as compared to the baseline condition following implementation of Phase 2 design as part of completing ADSRP.

Notes: (1) Releases are estimated based on existing Coyote Reservoir operational rules. Actual releases will depend on hydrology and could be less than or greater than those shown here.
(2) Summer = May 1 to October 31.
(3) Winter = November 1 to April 30.

Table 3: Estimated Natural Inflows into Anderson Reservoir (excluding Coyote Reservoir outflows) Based on Water Year Type

Winter Monthly High	215	2,489	11,070
Summer Monthly Low	0	8	129

Table 4: Estimated Inflows into Anderson Reservoir from Coyote Reservoir Based on Water Year Type

Maximum Monthly Volume	109	3,721	26,071
Minimum Monthly Volume	14	116	472

Table 5: Reservoir Storage Thresholds (AF) Associated with Winter Base Rule Curves for Both FAHCE and FAHCE-plus Modified Operating Rules

November 1	31,050	29,173	26,411	23,648	20,886
December 1	31,050	29,173	26,411	23,648	20,886
January 1	31,050	29,216	26,454	23,691	20,929
February 1	31,050	29,495	26,733	23,970	21,208
March 1	31,050	30,316	27,554	24,791	22,029
April 1	31,050	30,842	28,080	25,317	22,555
May 1	31,050	31,050	28,288	25,525	22,763

Table 6: Pulse Releases by Operations Scenario

Baseline	N/A	N/A	N/A	N/A	N/A	No regular pulse releases in Baseline
Post-ADSRP: **FAHCE Settlement Agreement** & Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve	February 1 – April 30	80,000	Passage	50 cfs for 5 days	Up to one pulse per month and up to two during time period	
	December 1 – April 1	80,000	Attraction Pulse	90 cfs for 10 days	Up to two per month during December through March, then one possible on April 1	
Post-ADSRP: **FAHCE-plus Modified** and Anderson-Coyote Combined Incidental Flood Risk-Reduction Rule Curve	January 15 – March 31	55,000 + minimum flow of 30 cfs for 2 consecutive days at streamflow station 5058	Safeguard Pulse	90 cfs for 5 days	Up to two during time period	If on March 1 the reservoir storage threshold is met, but the 30 cfs flow threshold is not been met, then release a single pulse of 90 cfs for 10 days
	April 1 – May 31	45,000 + minimum flow of 10 cfs for 2	Outmigration Pulse	60 cfs for 3 days	Up to two during time period	If on May 15 the reservoir storage

	consecutive days at streamflow station 5058		threshold is met, but the 10 cfs flow threshold has not been met, then release a single pulse of 60 cfs for 7 days

Notes: (1) Combined storage in Anderson and Coyote reservoirs (minus imported water stored in Anderson)

(2) All pulse releases will include ramping down of releases according to FAHCE Settlement Agreement or FAHCE-plus Modified operating rules.

Figure 1: Schematic of Coyote Creek Facilities Upstream of Streamflow Station 5058, Inflows, Outflows, and Proposed Imported Water Turnout

Note: There are no proposed changes for facilities upstream of Anderson Dam, including Coyote dam and reservoir and Coyote Creek reach between Coyote Dam and Anderson Reservoir.

Figure 2: Anderson-Coyote Reservoirs Operation Rule Curves (including Pulse Flows): FAHCE

Figure 3: Anderson-Coyote Reservoirs Low Storage Winter Base Flow Rule Curves: FAHCE

Figure 4: Anderson-Coyote Reservoir Operating Rule Curves (including pulse flows): FAHCE-plus Modified

Figure 5: Anderson-Coyote Reservoirs Low Storage Winter Base Flow Rule Curves: FAHCE-plus Modified

Appendix K

Anderson Dam Seismic Retrofit Project

Potential Flood Impacts for ADSRP Technical Memorandum

TECHNICAL MEMORANDUM

PROJECT: Anderson Dam Seismic Retrofit Project **DATE**: August 22, 2023

SUBJECT: Potential Flood Impacts for ADSRP

PREPARED: Jack Xu, PE, CFM; Darshan Baral, PhD, PE

1. PURPOSE

The Environmental Impact Report (EIR) for the Anderson Dam Seismic Retrofit Project (ADSRP) requires an analysis on various downstream impacts due to Project construction and reoperation of Anderson Dam. This report summarizes how historic inflow data into Anderson and Coyote Reservoirs were determined, and presents flow frequency predictions for Reservoir outflows before, during, and after ADSRP construction.

2. STRATEGY

Results from a Monte Carlo Simulation (MCS) were used to determine flow frequencies. To determine peak flow frequencies, the initial strategy was to use historic inflow data[1] from 1973 to 2021 and run various reservoir operation scenarios by using Reservoir System Simulation (HEC-ResSim)[2] software. This strategy was abandoned to determine peak flows because of the challenges encountered during the application of traditional flow frequency analysis methods to regulated flows (discussed below). However, the determination of how long a certain flow threshold was exceeded relied on HEC-ResSim using the historic inflow dataset.

3. OPERATION SCENARIOS

Figure 1 shows seven historical operation scenarios since 1973. For the purposes of the EIR, four of those scenarios were deemed necessary and are described below. Historically, the definition of a “full” reservoir (for both Coyote and Anderson) varied depending on the Department of Water Resources, Division of Safety of Dams (DSOD) or Federal Energy Regulatory Commission (FERC) restrictions in place. The DSOD restriction changed over the years as seismic analysis would reveal deficiencies. In 2020, FERC restricted Anderson Reservoir to 3% storage.

[1] Xu, Jack. SCVWD. TM: Anderson Dam Seismic Retrofit Project – Historical Reservoir Inflow Data. March 8, 2022.
[2] The Reservoir System Simulation (HEC-ResSim) software is developed by the U.S. Army Corps of Engineers, Institute for Water Resources, Hydrologic Engineering Center (CEIWR-HEC) is used to model reservoir operations at one or more reservoirs for a variety of operational goals and constraints. Version 3.3. https://www.hec.usace.army.mil/software/hec-ressim/

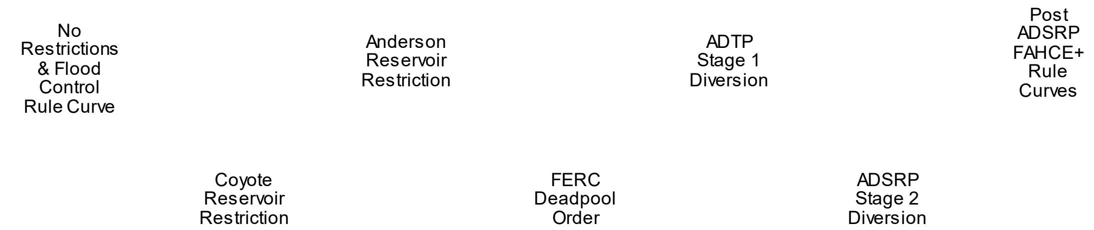

FIGURE 1: Anderson and Coyote Dam Operation Timeline

4. SCENARIO 1: HISTORIC CONDITIONS – SEISMIC RESTRICTIONS (2017 DSOD)

This scenario represents operational conditions that existed in 2009 through 2019 with seismic restrictions for both Anderson and Coyote Reservoir. (Figure 1). Anderson was operated to fully release if its Division of Safety of Dams (DSOD) restriction was exceeded. Coyote was operated to fully release if its DSOD restriction was exceed, unless Anderson was already above its restriction, at which point Coyote outlet would only release a minimal 5 cubic feet per second (cfs) to keep Coyote Creek wet. Anderson's outlet is estimated to have roughly a 500cfs maximum release capacity at full head, while Coyote's outlet is estimated at roughly 450cfs.

5. SCENARIO 2: POST ADTP & ADSRP CONSTRUCTION – STAGE 1 DIVERSION (2023 ADTP)

This scenario represents operational conditions that are expected to occur after the Anderson Dam Tunnel Project (ADTP) is completed. ADTP essentially installs the Stage 1 diversion outlet system to Anderson Dam. Coupled with the existing outlet, it will be operated to a maximum discharge of 2,500cfs. The existing outlet has an invert at an elevation of 488' NAVD88[3] (deadpool), while the Stage 1 diversion outlet won't begin releasing water until 500' NAVD88.

Anderson Reservoir is under the FERC 2020 Deadpool Order (FERC Order) which restricts the reservoir to the deadpool elevation while Coyote Reservoir is assumed to be operating to an 80% water supply exceedance probability (EP) rule curve. The 80% EP rule curve approximates normal historical operations and is needed because Anderson and Coyote reservoir were operated in tandem to a combined storage rule curve to achieve DSOD restrictions prior to the FERC Order.

[3] North American Vertical Datum of 1988.

6. SCENARIO 3: ADSRP CONSTRUCTION – STAGE 2 DIVERSION (2028 ADSRP)

This scenario represents operational conditions that are expected to exist during construction of the Anderson Dam Seismic Retrofit Project (ADSRP) while the emergency spillway is offline. The Stage 2 diversion outlet will be operational, and have a maximum outlet capacity of about 6,000cfs to 6,800cfs, depending on the reservoir pool elevation. Anderson Reservoir will remain drained below deadpool to facilitate construction, and Coyote Reservoir is assumed to be operating under the current 80% EP rule.

7. SCENARIO 4: POST ADSRP FAHCE+ OPERATIONS (FAHCE 2032)

The scenario represents the anticipated operational conditions after ADSRP is completed and the FAHCE (Fish and Aquatic Habitat Collaborative Effort) rule curves are implemented. (The FAHCE-plus Modified Alternative evaluated in the EIR is referred to as FAHCE+ in this memo). Figures 2A and 2B detail the complexities of this rule curve used in the modeling, and some simplification that was performed. However, the most important aspect of this rule curve is the flood rule curve, which would govern the flood flows used in the flow frequency analyses.

The Coyote Reservoir DSOD restriction does not change after ADSRP, and therefore the incidental flood risk reduction curve has been modified to account for Coyote's restriction to ensure the DSOD restriction isn't exceeded, as seen in the dashed orange line in Figure 2A.

As describe later, the FAHCE rule curve is designed to address releases at lower reservoir storage. To properly model operations when reservoir storage is high, additional rules were added to the FAHCE rule curve. Specifically, additional releases of 40cfs, 100cfs, and 200cfs were added to the model. These additional releases serve as a proxy for water supply uses, such as aquifer recharge, transfers to treatment plants, and diversions to other reservoirs via pipelines (Figure 2B).

The modified incidental flood risk reduction curve does not affect the FAHCE or FAHCE + rule curves that trigger winter base flows and pulse releases, because the rule curves trigger those releases at significantly lower combined storage than the modified incidental flood risk reduction curve establishes. The flood risk results will not differ between FAHCE or FAHCE+ because both alternatives utilize the same incidental flood risk reduction rule curve (Figure 2a). Because the FAHCE2032 model focuses on wet weather flood flow releases, the model outputs apply to both either FAHCE or FAHCE+ post-construction normal operating scenarios, which trigger release at much lower combined reservoir storage. The term FAHCE 2032 as used in this memo refers to wet weather flood flow release model results under FAHCE and FAHCE+ normal operating scenarios.

8. MONTE CARLO SIMULATION – RESERVOIR OPERATIONS

Effort was taken to preserve the same operational parameters as described in this report For the Monte Carlo Simulation[4] (MCS). However, there were several inherent differences of note due to how the models are set up.

Each year is run separately and independent of one another in the MCS, while the years carry over in HEC-ResSim. Therefore, the MCS simulations require a starting storage in both Anderson and Coyote Reservoir at the start of each year.

- Coyote starts at 4TAF, which is consistent with normal operations for all scenarios above.
- Anderson starts at approximately 51.7TAF (DSOD restriction) for scenario 1 and 53TAF for scenario 4 (historical median in September). Sensitivity was tested on the starting storage for scenario 4 by increasing the initial storage to 70TAF and 80.7TAF, and results showed relatively little change in the flow frequencies. For scenarios 2 and 3, Anderson begins at deadpool.

As mentioned above, for the complexity of the FAHCE rule curves, only the flood rule curve was of consequence in the modeling of flow frequencies. The summer environmental flow curves were neglected in the MCS since the reservoir would be reset to its initial storage at the start of every winter. During the winter, a constant outlet release of 26fs was assumed, which covered all the FAHCE requirements.

[4]Schaaf & Wheeler, Valley Water, Black & Veatch. Anderson Dam Seismic Retrofit Project – Reservoir Operation and Reliability during Construction. Volume 1: Stochastic Generation of Reservoir Inflow. July 25th, 2023.

FIGURE 2A: Modeled FAHCE Combined Operational Flood Control Curves

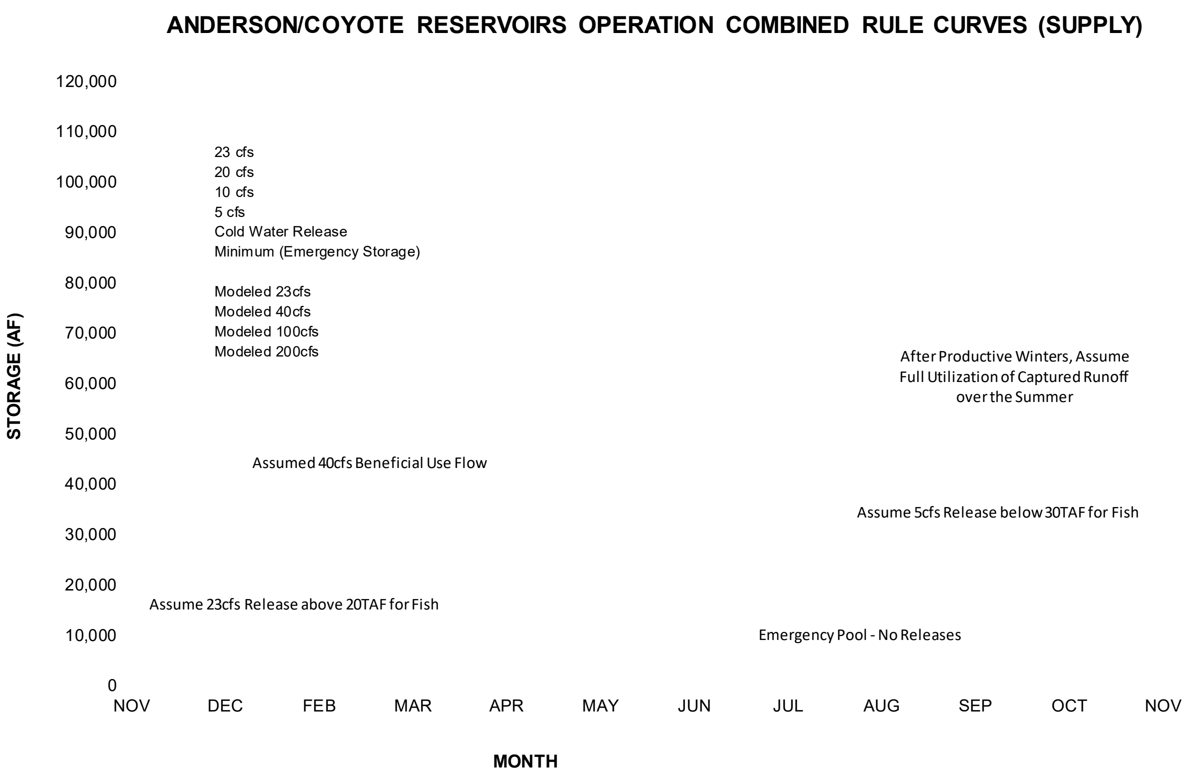

FIGURE 2B: Modeled FAHCE Combined Operational Water Supply Curves

9. BULLETIN 17C FLOW FREQUENCY

Once the 48 years of historical runoff were run through HEC-ResSim for the four scenarios, flow frequency analysis using Bulletin 17C[5] methods were performed using HEC-SSP[6] software. Regional skew parameters were determined from an existing USGS study[7] for California. Final regional skew was determined to be -0.504 with a regional skew mean square error of 0.14.

Using the 48 years of historical data, the 17C outputs for scenarios 2 and 3 appear reasonable, while outputs for scenario 1 and 4 had extremely poor fits. These flow frequency plots are included in the Appendix for record. This is because the Log Pearson III (LPIII) statistical distribution, used for the Bulletin 17B[8]/17C analyses, is better suited to fit peak annual flows for a natural, unimpaired river system. Scenarios 2 and 3 have a decent fit to the LPIII distribution due to the 'pass through' operation of Anderson, while scenarios 1 and 4 fail considerably because they were more regulated.

Effort was also made to correlate unregulated flows (no dam) with regulated flows in the four scenarios so that a proper 17C analysis could be performed, but ultimately the results were not consistent. Therefore, MCS approach was used to determine the flow frequencies.

[5] England, J.F., Jr., Cohn, T.A., Faber, B.A., Stedinger, J.R., Thomas, W.O., Jr., Veilleux, A.G., Kiang, J.E., and Mason, R.R., Jr., 2018, Guidelines for determining flood flow frequency—Bulletin 17C (ver. 1.1, May 2019): U.S. Geological Survey Techniques and Methods, book 4, chap. B5, 148 p., https://doi.org/10.3133/tm4B5

[6] US Army Corps of Engineers: Hydrologic Engineering Center – Statistical Software Package.

[7] Parrett, C., Veilleux, A., Stedinger, J.R., Barth, N.A., Knifong, D.L., and Ferris, J.C., 2011, Regional skew for California, and flood frequency for selected sites in the Sacramento–San Joaquin River Basin, based on data through water year 2006: U.S. Geological Survey Scientific Investigations Report 2010–5260, 94 p.

[8] U.S. Interagency Advisory Committee on Water Data, 1982, Guidelines for determining flood flow frequency, Bulletin 17-B of the Hydrology Subcommittee: Reston, Virginia, U.S. Geological Survey, Office of Water Data Coordination, [183 p.].

10. MONTE CARLO SIMULATION (MCS) FLOW FREQUENCY

A stochastic Monte Carlo simulation (MCS) was developed to help determine the construction risk and reliability of the interim dam,[9] and then also used to model post-construction flood impacts for purposes of this memorandum. This model used historical rainfall data to produce a synthetic rainfall pattern over 100,000 years. This was then used as input into a runoff model to produce 100,000 years of inflow into both Coyote and Anderson Reservoirs. Both the synthetic rainfall pattern and modeled flows were validated through comparisons with historical statistics. The modeled inflows were then routed through the four different scenarios to produce 100,000 years of annual maximum peak flow for Anderson Dam outflow to Coyote Creek to support assessment of flooding impacts during and post-construction.

The primary use of Bulletin 17B/17C was to fit a LPIII distribution on a known historic dataset and to extrapolate that trend to estimate extremely infrequent flow values. However, with the availability of 100,000 data points, the Bulletin 17B/17C LPIII distribution is no longer needed to characterize the extreme values, as the sheer volume of data points becomes its own distribution. Exceedance frequencies were calculated straight from this dataset and summarized in Table 1.

TABLE 1: Flow Frequencies using MCS

		Stochastic Flows from Dam (cfs)			
% Freq	**Return Period**	**2017 DSOD[1]** *Pre FERC Order Baseline*	**2023 ADTP[1]** *Construction Phase – Stage 1 Diversion*	**2028 ADSRP[2]** *Construction Phase – Stage 2 Diversion*	**2032 FAHCE[1]** *Post-Construction; FAHCE or FAHCE+ Operations*
0.2	500	18,144	2,500	5,830	16,392
0.5	200	13,512	2,500	5,485	12,143
1	100	10,211	2,500	5,185	8,999
2	50	6,253	2,500	4,880	5,875
4	25	1,798	2,500	4,600	3,884
5	20	530	2,500	4,455	3,369
10	10	516	2,500	4,020	2,505
20	5	506	2,500	3,430	1,609
50	2	Ops Decision[3]	2,500	2,420	FAHCE Ops[4]

[1]*MCS run by Valley Water (Python Script)*
[2]*MCS run by Schaaf and Wheeler (MATLAB Script). Current design and analysis show the interim dam to overtop at approximately the 500yr return period. Therefore Table 1 only accounts for outlet releases.*
[3]*The 2-year return period was driven by operational decisions to maximize water supply benefits while maintaining compliance with the Dam Safety restrictions.*
[4] *Once the FAHCE or FAHCE+ rule curves are adopted, the 2-year return period will be governed by routine releases for water supply and flood control, which are not accurately modelled using MCS.*

[9] When the embankment construction is underway, the interim dam height is reduced and not connected to the spillway. All watershed inflows are passed through the Stage 1 and Stage 2 diversion systems.

11. DURATION OF FLOW EXCEEDANCE

Additional analysis was performed to determine the amount of time a specific in-stream flow threshold (selected for reasons described in this section below) was to be exceeded under the four scenarios. To accomplish this, the 48 years of historical runoff used in the previous Bulletin 17C Flow Frequency analysis was used. These estimates are for flow directly downstream of the dam, and do not consider additional inflow in Coyote Creek past the dam.

TABLE 2: DURATION OF FLOW EXCEEDANCE USING HISTORIC INFLOW

Percentage of Time (1973 - 2022) above Threshold

Flow Threshold	300	500	1000	1400	2000	3000	4000	5000	6000	7000
DSOD2017	8.06%	0.93%	0.15%	0.08%	0.04%	0.01%	0.01%	0.01%	0.00%	0.00%
ADTP2023	7.42%	3.01%	0.72%	0.42%	0.26%	0.01%	0.00%	0.00%	0.00%	0.00%
ADSRP2028	7.40%	2.98%	0.69%	0.39%	0.21%	0.12%	0.04%	0.02%	0.00%	0.00%
FAHCE2032	1.80%	1.77%	1.77%	1.71%	0.02%	0.01%	0.00%	0.00%	0.00%	0.00%

Number of Total Days (1973 - 2022) above Threshold

Flow Threshold	300	500	1000	1400	2000	3000	4000	5000	6000	7000
DSOD2017	1410.4	162.9	25.8	13.4	7.4	2.5	1.3	0.9	0.6	0.3
ADTP2023	1299.1	526.9	125.4	73.6	46.3	1.3	0.0	0.0	0.0	0.0
ADSRP2028	1294.9	520.8	121.0	68.3	36.2	20.4	7.1	3.2	0.0	0.0
FAHCE2032	315.4	309.7	309.7	300.1	2.9	1.2	0.5	0.0	0.0	0.0

The 300cfs flow threshold serves as a proxy for the existing outlet (DSOD 2017) and generally indicates that the outlet is being fully opened in response to reaching the DSOD restriction. The 300cfs threshold is used as a proxy because while the existing outlet in the DSOD 2017 scenario has the capacity to release up to 500cfs, in practice the 500cfs outflow is rarely met because the reservoir must be completely full for the existing outlet to release its full capacity. This threshold is set so that the variation of flow due to available head from the reservoir would be covered. Peak flows that exceed 500cfs indicate spillway activation in the DSOD 2017 scenario.

The 1,400cfs flow threshold acts as a proxy for the final outlet capacity (FAHCE 2032). Although the outlet could release up to 1,485cfs if the reservoir were completely full and the valves were operated to be completely open, a slightly lesser threshold was selected to represent a full release to account for variations in head pressure. Flows above 1,400cfs should indicate that the outlet is being fully opened in response to meeting a flood rule curve threshold. Flows that exceed 1,485cfs indicate spillway activation in the FAHCE 2032 scenario. Additional detail in the results are provided in Appendix B, where durations are broken down into each water year for various flows.

Flows upwards of 2,000cfs were modeled in 1,000cfs increments to assess impacts at various flows shown in Table 1. Analysis stopped at 7,000cfs as flood impacts due to the Project diminish past this threshold.

12. DISCUSSION OF RESULTS

MAGNITUDE AND DURATION OF ANDERSON RESERVOIR RELEASES

It is worth noting that the characterization of less frequent high flows (i.e., 300cfs) does not translate to lower flows for in-stream uses (i.e., 25cfs - 100cfs). The flood analysis could not properly capture nuances in water supply operation during summer months and dry periods. The 2-year return period for scenarios 1 and 4 were below the maximum capacity of the outlet and is therefore governed by outlet releases as determined by environmental and water supply needs which can vary based on seasonal demand. The modeling could not capture all the nuances of these decisions. Please refer to the Anderson Reservoir Operations Post-ADSRP Technical Memorandum[10] for a description of routine releases that are anticipated once ADSRP is completed and FAHCE has been implemented.

Table 3 details maximum annual flows from Anderson Dam under Pre-FERC Order conditions (DSOD 2017) and the three future scenarios (i.e., construction phase stage 1 diversion, construction phase stage 2 diversion, and post-construction). Figure 3 presents this information graphically. In the ADTP 2023 and ADSRP 2028 scenarios, the outlet is left open to pass runoff, prioritizing an empty reservoir because FERC and DSOD has required that we maintain drawn down conditions in Anderson reservoir during construction for dam safety. The future post-Project FAHCE 2032 scenario shows a decrease in years where flood releases would have to be made, due to the removal of the DSOD seismic restriction on Anderson reservoir. Based on the historical hydrologic dataset, under the DSOD 2017 scenario, the full outlet (up to 500cfs) is utilized 28 out of 47 years (~60% of years), while in the FAHCE 2032 scenario the full outlet (up to 1,485 cfs) is utilized for flood protection releases 19 out of 47 years (~40% of years) Using the MCS dataset, in the FAHCE 2032 scenario releases of 1,400 cfs would correspond with a 3-5 year return period, confirming the pattern observed using the hydrologic dataset used for Table 3.

Table 3 also highlights a change in the frequency and magnitude of spill events from Anderson Reservoir. In the FAHCE 2032 scenario, spill events are less frequent and are of a smaller magnitude due to the ability of the newer outlet to draw down the reservoir faster (4 spills out of 47 years in the DSOD 2017 scenario and 2 spills out of 47 years in the FAHCE 2032 scenario). Further, spill events that occur in the FAHCE 2032 scenario would generally result in smaller peak flows. For example, the results in Table 3 show that the 2017 spill event that led to spillway flows up to 7,400cfs[11] and widespread flooding would not have occurred if the larger outlets were in place. Instead, the peak flows would be cut significantly (2,500cfs in the ADTP 2023 scenario, 4,740cfs in the ADSRP 2028 scenario, and 1,560cfs in the FAHCE 2032 scenario).

[10] Valley Water. Anderson Dam Seismic Retrofit Project. Post-ADSRP Operations Technical Memorandum. July 2023.

[11] The 2017 storm event that saw up to 7,400cfs spilling from Anderson Dam became the basis of design for the Coyote Creek Flood Protection Project (CCFPP), which will provide flood protection along Coyote Creek up to the 2017 flows experienced in areas of downtown San Jose. This Project is assumed to be completed prior to the releases described under the ADSRP 2028 scenario.

Table 4 qualitatively summarizes all the impacts for various flow thresholds that are quantitatively presented in Tables 2 and 3. Orange colors represent an increase in flow frequencies and durations (more frequent and longer duration), while green colors represent a decrease in peak flow frequencies and durations, and yellow represents little to no change in frequency or durations.

Figures 4A and 4B detail the outflow for an average (2015-2016) and wet year (2016-2017) for the four scenarios, giving a reference to how the reservoirs would operate. Under prevailing historic conditions (DSOD 2017), there was the highest duration of flows under 300cfs compared to the other scenarios due to the sheer amount of time it takes to reduce the reservoir level with the existing outlet in wet years. In addition, it was the only scenario where flows above 6,000cfs were observed, courtesy of the spillway. The remaining scenarios are governed by the maximum outlet capacity. For all scenarios, Figure 3 shows that the highest flows occur during a handful of wet winters (1982-1983, 1986, 1995-1998, 2017).

Notably, due to the larger outlet capacity after completion of the Project, parkland along the riparian corridor surrounding Coyote Creek will experience higher flows on a more routine basis, up to about 1,400cfs (flood releases from the outlet) every 3 to 5 years. These impacts can be conservatively estimated using the 2,000cfs inundation area that is shown in Figures 5A – 5M. This will result in additional trail flooding along the Coyote Creek Trail[12], but the duration of trail inundation for flows under approximately 300cfs – 400cfs will be less. As shown in Table 2, both during and after ADSRP construction, trails may be routinely closed during and after storm events.

FEMA FLOOD INSURANCE STUDY COMPARISON

Comparisons can also be made to the current effective FEMA Flood Insurance Study (FIS) discharges that show significantly higher flows. For example, the 1% FIS flow is about 15,000cfs downstream of Anderson Dam. These flows are primarily based on hydrologic analysis performed in the 1970's and before any seismic restrictions were imposed on Anderson or Coyote Reservoirs. Based on the MCS modelling in Table 1, the 1% flow is substantially less than the FIS prediction (15,000cfs vs 10,207cfs) and the implementation of the Project will reduce the magnitude of the 1% event.

[12] Coyote Creek Trail is a regional trail that connects parkland from the Anderson Lake Visitor Center to Hellyer Park via the Coyote Creek Parkway. The trail includes several low-flow crossings that flood routinely, rendering the trail unavailable to provide a regional connection for bicycle commuters and trail users of other types. The County has observed that key crossings close when approximately 25cfs is recorded at the Edenvale Stream Gage; this includes a creek crossing that provides the sole access to a picnic area within Hellyer Park. Based on the hydrologic record between 1988 and 2020, streamflow at the Edenvale Gage exceeds 25cfs approximately 13% of the time. This data set is difficult to correlate to Anderson Dam releases precisely due to rates of in-channel percolation, evaporation, and tributary runoff that are other than Anderson Reservoir contributions. These can vary widely depending on hydrologic conditions. In general, releases from Anderson Reservoir between 55cfs - 90cfs could trigger the key low-flow crossings to be closed. Historically those flow rates occurred 13% - 4% of the time, respectively.

TABLE 3: Yearly Maximum Outflow using Historical Inflow (cfs)

Year	DSOD 2017	ADTP 2023	ADSRP 2028	FAHCE 2032	MAR
1974	427	1066	1167	1481	50
1975	427	1084	1217	1485	50
1976	413	112	208	1423	50
1977	50	23	137	40	50
1978	426	2466	2798	200	50
1979	50	352	373	40	50
1980	490	2500	3868	**2589**	50
1981	50	559	622	40	50
1982	449	1581	1570	1485	50
1983	**2996**	2500	2910	1485	50
1984	427	719	802	1430	50
1985	50	205	309	40	50
1986	476	2500	4991	1481	50
1987	50	45	208	40	50
1988	50	224	265	40	50
1989	50	579	710	40	50
1990	50	211	208	40	50
1991	50	739	830	40	50
1992	50	921	1097	40	50
1993	429	1665	1683	1485	50
1994	50	500	638	40	50
1995	471	2438	2518	1481	50
1996	455	2201	2158	1482	50
1997	**3753**	2500	4574	1470	50
1998	**2500**	2500	4388	**4342**	50
1999	425	831	943	200	50
2000	440	1288	1398	1481	50
2001	50	561	617	100	50
2002	50	238	221	40	50
2003	50	535	557	40	50
2004	426	613	714	100	50
2005	428	1502	1584	1483	50
2006	436	1699	1688	1481	50
2007	50	271	280	40	50
2008	425	661	740	100	50
2009	424	498	593	100	50
2010	424	734	778	100	50
2011	445	1428	1466	1473	50
2012	50	63	208	40	50
2013	50	518	586	100	50
2014	284	284	261	100	50
2015	50	478	588	40	50
2016	424	1047	1115	100	50
2017	**7419**	2500	4750	1485	50
2018	297	246	252	100	50
2019	439	1185	1237	1481	50
2020	50	247	247	100	50
2021	50	107	139	40	50

Red – Spillway Events

Blue – Outlet not Utilized for Flood Control Release; Only Environmental & Water Supply Releases (50-200cfs assumption)

Yellow –Full Outlet Utilized for Flood Control Release.

TABLE 4: Impact Rubric Comparing Scenarios to Existing (DSOD2017) Conditions.

Flow Thresholds	ADTP 2023 Post ADTP - 2,500 Max Outlet, Empty Reservoir Frequency	 Duration	ADSRP 2028 ADSRP Construction - 6,800cfs Max Outlet, Empty Reservoir Frequency	 Duration	FAHCE 2032 Post ADSRP - 1,400cfs Max Outlet, Normal Reservoir Frequency	 Duration
300		Time exceeding this threshold during a dry and normal year would increase (due to operating rules passing all storm runoff), while during a wet year it would decrease (existing conditions would release for flood control with a smaller outlet).		Time exceeding this threshold during a dry and normal year would increase (due to operating rules passing all storm runoff), while during a wet year it would decrease (existing conditions would release for flood control with a smaller outlet).	Threshold will be exceeded less frequently due to a higher operating threshold for flood releases (DSOD restriction vs. Flood Rule Curve).	Time exceeding this threshold will decrease due to a larger outlet being able to discharge more water, meeting operating thresholds faster.
500	Threshold is likely to be exceeded more frequently every year due to operations which prioritize an empty reservoir, passing all runoff through the dam.				Threshold would be exceeded more frequently due to the larger outlet.	Time exceeding this threshold would increase due to the larger outlet.
1000						
1400		Time exceeding this threshold would increase due to the larger outlet.	Threshold is likely to be exceeded more frequently every year due to operations which prioritize an empty reservoir, passing all runoff through the dam.			
2000				Time exceeding this threshold would increase due to the larger outlet.		
3000						
4000					Threshold will be exceeded less frequently due to the ability of the larger outlet to release water more quickly before a spill occurs.	Time exceeding this threshold will decrease due to the ability of the larger outlet to release water more quickly before a spill occurs.
5000	Threshold will be exceeded less frequently. The joint effect of a very large outlet and an empty reservoir will throttle outflows that would have normally spilled.	Time exceeding this threshold will be exceeded less frequently. The joint effect of a very large outlet and an empty reservoir will throttle outflows that would have normally spilled.				
6000			Threshold will be exceeded less frequently. The joint effect of a very large outlet and an empty reservoir will throttle outflows that would have normally spilled.	Time exceeding this threshold will be exceeded less frequently. The joint effect of a very large outlet and an empty reservoir will throttle outflows that would have normally spilled.		
7000						

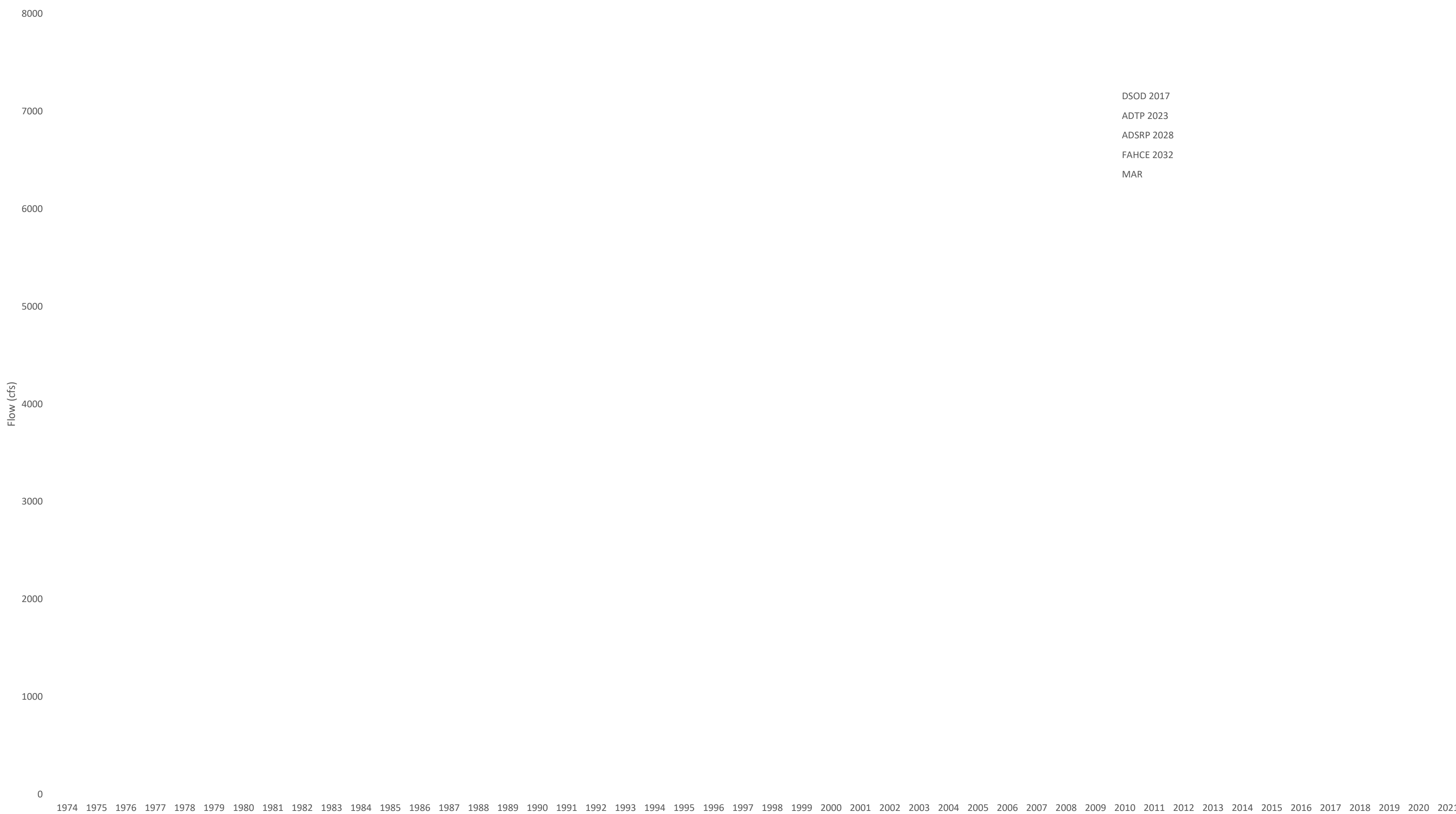

FIGURE 3: Yearly Maximum Outflow using Historical Inflow

MAR = Managed Aquifer Recharge; *assumed flow where maximum releases would be only for environmental or water supply (i.e. no flood control releases)*

FIGURE 4A: Modeled Anderson Releases for October 2015 – October 2016 Average Year

FIGURE 4B: Modeled Anderson Releases for October 2016 – October 2017 Wet Year

FIGURE 5A: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.

2021 Orthophoto: County of Santa Clara; Sanborn Map Company

FIGURE 5B: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

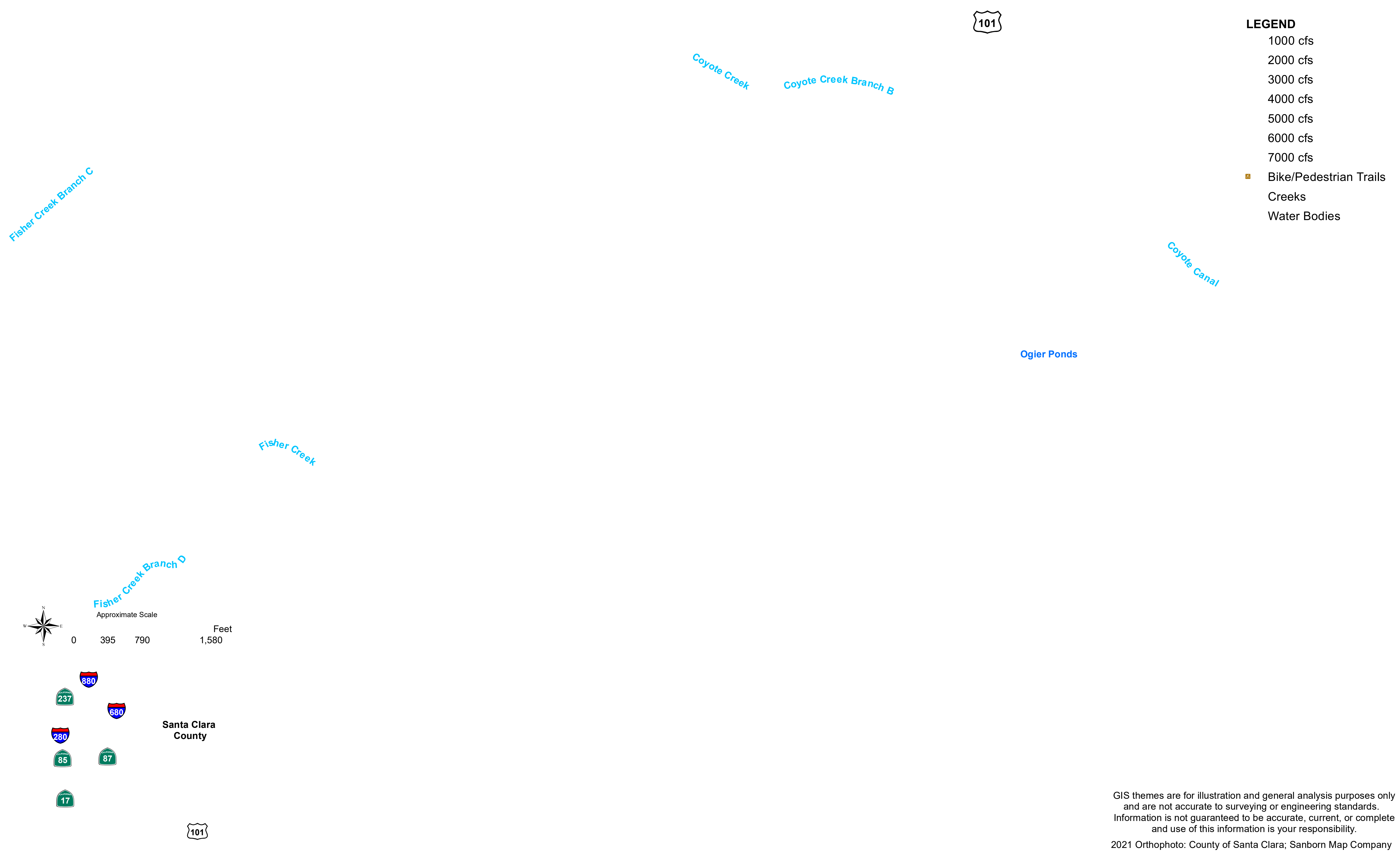

FIGURE 5C: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

FIGURE 5D: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

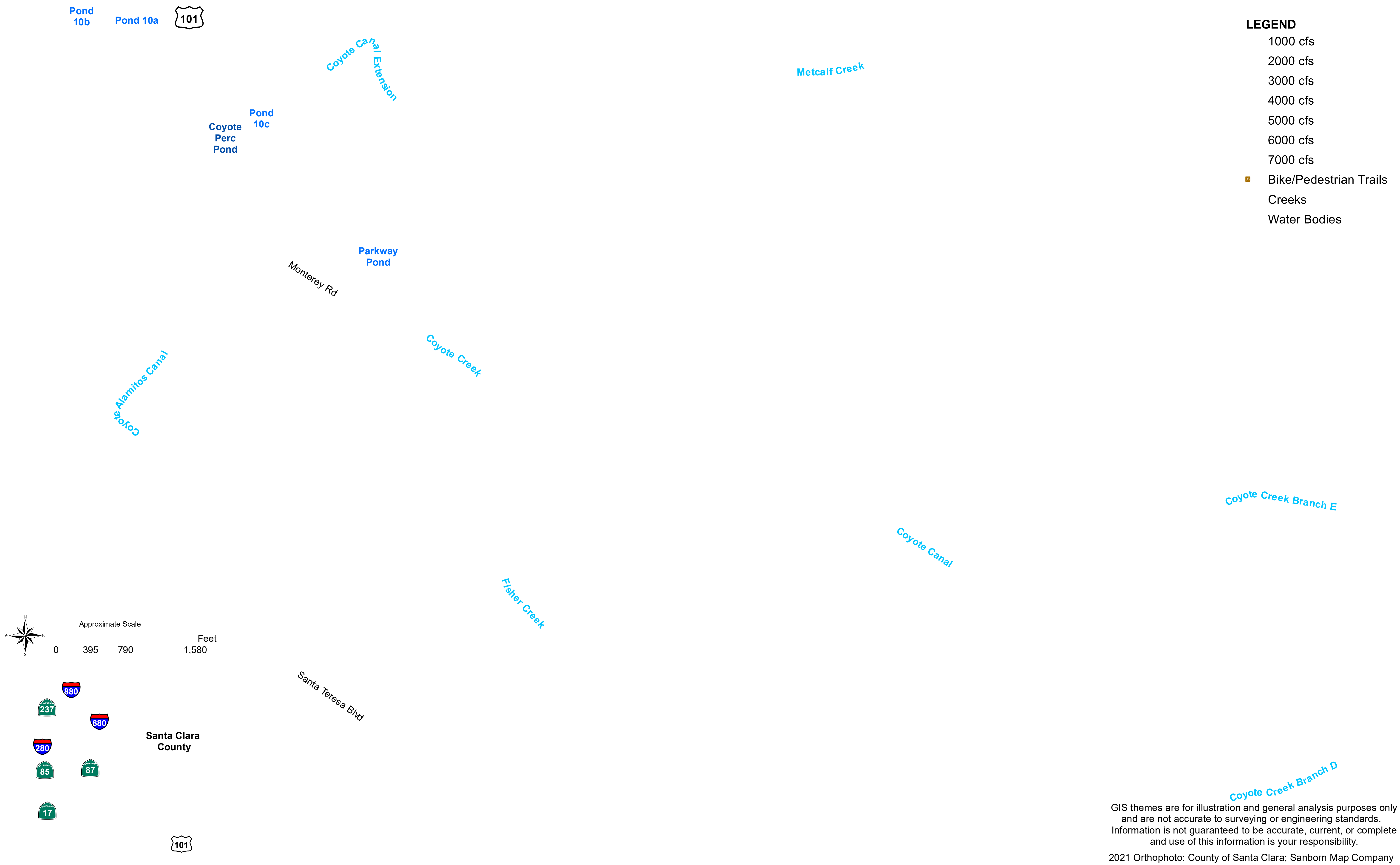

FIGURE 5E: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

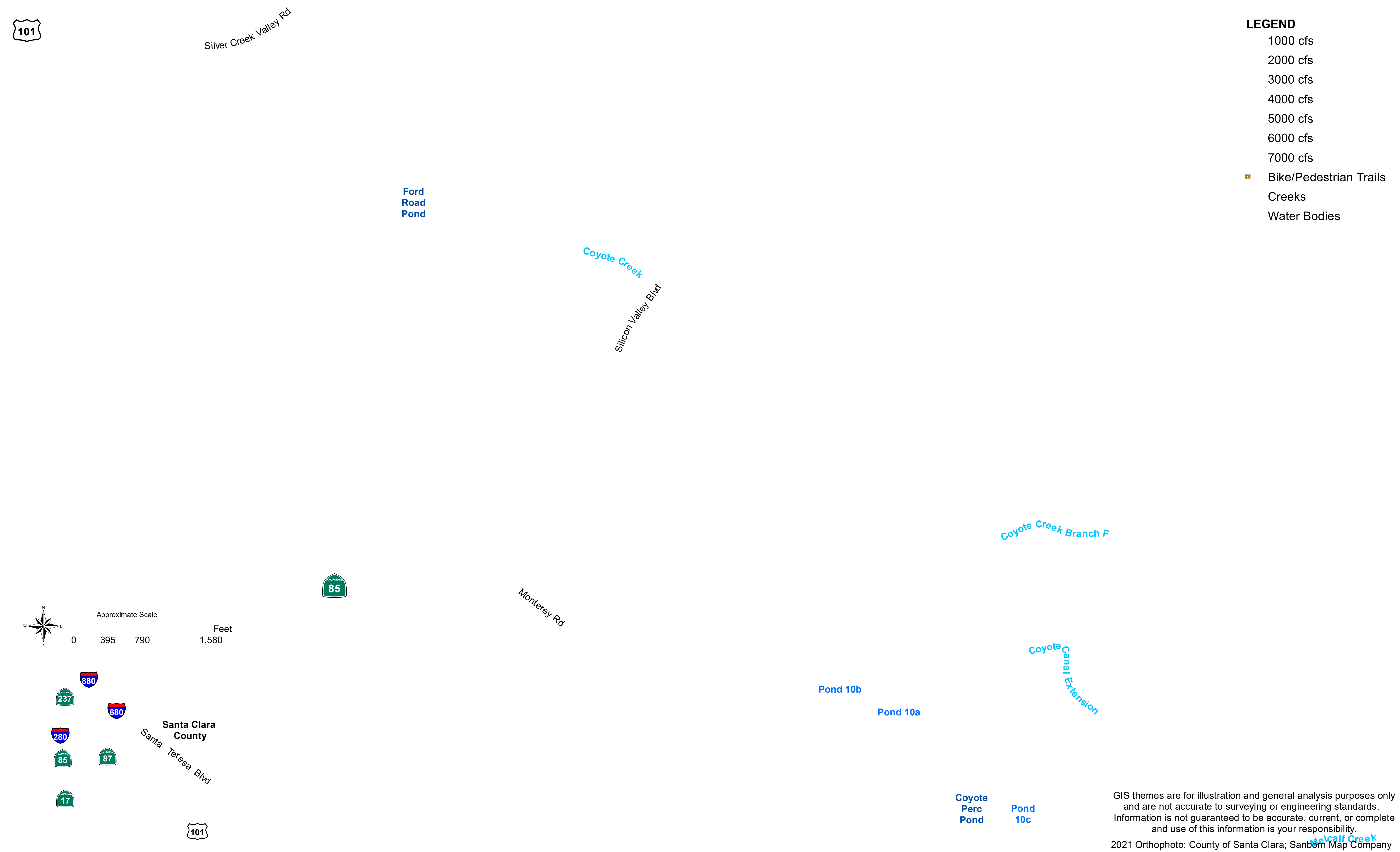

FIGURE 5F: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

FIGURE 5G: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

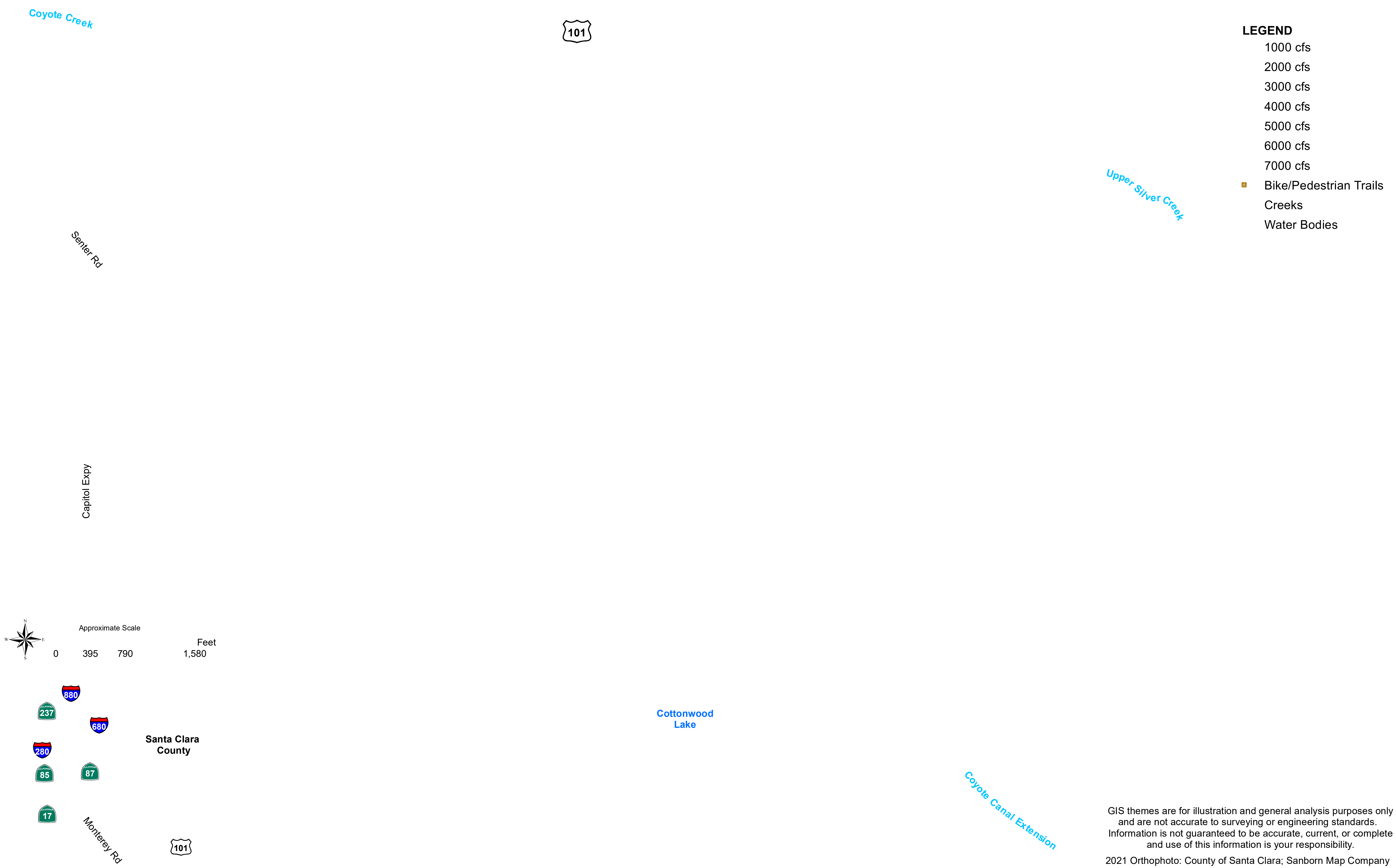

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FIGURE 5H: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

FIGURE 5I: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

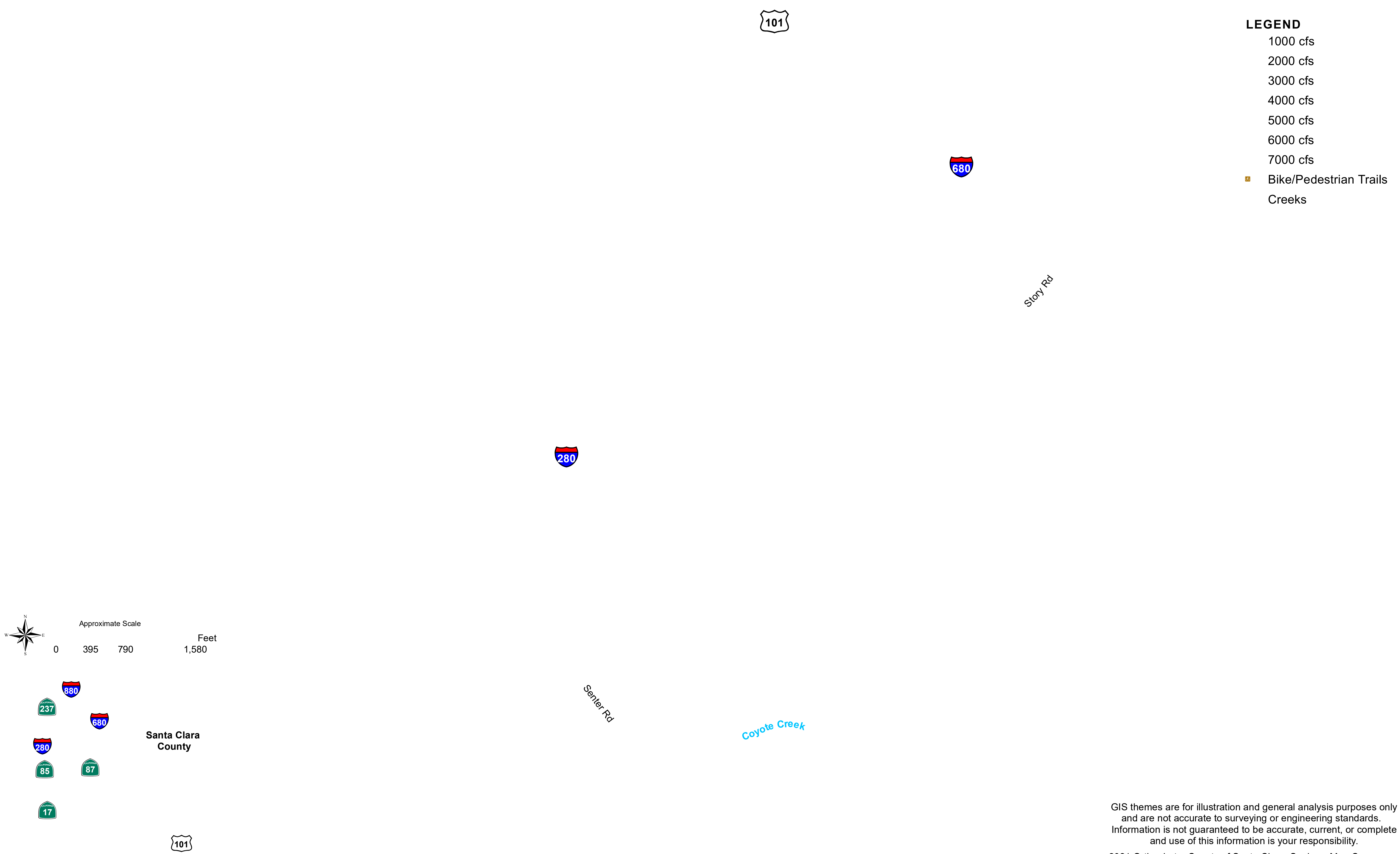

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FIGURE 5J: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

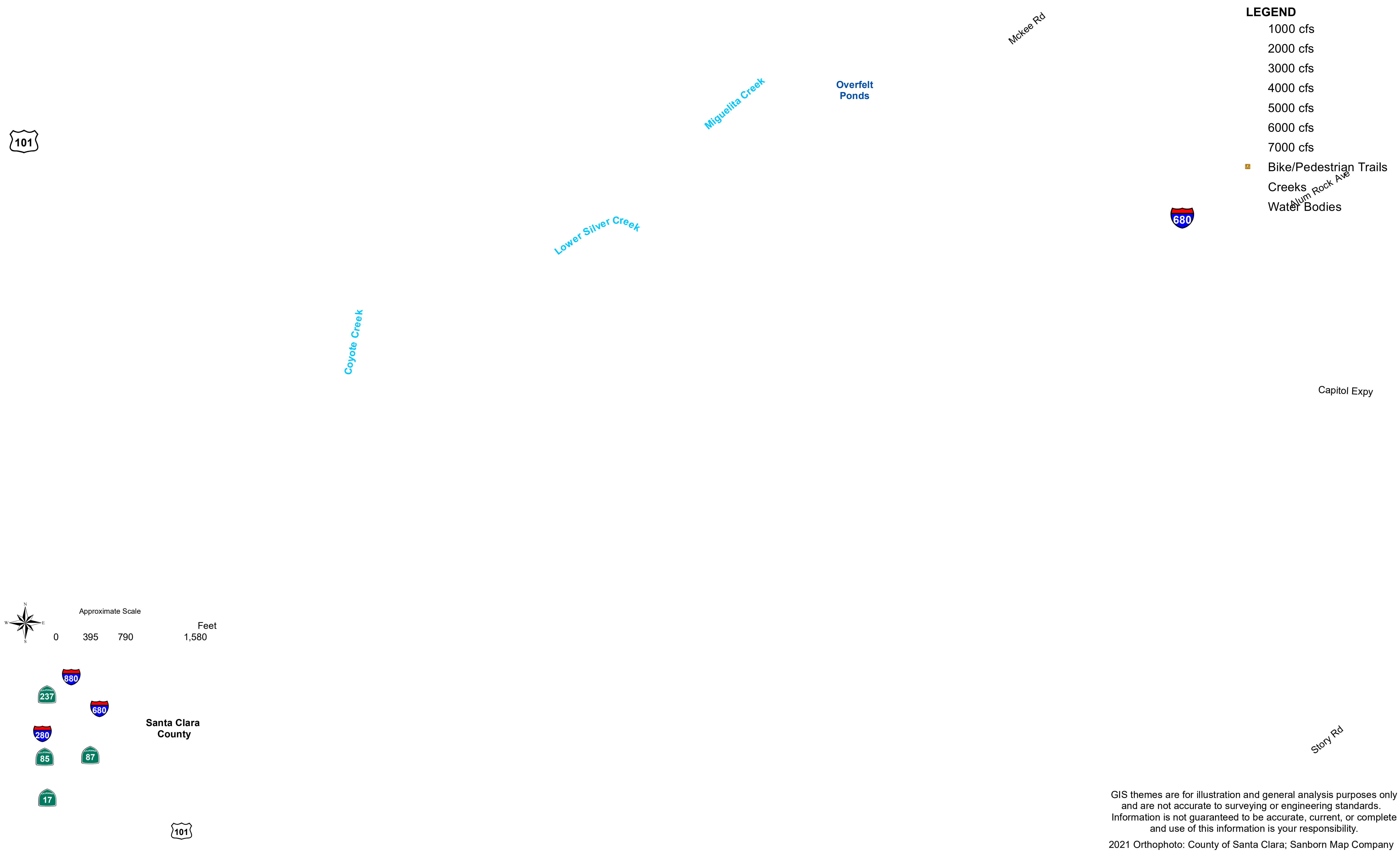
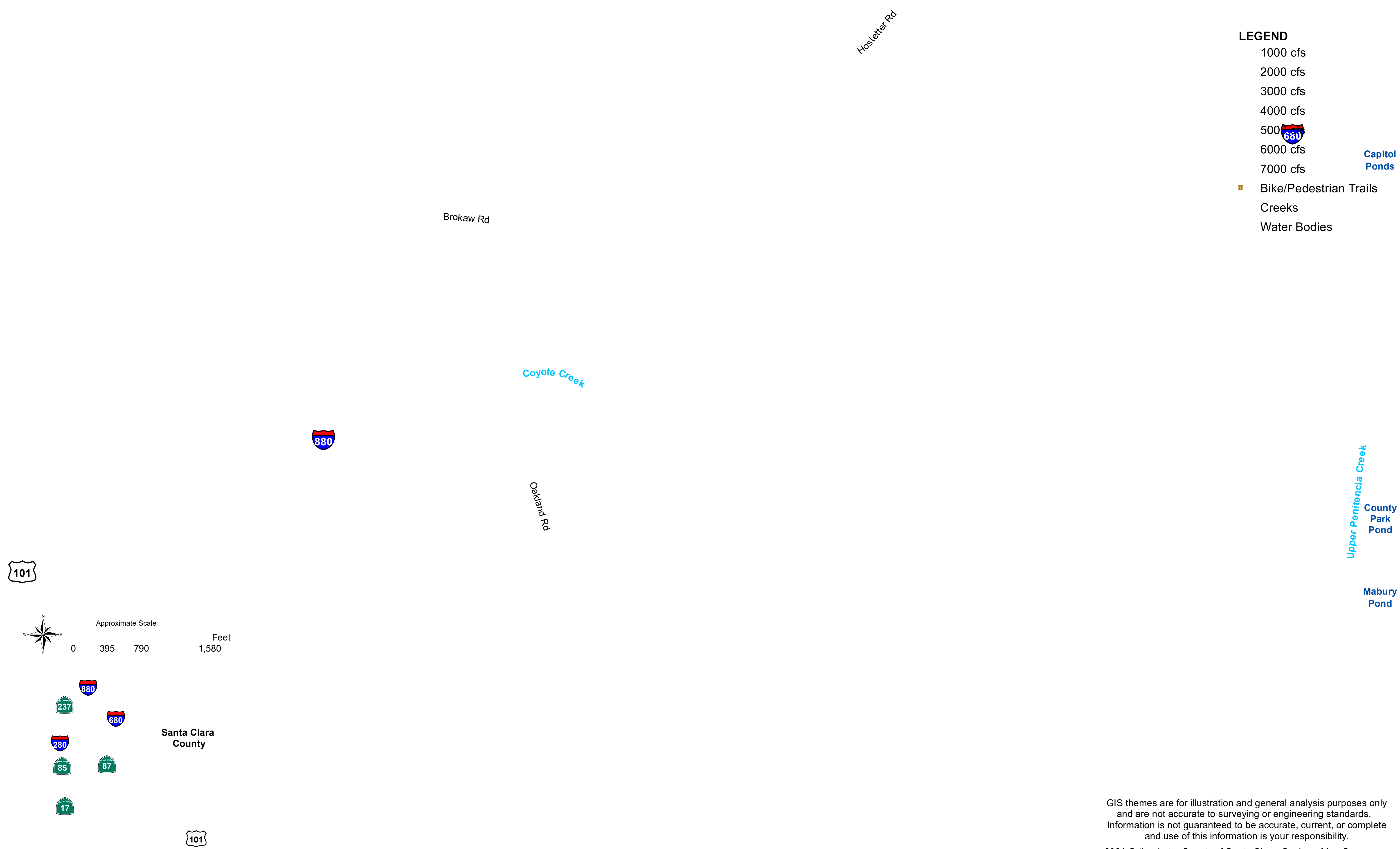


FIGURE 5K: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project



GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.

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FIGURE 5L: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project

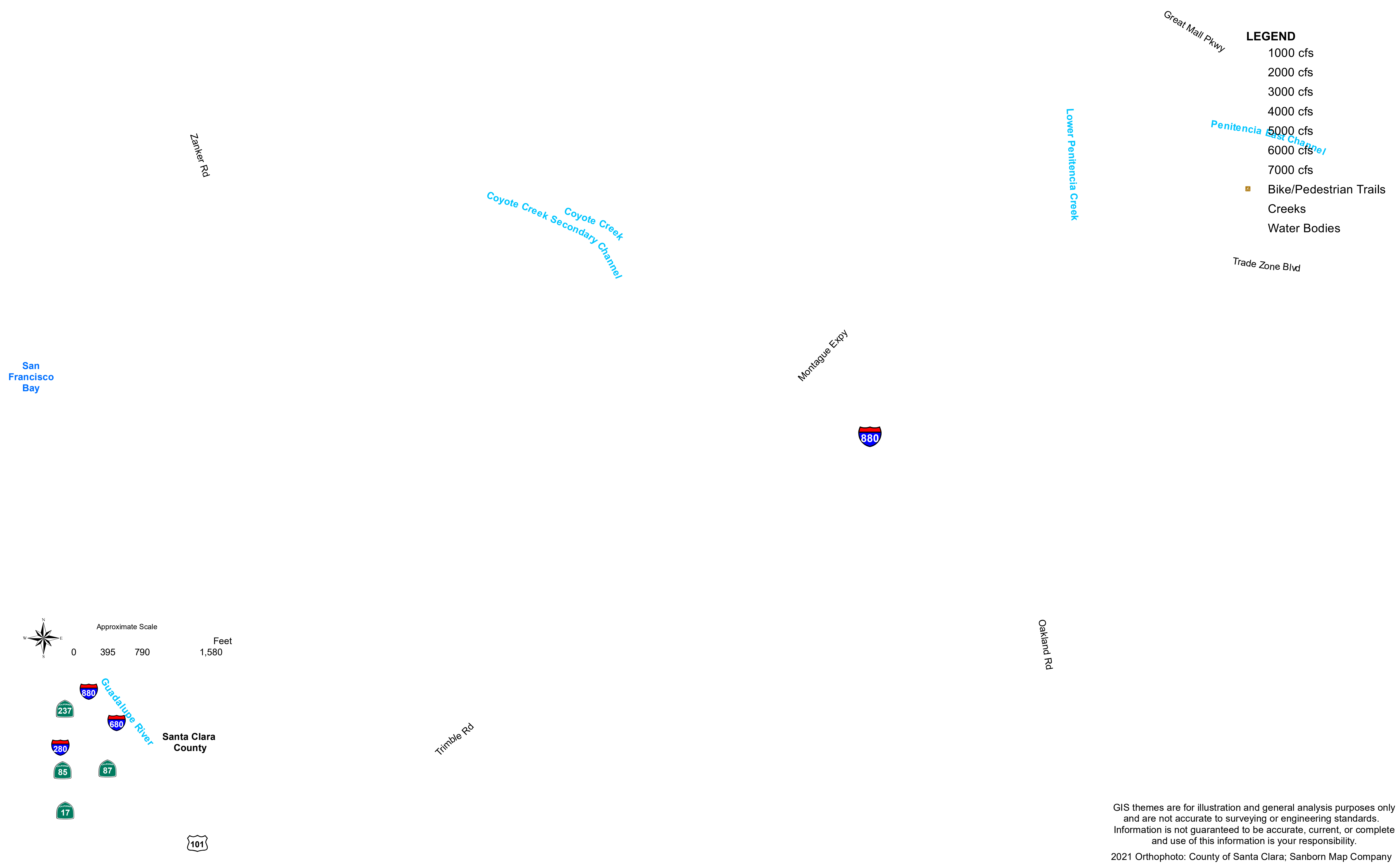
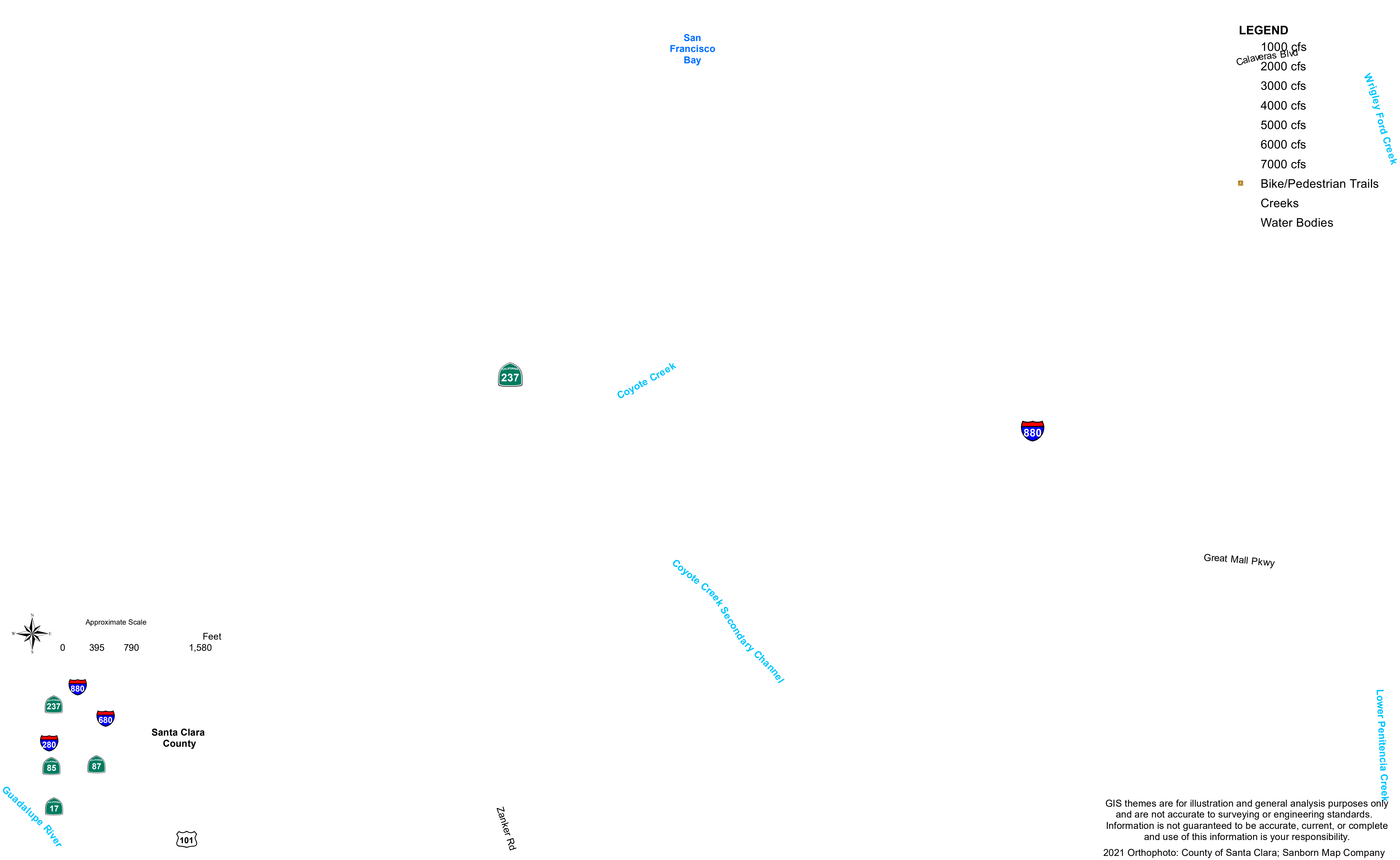


FIGURE 5M: Coyote Creek Inundation - Estimated Post Coyote Creek Flood Protection Project



APPENDIX A – BULLETIN 17C FLOW FREQUENCY PLOTS

Figure A-1: Scenario 1 (DSOD 2017 Conditions) Raw Flow Frequency Curve

Figure A-2: Scenario 2 (ADTP 2023 Conditions) Raw Flow Frequency Curve

Figure A-3: Scenario 3 (ADSRP 2028 Conditions) Raw Flow Frequency Curve

Figure A-4: Scenario 4 (FAHCE 2032 Conditions) Raw Flow Frequency Curve

APPENDIX B – DURATION ABOVE FLOW FOR VARIOUS THRESHOLDS

Figure B-1: 300cfs Threshold

Figure B-2: 500cfs Threshold

Figure B-3: 1,000cfs Threshold

Figure B-4: 1,400cfs Threshold

Figure B-5: 2,000cfs Threshold

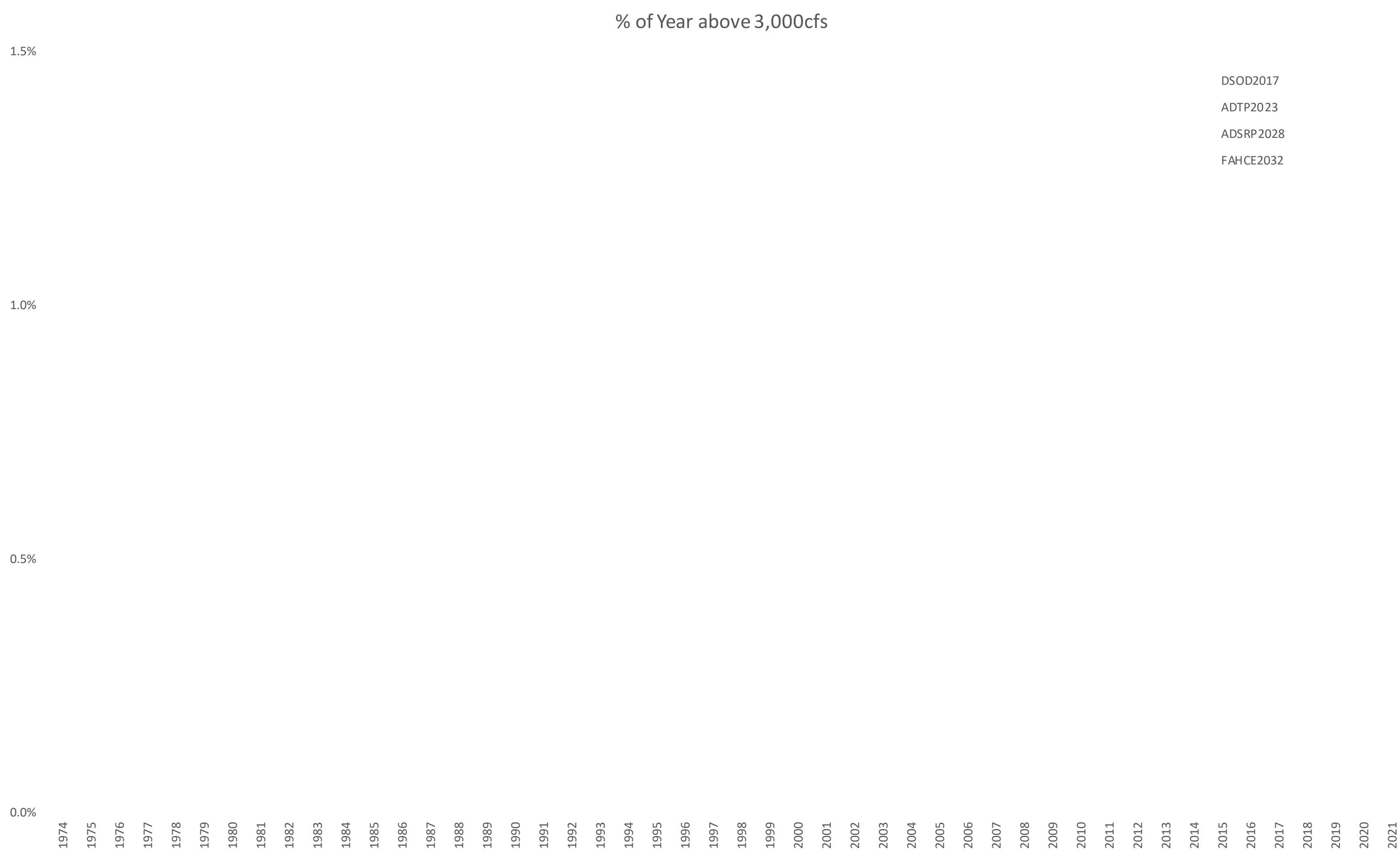


Figure B-6: 3,000cfs Threshold

Figure B-7: 4,000cfs Threshold

Figure B-8: 5,000cfs Threshold

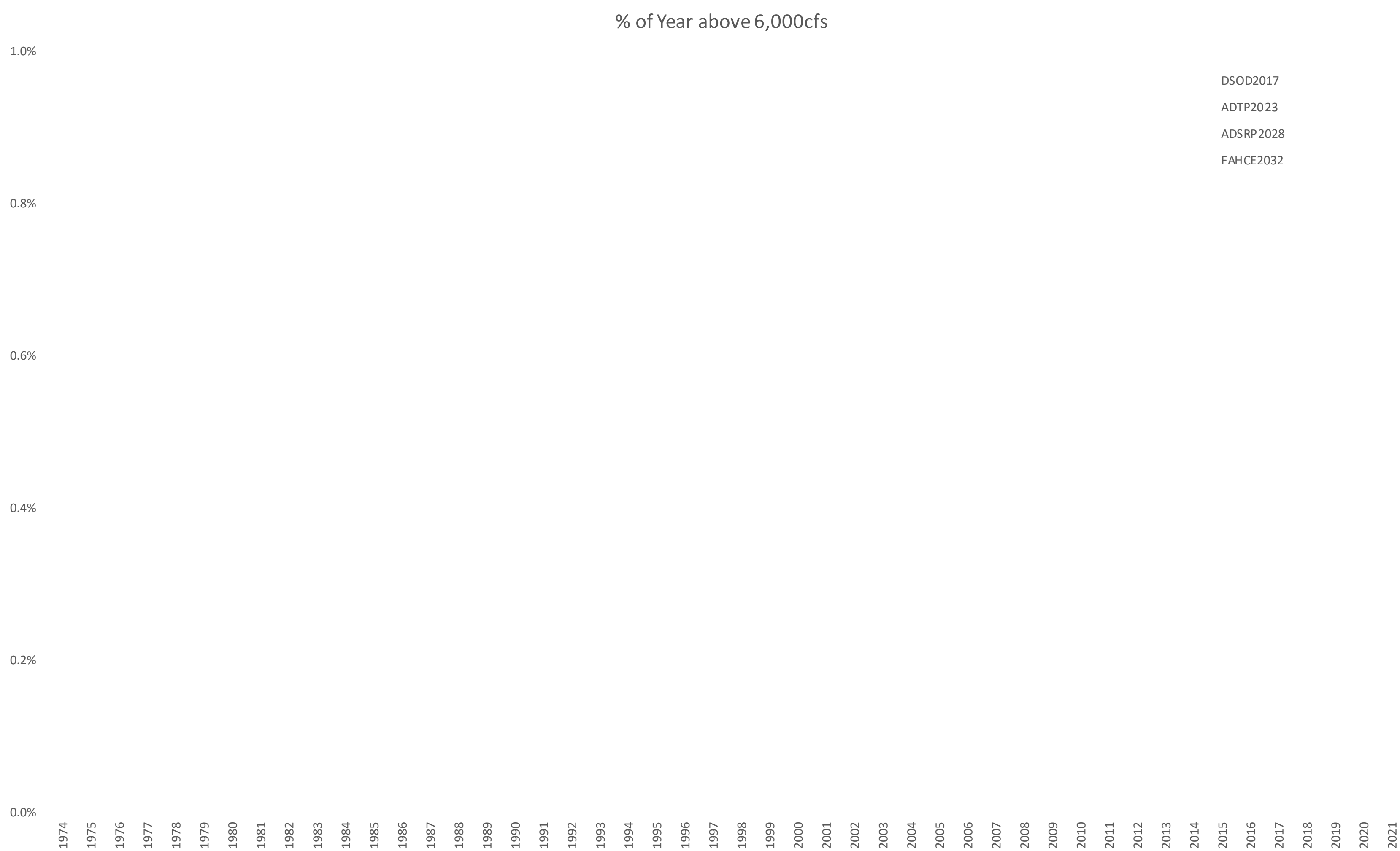


Figure B-9: 6,000cfs Threshold

Figure B-10: 7,000cfs Threshold

Appendix K

Anderson Dam Seismic Retrofit Project

Tidal Floodplain Impacts for ADSRP Technical Memorandum

TECHNICAL MEMORANDUM

PROJECT: Anderson Dam Seismic Retrofit Project **DATE**: August 17, 2023

SUBJECT: Tidal Floodplain Impacts for ADSRP

PREPARED: Jack Xu, PE, CFM

1. PURPOSE

The Environmental Impact Report (EIR) for the Anderson Dam Seismic Retrofit Project (ADSRP) requires an analysis on downstream impacts to the tidal floodplain on Coyote Creek due to Dam construction and reoperation.

2. STRATEGY

To properly assess the ADSRP impacts to tidal floodplains on Coyote Creek near the San Francisco Bay (SF Bay), 2D hydraulic modeling will be performed for various boundary conditions. The hydraulic model will extend from Coyote Creek at Highway CA-237 downstream and end at the confluence of Coyote Slough with the Bay. This covers the extent of tidal influences in Coyote Creek.

Due to the near infinite permutations of boundary conditions, a bookend strategy was employed to determine the maximum impacts that ADSRP would have. For example, the SF Bay experiences a diurnal tidal cycle that also varies seasonally. Depending on when future high flows occur in relation the tides, fluvial impacts can vary significantly due to high tailwater conditions on Coyote Creek.

Since the ecological impacts in question focus on areas that are not subject to frequent tidal flooding, it was determined that various static fluvial flows should be used in conjunction with the Mean High-High Water (MHHW) as the tidal boundary condition to achieve a reasonable maximum fluvial inundation. Once the inundation areas were determined, they would be assigned to a flow occurrence probability based on existing or proposed conditions.

3. DATASETS

HYDRAULIC MODEL

Hydraulic modeling for the floodplain inundation extents were performed in HEC-RAS v6.2 using LiDAR data collected in 2020 for the base terrain. Bay bathymetry was not needed due to the high boundary condition being used. The model domain was bounded by man-made salt pond levees that are higher than modeled water elevations. It was also cropped at various locations where other waterways empty into the slough to focus the analysis efforts on the main stem of Coyote Creek. Roughness values in the model were separated into four main regions:

- 0.065 for the general creek channel and shaded riparian areas.
- 0.055 for the general creek channel and lightly wooded areas.
- 0.045 for floodplain areas with shrubs and vegetation.
- 0.030 for grassy areas without woody vegetation, channel, or floodplain.

Figure 1 shows the extents of the model 2D domain.

TIDES

Tides were determined from San Francisco Bay Tidal Datums Study[1]. MHHW was set at 7.48' NAVD88 per the Study. The Study's tide values were used because the official NOAA Tides and Currents website for Coyote Creek[2] did not have a conversion to NAVD88 datum. However, the relative difference in elevation between Mean High Water (MHW) and MHHW was very similar between the two data sources, which gives confidence in the accuracy of the Tidal Datums Study.

FLUVIAL FLOW

Flow frequency data was gleaned from a sister report[3] and detailed below in Table 1. The duration of time certain flows are above certain thresholds are defined in Table 2. These estimate the peak flow frequencies downstream of Anderson Dam, and do not consider any additional inflow from sources downstream of the Dam.

Given the hydrologic nature of the Coyote Creek system, flows from the Dam may take over a day of travel time to reach the tidal areas of interest. This is contrasted by the flashy nature of the lower reaches, that can see runoff peak in several hours. Therefore, this analysis works off the assumption that localized inflow downstream of the Dam is generally separate from Dam releases during storm events.

Efforts will focus on the differences between the 2023 ADTP (baseline) and 2028 ADSRP (project) values.

[1] AECOM for FEMA & SF BCDC. San Francisco Bay Tidal Datums and Extreme Tides Study. February 2016.
[2] https://tidesandcurrents.noaa.gov/datums.html?id=9414575
[3] Jack Xu, Valley Water. Potential Flood Impacts for ADSRP. August 16, 2023.

FIGURE 1: 2D HYDRAULIC MODEL DOMAIN

TABLE 1: FINAL FLOW FERQUENCIES USING MONTE CARLO SIMULATIONS

		Stochastic Flows			
% Freq	**Return Period**	**2017 DSOD[4]**	**2023 ADTP[5]**	**2028 ADSRP[6]**	**2032 FAHCE[7]**
0.2	500	18,144	2,500	5,830	16,392
0.5	200	13,512	2,500	5,485	12,143
1	100	10,211	2,500	5,185	8,999
2	50	6,253	2,500	4,880	5,875
4	25	1,798	2,500	4,600	3,884
5	20	530	2,500	4,455	3,369
10	10	516	2,500	4,020	2,505
20	5	506	2,500	3,430	1,609
50	2	Ops Decision	2,500	2,420	FAHCE Ops

TABLE 2: DURATION OF FLOW EXCEEDANCE USING HISTORIC INFLOW

Percentage of Time (1973 - 2022) above Threshold

Flow Threshold	**300**	**500**	**1000**	**1400**	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**
DSOD2017	8.06%	0.93%	0.15%	0.08%	0.04%	0.01%	0.01%	0.01%	0.00%	0.00%
ADTP2023	7.42%	3.01%	0.72%	0.42%	0.26%	0.01%	0.00%	0.00%	0.00%	0.00%
ADSRP2028	7.40%	2.98%	0.69%	0.39%	0.21%	0.12%	0.04%	0.02%	0.00%	0.00%
FAHCE2032	1.80%	1.77%	1.77%	1.71%	0.02%	0.01%	0.00%	0.00%	0.00%	0.00%

Number of Total Days (1973 - 2022) above Threshold

Flow Threshold	**300**	**500**	**1000**	**1400**	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**
DSOD2017	1410.4	162.9	25.8	13.4	7.4	2.5	1.3	0.9	0.6	0.3
ADTP2023	1299.1	526.9	125.4	73.6	46.3	1.3	0.0	0.0	0.0	0.0
ADSRP2028	1294.9	520.8	121.0	68.3	36.2	20.4	7.1	3.2	0.0	0.0
FAHCE2032	315.4	309.7	309.7	300.1	2.9	1.2	0.5	0.0	0.0	0.0

[4] Operations circa 2017 (existing conditions)
[5] Operations post tunnel project (ADTP) with enlarged outlet under FERC dead pool order to minimize storage
[6] Operations during ADSRP stage 2 diversion and offline spillway to minimize storage
[7] Operations post ADSRP with no seismic restrictions and fish and aquatic habitat (FAHCE) rules.

4. FLUVIAL FLOW FREQUENCIES

LOCAL RUNOFF

Since all the analysis performed on fluvial flow frequencies (Tables 1 & 2) are immediately downstream of the dam, additional insight into local runoff is needed, as there is an additional 125 square miles of drainage area. The USGS has been operating a stream gage at Highway CA-237 on Coyote Creek for 23 years. During these years, there has only been two years where Anderson Dam spilled (2006 & 2017). In 2006, the spill was under 1,000cfs, while in 2017 the spill was above 7,000cfs. For the 22 remaining years, flows above 500cfs have occurred every year at CA-237, flows above 1,000cfs are very likely (>75%), and flows above 1,500cfs occur half the time. Therefore, flows under 2,000cfs were not modeled since they are below the typical 50% recurrence for ordinary high water.

The peak flows recorded at the USGS gage (Figure 2) can be considered local runoff (except for the spillway years) and not from the Anderson outlet. The maximum discharge from the outlet is approximately 450cfs – 500cfs and is not operated to that level unless it is a very wet year with a good chance of dam spill. Hence it can be assumed that peak flows for most years, except for 2006 and 2017, are from runoff downstream of the dam (Figure 2). For most of the time, controlled releases are for environmental and groundwater recharge purposes. These are relatively small flows that are far below the peak flows caused by storm runoff.

When accounting for spillway flows from the dam, the time to travel from the mountains into the Dam, and then from the Dam to the stream gage can take near 24 hours during very high flows (2017). This would be even longer when there is less flow. Runoff from local sources downstream of the dam peak much faster, within 6 to 12 hours. Therefore, for 2006, the measured peak flow of approximately 1,8000cfs would be the local runoff peak and not the dam spill of 1,000cfs. Only in 2017 was the recorded peak due to dam spill and not used to inform this analysis.

FIGURE 2: ANNUAL PEAK STREAMFLOW ON COYOTE CREEK AT CA-237

FLOW BOOKENDS

All flows in the ADSRP condition (ADSRP 2028) will be higher the baseline (ADTP 2023). Four ADSRP scenarios are to be analyzed with respect to existing conditions based on the results in Table 1:

1. An increase from 2,500cfs to 5,000cfs at the 50yr – 100yr return period.
2. An increase from 2,500cfs to 4,500cfs at the 20yr – 25yr return period.
3. An increase from 2,500cfs to 4,000cfs at the 10yr return period.
4. An increase from 2,500cfs to 3,500cfs at the 5yr return period.

5. TIDAL FLOODPLAIN IMPACTS

For the four selected return periods, we see an increase in tidal floodplain area varying from 68 to 155 acres, which amounts to a total percentage increase of 4.3% to 9.7%. Looking at Table 2, these additional areas would be inundated anywhere between a few days to a few weeks longer than existing conditions.

Average water surface elevation increases were minimal in the tidally influenced areas. Table 3 generalizes the change in water surface given the flow increases. Upstream of Lower Penitencia confluence towards CA-237, the water surface increases were larger, while for most of the tidal zone (downstream Lower Penitencia Creek) the increases were very small. Figures showing the difference in inundation areas for each of the four scenarios listed in Table 3 are depicted in the Appendix.

Figure 3 shows the anticipated inundation during the January 2022 king tide event (red) with no fluvial flow compared with the 5,000cfs + MHHW scenario (blue)

TABLE 3: TIDAL FLOODPLAIN INCREASES FOR VARIOUS RETURN PERIODS

#	**Annual Freq**	**Annual Return Period**	**Flow Increase in CFS (*Flow Modeled*)**		**Area Increase (acres)**	**Area Increase (%)**	**Range of Water Surface Increase**
			2023 ADTP	**2028 ADSRP**			
1	1% - 2%	50yr – 100yr	2,500 (*2,500*)	5,815 – 4,880 (*5,000*)	155	9.7%	2’ – 0.4’
2	4% - 5%	20yr – 25yr	2,500 (*2,500*)	4,600 – 4,455 (*4,500*)	121	7.6%	1.5’ – 0.3’
3	10%	10yr	2,500 (*2,500*)	4,020 (*4,000*)	86	5.4%	1’ – 0.2’
4	20%	5yr	2,500 (*2,500*)	3,430 (*3,500*)	68	4.3%	0.75’ – 0.15’

FIGURE 3: JANUARY 2022 KING TIDE INUNDATION (RED) VERSUS 5,000CFS + MHHW INUNDATION (BLUE)

APPENDIX A – FLOODPLAIN MAPS

Figure A-1: Scenario 1 – Inundation Area Change from 2,500cfs (Baseline) to 5,000cfs (ADSRP Implementation) from an Expected 50yr – 100yr Anderson Outflow

Figure A-2: Scenario 2 – Inundation Area Change from 2,500cfs (Baseline) to 4,500cfs (ADSRP Implementation) from an Expected 20yr – 25yr Anderson Outflow

Figure A-3: Scenario 3 – Inundation Area Change from 2,500cfs (Baseline) to 4,000cfs (ADSRP Implementation) from an Expected 10yr Anderson Outflow

Figure A-4: Scenario 4 – Inundation Area Change from 2,500cfs (Baseline) to 3,500cfs (ADSRP Implementation) from an Expected 5yr Anderson Outflow

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix L

Water Quality Technical Memorandum

Appendix L

Water Quality Appendix

FOCP Anderson Reservoir Temperature Monitoring

January – July 2021

As directed by the FOCP Water Temperature and Fisheries Monitoring Plan B(6) and B(10), data was downloaded from temperature loggers deployed at the deepest part of Anderson Reservoir near the outlet structure and in Coyote Creek at the upstream end of the reservoir. Data is available for January 1 through July 28, 2021 for Anderson Reservoir and January 1 through July 19, 2021 for Coyote Creek. Below is a map of the logger locations and a diagram of the original configuration of the temperature and dissolved oxygen (DO) logger arrays deployed in the reservoir (Figures 1 and 2). Buoy Line 1 was re-tensioned on April 21, 2021 to capture temperatures and DO concentrations within the water column at deadpool and is currently at a shallower depth than what is depicted in the diagram. Additionally, on May 27, 2021, DO loggers 20649672 and 20649670 were moved up on Buoy Line 2 and the DO loggers on Buoy Line 1 were transferred to Buoy Line 2 in order to collect data within the water column. An updated configuration diagram is in development.

Figures 3 and 4 include graphs of daily mean, minimum, and maximum temperatures for the Coyote Creek logger (ARRCC-1) and the logger nearest the surface within the reservoir (SN20643986; located 1 meter below the surface of the water) for the time periods of January 1 to July 19, 2021 and January 1 to July 28, 2021, respectively. Also included is the average monthly temperature profile of the remaining pool (Figure 5). Deadpool depth at the logger array is 10.7 meters (35 feet); therefore, only the loggers positioned above 10.7 meters are included in the temperature profile. The majority of loggers have been buried in bottom sediments since December 2020 due to declining water surface elevations when the reservoir was drained to deadpool. All data for the loggers analyzed in this summary is provided in an accompanying Excel spreadsheet.

Figure 1. Logger locations within Anderson Reservoir and in Coyote Creek upstream of the reservoir.

Figure 2. Anderson Reservoir temperature and dissolved oxygen logger configuration. A new diagram with updated logger locations is in development.

Figure 3. Daily mean, minimum, and maximum temperature at logger ARRCC-1 from January 1 through July 19, 2021.

Figure 4. Daily mean, minimum, and maximum temperature at logger 20643968 from January 1 through July 28, 2021.

Figure 5. Anderson Reservoir average monthly temperature profile.

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Project name:
ADTP Sediment Study Results

Project ref:

To:
Sarah Piramoon
Associate Environmental Planner, Valley Water

From:
Phillip Mineart

Date:
October 12, 2021

CC:
Ethan Bell
Senior Fisheries Ecologist, Stillwater Sciences

Memo

Subject: Update to April 30, 2021 memo on Sediment Deposition in Coyote Creek above Ogier Ponds and Discharge to Estuary

Background and Purpose

The Anderson Dam Tunnel Project (ADTP) and Seismic Retrofit Project (ADSRP) are being undertaken by the Santa Clara Valley Water District (SCVWD) to correct Anderson Dam deficiencies identified in previous studies. In response to a directive by the Federal Energy Regulatory Commission (FERC) to lower the reservoir to El. 488 feet[1], a low-level diversion system will be constructed prior to ADSRP to help maintain the reservoir at that elevation. The low-level diversion system will be constructed as part of the ADTP. Both the ADTP and ADSRP include diversion systems capable of making large releases to Coyote Creek. A full description of the Stage 1 diversion system being constructed under ADTP and the Stage 2 diversion system being constructed under ADSRP can be found in the Diversion Basis of Design technical memorandum (URS, 2020a). Building upon the ADTP diversion system, the permanent outlet works to be constructed as part of ADSRP includes a low-level outlet works (LLOW) and a high-level outlet works (HLOW). A description of the LLOW and HLOW can be found in the Outlet Works Basis of Design TM (URS, 2020b). The outlets for the diversion systems and outlet works will be constructed a short distance downstream of the existing outlet works, and their flows will enter Coyote Creek through short connecting outlet discharge channels.

URS conducted a sediment study in 2020 that considered the potential for the ADTP project to mobilize sediment within Anderson Reservoir and downstream in Coyote Creek (URS 2020c). The goals of that study were:

[1] The vertical datum for all elevations in this Technical Memorandum is in reference to NAVD88.

- Provide information on the volume and concentration of suspended sediment potentially mobilized from Anderson Reservoir and in Coyote Creek downstream of the reservoir during each phase of ADTP construction.
- Identify locations of sediment deposition in the Cold-Water Management Zone Coyote Creek.

The URS 2020c study involved sediment transport modeling that included the discharge of sediment from Anderson Reservoir and its subsequent transport in Coyote Creek. Results were presented of the suspended sediment concentrations leaving Anderson Reservoir for several storm event scenarios and at select locations in Coyote Creek. Estimated deposition in the Ogier and Metcalf ponds were also provided. This memo provides model results from the URS (2020c) study for additional locations in Coyote Creek above the Ogier and Metcalf Ponds and estimates of suspended sediment and deposition in the Coyote Creek Estuary based on additional calculations.

Model Conditions

The scenarios simulated in the previous sediment study (URS, 2020c) are shown in Table 1.

Table 1. Reservoir Conditions Used in Sediment Transport Model

1	488	Existing	3
2	488	Existing with ADTP low level restricted to 2,000 cfs	1.75
3	450	Existing with ADTP low level restricted to 2,000 cfs	0.25
4	467	Low-Level Outlet Tunnel	4

Source: <URS, 2020c>

The Coyote Creek hydraulic and sediment transport model was defined by a series of unevenly spaced channel cross-sections. At each cross section, hydraulic results (e.g., velocity, depth) and sediment results (e.g., suspended sediment concentration, sediment loads) are calculated. The net erosion and deposition of sediment within a creek reach (for example above Ogier ponds and within the ponds) is calculated as the difference in sediment load passing a section above and below the reach of interest. This method provides the net deposition (or erosion) within the reach though both erosion and deposition could occur at different locations within the reach. For the Ogier and Metcalf ponds the selected reach included only the ponds, and due to sediment transport dynamics in slow moving water, these reaches were predominantly depositional.

The reach between the Ogier Ponds and Anderson Dam contains over 50 cross-sections, some are depositional, and some are erosional. In the previous version of this memo (dated 4/30/2021) and in the Sediment Transport Memorandum only the deposition results were provided (URS 2020c), though most of the reach is erosional under storm conditions. The pattern of erosion and deposition in Coyote Creek will be different from existing conditions due to the larger flows that will be released from Anderson Reservoir into Coyote Creek after the bypass tunnel is constructed. For example, even if no sediment was released from Anderson Reservoir there could still be increased deposition in some reaches due to increased erosion in other reaches caused by the higher flow rates. The result is that it is possible for the total amount of deposition in Coyote Creek plus the amount of sediment discharged to the estuary to exceed the amount of sediment released from Anderson Reservoir.

The hydraulic and sediment model used for the URS 2020c study did not include analysis of the Coyote Creek estuary. The model calculated the sediment load discharged from the creek into the estuary but did not calculate the fate of the sediment in the estuary. This memo presents "typical" sediment concentrations in the estuary that can be used to represent existing conditions, sediment quantities that would be transported to the estuary from Coyote Creek with the proposed project, and existing loads to the estuary from San Francisco Bay and Coyote Creek to provide some context for evaluation of potential impacts. A simple suspended sediment transport model of the estuary was developed that was used to calculate the mixing of suspended sediment discharged to the estuary with tidal waters from San Francisco Bay. This model did not include erosion and deposition in the estuary. A simple deposition model was used to estimate the potential deposition depths in quiescent areas of the estuary for scenarios with significant sediment loads.

Results

The results of the modeling effort for sediment mobilization from the Reservoir and the stream channel and a review of the existing sediment loads to the Coyote Creek Estuary are described below. URS (2020c) provided time series plots of suspended sediment concentrations in Coyote Creek at several locations between Anderson Dam and Milpitas. Attachment B provides additional suspended sediment time series plots at several locations between Anderson Dam and Oiger Ponds.

Sediment Load to the Coyote Creek Estuary

Figure 2 shows the location of the Coyote Creek estuary. Sediment transport in the Coyote Creek estuary differs from sediment transport in Coyote Creek since tidal flows provide a continuous source of sediment to the estuary that can dilute storm water inflows from the creek. In addition, there is continuous deposition and or erosion in the estuary due to tidal flows that in some cases may be replaced by the new sediment released from Anderson Reservoir and in other places in addition to the new inflows.

The three sediment sources to the Coyote Creek estuary described below include:

1. Sediment loads from Anderson Reservoir during construction of Anderson Dam.
2. Sediment loads from tides in South San Francisco Bay,
3. Existing loads from Coyote Creek.

The loads from South San Francisco Bay and Coyote Creek flows during non-construction periods were not included in the Anderson Dam Tunnel Project Sediment Transport Modeling study (URS

2020c). Therefore, the quantities of sediment from the Bay are estimated below from other studies or existing available data

Sediment Loads from Anderson Reservoir

Sediment results from 9 simulation runs are provided in Table 2 below (URS 2020c), 2 non-storm events and 7 with storm events. The results include the reservoir outflow rate, suspended sediment concentrations and loads, and the amount of deposition and erosion predicted in Coyote Creek.

Runs 5 and 8 simulated cases with no storm events but normal release flow rates. Run 5 is the worst case for non-storm conditions since it simulated an empty reservoir. Run 8 represents the case with the reservoir maintained at an elevation 467 feet and the outflow also limited to 180 cfs. The results from this scenario can be considered similar to existing conditions as a pool is maintained in the reservoir and the outflow rate is limited. Since these two runs have a constant flow rate sediment load results are presented as tons/day as compared with total tons for the storm event-based runs.

The stream reach above the Ogier Ponds is primarily erosional but there are locations of deposition, mainly downstream of bridges. This is generally due to the changes in creek cross-section that occur near the bridges. Table 3 shows the estimated depth of deposition that occurs at the depositional locations. Depths are generally between about 0.25 to 0.5 feet. For runs 5 and 8, values per day are presented since these runs assumed a constant flow rate. Note that the Tables show the deposition (or erosion) that occurs at the end of a storm event release from the reservoir. After the storm event passes there may be continued releases at lower flow rates than may slowly change the amount of deposition or erosion in the stream.

Table 2. Erosion and Deposition in Coyote Creek due to Releases from Anderson Reservoir

Scenario	**1**	**2**	**3**	**3**	**3**	**4**	**4**	**4**	**4**
Flow Condition	**2-year event**	**2-year event**	**Constant 180 cfs**	**2-year event**	**½ 2-year event**	**Constant 180 cfs**	**2-year event**	**2-year double peak**	**5-year event**
Reservoir Elevation									
Model Label (Run #)	**Run 9**	**Run 10**	**Run 5[1]**	**Run 11**	**Run 12**	**Run 8[1]**	**Run 13**	**Run 14**	**Run 15**
				Anderson Reservoir Outflow					
Peak Flow Below Dam (cfs)	242	2,305	180	1,720	1,211	190	2,792	5,578	4,995
Average Flow below Dam (cfs)	175	1,480	180	460	264	190	548	2,350	1,585
Volume Released (acre-feet)	4,195	33,732	316[1]	11,063	4,777	352[1]	9,982	61,930	28,636
Average Sediment Conc. (mg/L)	255	645	4,649	2,462	1,713	258	1,958	3,668	2,704
Max sediment Concentration (mg/L)	3,172	7,273	4,649	32,122	7,393	259	26,309	25,109	20,882
Sediment Load (tons)	1,825	38,338	1,990	80,766	17,364	123	89,541	166,863	166,766
Duration (days)	9.7	8.5	NA	4.5	4.0	NA	5.8	4.8	5.9
Average Sediment Load (tons/day)	188	4,510	NA	17,948	4,341	NA	15,438	34,763	28,265
				Between Anderson Dam and Ogier Ponds					

Scenario	1	2	3	3	3	4	4	4	4
Flow Condition	2-year event	2-year event	Constant 180 cfs	2-year event	½ 2-year event	Constant 180 cfs	2-year event	2-year double peak	5-year event
Reservoir Elevation									
Model Label (Run #)	Run 9	Run 10	Run 5[1]	Run 11	Run 12	Run 8[1]	Run 13	Run 14	Run 15
Deposition (tons) [2]	2,295	5,694	136	4,931	3,031	143	4,959	6,035	6,825
Erosion (tons) [2]	-2,975	-9,171-	-183	-6,816	-4,121	-156	-6,819	-9,674	-9,615
net deposition (tons) [2]	-680	-3,476	-47	-1,885	-1,090	-13	-1,860	-3,639	-2,789
				Ponds and Estuary					
Deposition in Ogier Ponds (tons) [2]	1,416	6,032	832	27,727	7,905	93	21,702	25,093	17,484
Deposition between Ogier and Metcalf Ponds (tons) [2]	-1,274	-4,671	-95	-2,768	-1,992	-80	-2,420	-2,962	-4,746
Deposition in Metcalf Ponds (tons) [2]	925	1,635	87	1,341	1,388	-1	1,166	891	2,268
Between Metcalf and Estuary (tons) [2]	15,216	13,567	-40	14,123	14,293	10	14,449	13,365	
Discharge to Estuary (tons) [2]		42,445	1,049	57,723	11,797	45	72,091	i	147,498

1. For runs 5 and 8, results are presented as daily values since the flow rate is constant.
2. Depositional results are noted as positive. Erosional results are noted as negative

Table 3. Approximate Depth of Deposition above Ogier Ponds (feet)

Location	Run 9	Run 10	Run 5[1]	Run 11	Run 12	Run 8[1]	Run 13	Run 14	Run 15
Serpentine Trail Crossing	0.0	0.63	-0.01	0.24	0.24	0.004	0.41	0.13	0.50
Downstream Sycamore Ave Crossing	0.52	0.09	-0.01	0.38	0.14	0.02	0.32	0.05	0.40
Downstream Coyote Creek Trail Crossing	-0.03 [2]	0.0	0.01	-0.09	0.53	0.01	-0.05	0.18	0.29
Downstream Highway 101	0.20	0.25	0.00	0.32	0.28	0.00	0.30	0.0	0.23

1. For runs 5 and 8, results are presented as daily values since the flow rate is constant.
2. Depositional results are noted as positive. Erosional results are noted as negative.

Tidal Loads

No data on suspended sediment loads to the Coyote Creek estuary from San Francisco Bay were identified. However, one year of suspended sediment data collected by the USGS at the mouth of Coyote Creek are available. The location of the station is shown in Figure 1 (Coyote Creek nr Alviso) and the data are provided in Figure 2. For comparison two additional years of data are provided in

Figure 3 for suspended sediment data collected in South San Francisco Bay about 2.5 miles from the mouth of Coyote Creek (Buchanan and Ganju, 2003, 2005). This data should be representative of the suspended sediment concentration in water that enters the Coyote Creek estuary during flood tides. The average concentration is about 100 mg/L with peak concentrations from about 200 mg/L to over 400 mg/L with some peak concentrations over 1,000 mg/L. Tidal flow data are not available to calculate loads. Tidal flow data calculated using the U.S. Army Corps of Engineers HEC-RAS model of the Coyote Creek estuary as part of the Alviso-Island Ponds restoration preliminary design study (URS 2014) were used to estimate sediment loads. The Island Ponds are in the tidal zone adjacent to Coyote Creek and are connected to Coyote Creek through breaches in their levees, see Figure 1 for location of Island Ponds. The calculated peak tidal flow rates varied from about 10,000 to 15,000 cfs. Tidal flow volumes are about 3,800 acre-feet with ebb tides, which are slightly larger than flood tides due to the inflows from Coyote Creek[2]. Average tidal sediment loads are about 500 tons per tide cycle (or 1,000 tons per day) with peak daily loads of over 2,000 tons per day (two tide cycles).

Coyote Creek Loads

The USGS collected 10 years of suspended sediment and flow data in Coyote Creek near Milpitas (see Figure 1 for location, USGS station 11172175 Coyote C AB HWY 237 A Milpitas CA). The gage was located above the tidal zone at the Highway 237 crossing. Data were collected during the winter from October 1, 2003 to April 30, 2013. Suspended sediment concentrations are shown in Figure 5 and sediment loads are shown in Figure 6.

Peak winter concentrations are between about 400 to 600 mg/L with some peaks over 1,000 mg/L. Only two of the 9 winters with data didn't have any days with a sediment load great than 500 tons per day in the period 2003 to 2013 (see Figure 6), but there were 3 events in the record that were greater than 2,000 tons per day. The largest storm in the record occurred in April 2006 and discharged about 9,000 tons over a period of 2 weeks with a peak daily load of 4,370 tons. These values are much lower than peak events during the Anderson Dam construction, which vary between about 4,000 to 34,800 tons per day depending upon storm event. The larger loads during construction are due to increased flows from the reservoir, existing flows are limited to less than 500 cfs, and a possible 2 to 3 times increase in suspended sediment concentrations.

Estuary TSS Concentrations

Existing turbidity at the mouth of Coyote Creek was measured by the USGS (Station 372750122012701 Coyote Creek Nr Alviso) for 15 months in 2015 and 2016 and is provided in Figure 2 and is summarized in Figure 7. Average suspended sediment in the estuary varies from about 100 to 300 mg/L with maximums over 800 mg/L.

Figure 8 shows suspended sediment concentrations near the mouth of Coyote Creek estuary collected during non-storm (summer) conditions. Tidally averaged concentrations vary from about 100 to 300 mg/L with spikes in concentration up to 500 to 800. Figure 9 provides the concentrations during storm (winter) conditions. Concentrations aren't much higher than observed in the summer but can be more persistent after storm events. Average Suspended Sediment Concentrations (SSC) entering Coyote Creek (represented by data measured at Milpitas) are lower than the average concentrations in the Bay but maximum concentrations (in the winter) are similar, however, only one year of data are

[2] Flood tides are tidal flows from the Bay into Coyote Creek estuary and ebb tides are flows out of the estuary into the Bay

available in the Bay vs 10 years at Milpitas so it is unknown if this relationship is true over the long term.

During construction of Anderson Dam sediment may be released from the reservoir in concentrations greater than have occurred historically which could cause an increase in estuary sediment concentrations. The concentration of suspended sediment in the estuary will be a mixture of sediment from the Bay brought in by the tides and sediment from Coyote Creek brought in by storm events. A simple 1-D sediment transport model was developed in HEC-RAS V5.05 that transports sediment from Milpitas (the last reported station in the URS 2020c sediment study) to the Bay. The model was developed to provide a mechanism to mix the two sediment sources. The following assumptions were made in the model.

- The discharge of sediment from the project affects the concentrations of sediment in the Coyote Creek Estuary but does not affect the concentration in South San Francisco Bay.
- The concentration of suspended sediment in South San Francisco Bay is 350 mg/L
- Deposition has only a minor effect on suspended sediment concentration. If deposition is significant the concentrations would be lower than predicted.
- Deposition in the Island Ponds was not included.

The results of the analysis are provided at four locations shown in Figure 10: in Coyote Creek above the junction with Warm Springs wetland; Coyote Creek above the opening to Pond A19, Coyote Creek above the junction with Mud Slough, near the mouth of Coyote Creek.

Graphs of the suspended sediment concentration for the different releases from Anderson Reservoir are provided in Figure 11 and provided in Table 4.

Table 4. Projected Increases in Sedimentation above Background in Quiescent and Slow-Moving Areas in Coyote Creek Estuary (mg/L)

Location	Run 10	Run 11	Run 12	Run 14	Run 15
Warm Springs Wetland	44	289	73	998	420
Above Island Ponds	20	119	21	419	163
Above Mud Slough Junction	2	7	1	36	18
Near Mouth	0	0	0	2	1

Sediment Deposition

No deposition data were available for Coyote Creek. However, deposition data are available for the Island Ponds, though, the deposition in the Island Ponds will be greater than occurs in Coyote Creek and fringe wetlands due to the low velocities that occur on the flooded islands as compared to flows in the creek. However, the rate of deposition does provide some information on the availability of sediment in the Coyote Creek estuary. The Island Pond levees were breached in March 2006 and the rate of deposition was tracked at 30 locations in the ponds for 43 months after that. Figure 4Figure 4 shows the cumulative deposition over that time period. The average amount of deposition varied from about 0.3 to 0.7 feet, although maximum deposition exceeded 1 foot at some locations.

Table 5 shows the average yearly and daily observed sedimentation rates in Ponds A19, A20 and A20 (same monitoring results as in Figure 4). The data indicate the rate of sedimentation decreases over time, likely due to the decrease in the duration of flooding as the elevation rises.

Krone (1962) developed the relationship below for the sediment settling rates of fine San Francisco Bay sediments.

$$v_s = kC^{4/3}, \quad (1)$$

Where:
v_s = the settling velocity (m/s)
k = 0.00011 for SI units
C = sediment concentration (mg/L)

Table 5. Average Sediment Accretion Rates (ft) per Year at the Island Ponds (values in parenthesis are average accretion in mm/day)

Time frame	Pond A19	Pond A20	Pond A21	Average
1 year post breach	0.17 (0.012)	0.36 (0.025)	0.28 (0.019)	0.27 (0.019)
31 months post breach	0.05 (0.003)	0.28 (0.019)	0.19 (0.013)	0.17 (0.012)
43 months post breach	0.09 (0.006)	0.1 (0.007)	0.09 (0.006)	0.09 (0.006)
55 months post breach	0.09 (0.006)	0.18 (0.013)	0.14 (0.010)	0.14 (0.010)

Source: Table 3-1 SCVWD (2011)

For fine sediments (such as clay) flocs form that increase the apparent size of sediment, therefore, increasing the settling rate. However, this is only true up to a point. At high concentrations the formation of flocs is hindered, and the settling rate does not increase anymore (and could decrease). Krone (1962) did not specify a cut off value for the application of Equation 1 but his results indicate that a concentration of about 10,000 mg/L would be a reasonable. The settling rate for concentrations above 10,000 mg/L was assumed to be equal to the settling rate at 10,000 mg/L.

The depth of deposition in slow moving or quiescent water can be estimated using Equation 2 below URS (2014).

$$\Delta z = \frac{v_s C \Delta t}{\rho_d} \quad (2)$$

Where:

Δz = deposition (m)
v_s = the settling velocity (m/s)
C = sediment concentration (kg/m^3)
Δt = time (s)
ρ_d = bulk density of deposited material (kg/m^3)

A bulk density of 590 (kg/m^3) was assumed based on calibration to the existing deposition rate (URS, 2014).

Equations 1 and 2 were used to estimate the amount of deposition that may occur in each scenario. Because of the uncertainties in the calculations using Equations 1 and 2, the increase in sedimentation above background for each scenario was calculated assuming the results of runs 8 and 9 represent background conditions since these runs have suspended sediment concentrations similar to observed concentrations at Milpitas.

Results of the analysis are shown in Table 6Table 6 and Table 7. The values shown in the tables should be considered maximum values as they represent the deposition under quiescent conditions; higher velocities or the addition of turbulence would decrease sediment deposition. The values in Table 6 are the increase in the rate of deposition above background, the values in Table 7 are the depth of deposition calculated as the average daily rate of deposition in the Island Ponds (0.0095 mm/day) times the results in Table 6. The values in Table 6 can also be thought of as the number of days sedimentation by tidal action is required to deposit the same amount of sediment as the storm deposits. For example, deposition estimated for Run 12 at Above Mud Slough Junction is 22 times background, or in other words it would take 22 days for tidal action to deposit the same amount of sediment. Most of the deposition is projected to occur above the Island Ponds, below the Island Ponds the sediment concentrations are reduced by mixing with the bay waters. The deposition would likely occur in the wetlands adjacent to Pond A19 and Warm Spring Wetland and inside the Island Ponds.

The large amounts of deposition shown for Runs 11,14 and 15 may not persist. The deposited sediment will be very loose and unconsolidated due to the rapid rate of deposition and some of the sediment may be removed by subsequent tidal action.

Table 6. Projected Increases in Sedimentation above Background in Quiescent and Slow Moving Areas in Coyote Creek Estuary (values represent the multiple of background deposition)

Location	Run 10	Run 11	Run 12	Run 14	Run 15
Warm Springs Wetland	49	357	77	1118	465
Above Island Ponds	42	275	69	952	401
Above Mud Slough Junction	21	127	22	449	174
Near Mouth	2	9	1	45	23

Table 7. Projected Depth of Deposition in Quiescent and Slow-Moving Areas in Coyote Creek Estuary (mm) (low intertidal zones shown below, is there enough information for low, mid, high marsh elevations?)

Location	Run 10	Run 11	Run 12	Run 14	Run 15
Warm Springs Wetland	7.2	52.3	11.3	164.0	68.2
Above Island Ponds	6.1	40.4	10.2	139.8	58.8
Above Mud Slough Junction	2.7	16.6	2.9	58.7	22.8
Near Mouth	0.2	1.0	0.1	5.0	2.5

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Figures

Figure 1. Coyote Creek Estuary with locations of Monitoring Stations

Figure 2. Measured Turbidity at Mouth of Coyote Creek (USGS Station 372750122012701). Data were collected in units of formazin nephelometric units (FNU). Conversion from FNU to mg/L is provided in Attachment A.

Figure 3. Measured SSC in South San Francisco Bay at Channel Marker 17 (A mid-depth, B near-bottom) (USGS, 2005, 2003)

Figure 4. Sediment accretion averaged over whole pond area over times for Ponds A19 (265 acres), A20 (63 acres) and A21 (147 acres)

(source, SCVWD 2010)

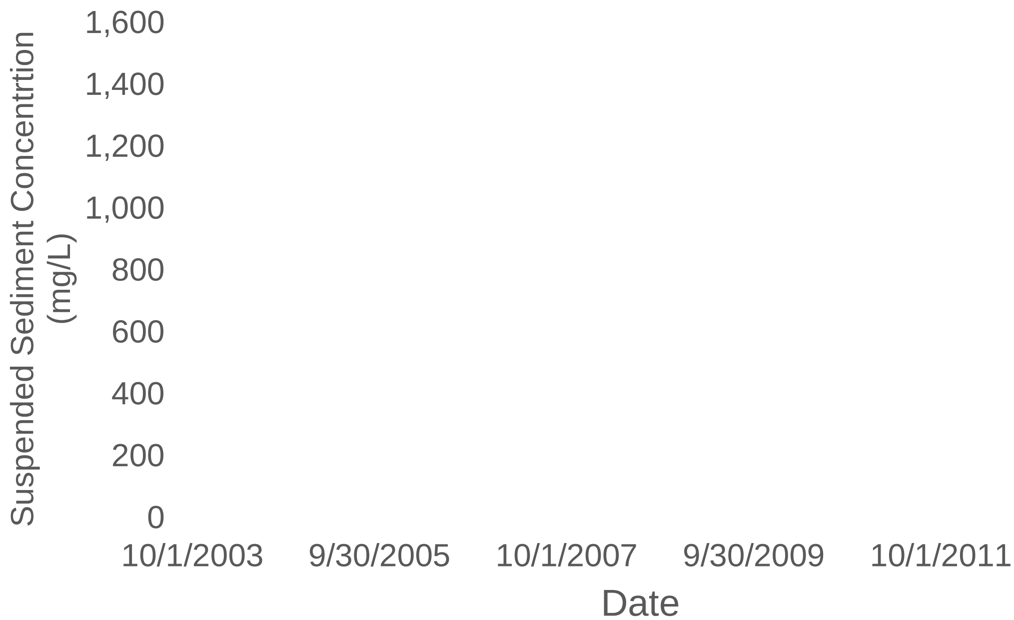


Figure 5. Suspended Sediment Data Collected at Highway 237 at Coyote Creek

Figure 6. Sediment Load from Coyote Creek to Coyote Creek Estuary

Figure 7. Summary of Suspended Sediment Concentration Collected at the Mouth of Coyote Creek (tidal water) and at Milpitas (river flow). Columns show Average Value, Upper Error Bars are Maximum Value

Figure 8. Suspended Sediment Concentration in Coyote Creek Estuary during non-storm periods

Figure 9. Suspended Sediment Concentrations in the Coyote Creek Estuary during Winter Conditions. Top Figure Shows Concentrations for the Entire Winter, Bottom figure Shows Concentration during December-January Period.

Figure 10. Locations where Suspended Sediment Results in Coyote Creek Estuary are Provided. A – Warm Springs Wetland, B- Above Island Ponds, C- Above Mud Slough Junction, D- Near Mouth

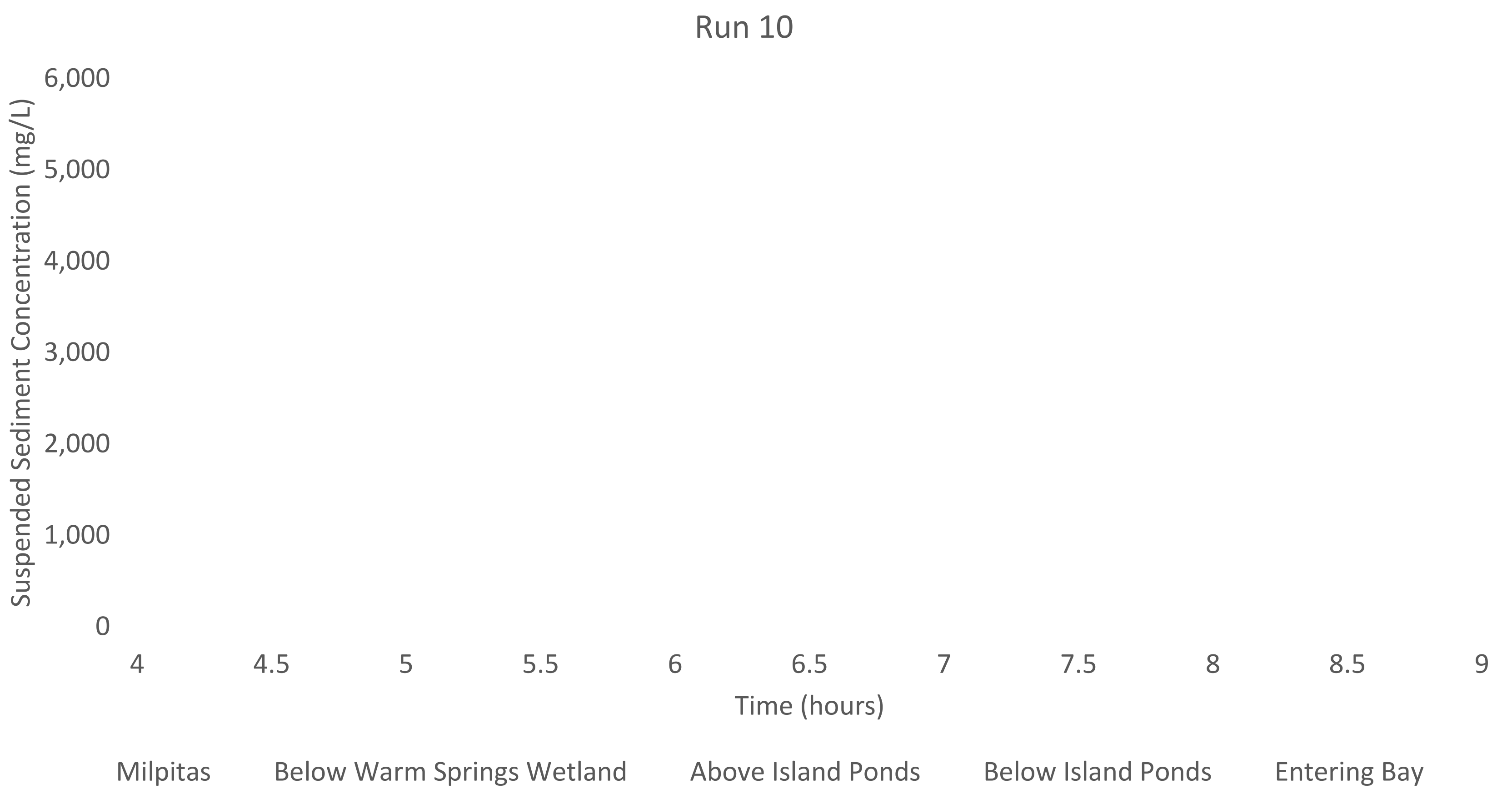


Figure 11a Suspended Sediment Concentration in Coyote Creek Estuary during Releases from Anderson Reservoir – Run 10

Figure 11b Suspended Sediment Concentration in Coyote Creek Estuary during Releases from Anderson Reservoir – Run 11

Figure 11c Suspended Sediment Concentration in Coyote Creek Estuary during Releases from Anderson Reservoir – Run 12

Figure 11d Suspended Sediment Concentration in Coyote Creek Estuary during Releases from Anderson Reservoir – Run 13

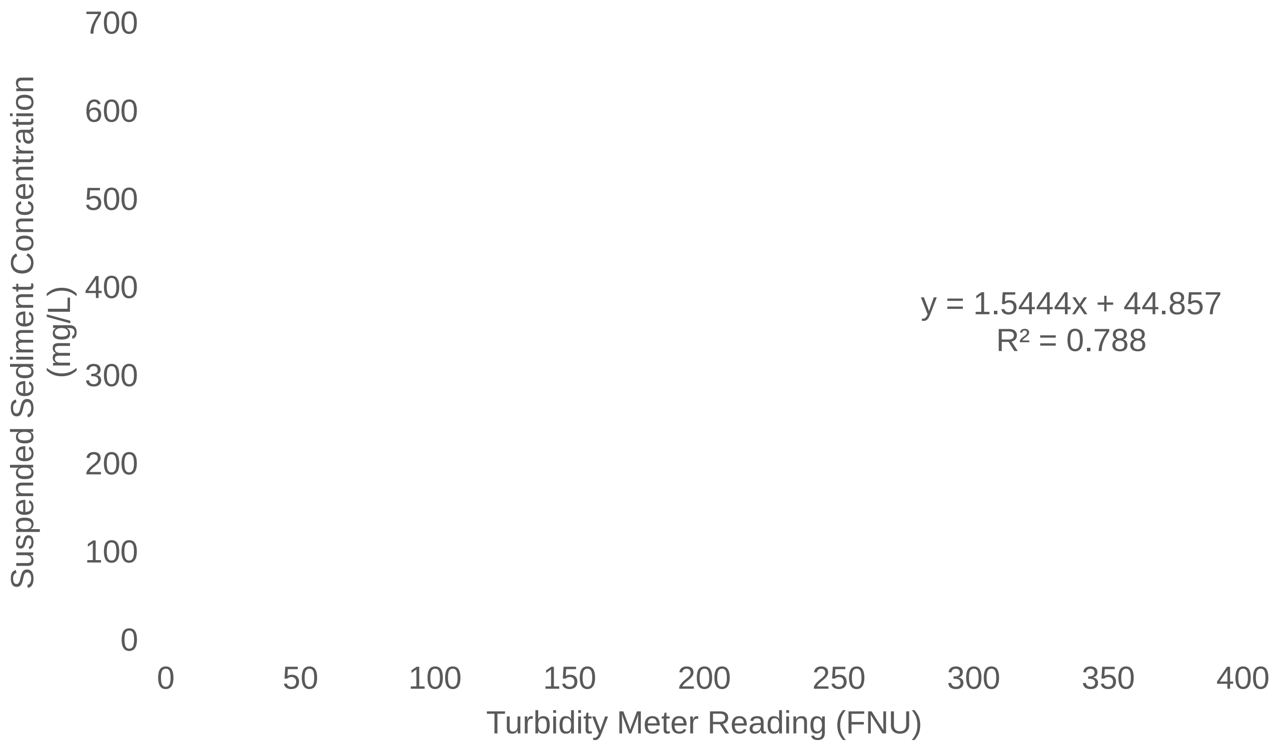
Figure 11e Suspended Sediment Concentration in Coyote Creek Estuary during Releases from Anderson Reservoir – Run 14

Figure 11f Suspended Sediment Concentration in Coyote Creek Estuary during Releases from Anderson Reservoir – Run 15

Figure 11. Suspended Sediment Concentration in Coyote Creek Estuary during Different Releases from Anderson Reservoir

Attachment A

Conversion from FNUs to mg/L is based on a comparison between grab samples collected by USGS at Station 372750122012701 between May 2015 and December 2017 and the reported value collected by the automatic sampler in FNUs. The figure below shows the comparison.



Attachment B

Additional suspended sediment concentration times series at select locations between Anderson Dam and Oiger Ponds. Sites were selected to be about 1 mile apart.

Run 9

Run 10

Run 11

Run 12

Run 13

Run 14

Run 15

Appendix L
Volumetric Analysis of Proposed FAHCE Freshwater Impact to Salinity in the South San Francisco Bay Estuary

TECHNICAL MEMORANDUM

PROJECT: FAHCE EIR **DATE**: January 12, 2022

SUBJECT: Volumetric Analysis of Proposed FAHCE Freshwater Impact to Salinity in the South San Francisco Bay Estuary

PREPARED: Jack Xu, PE, CFM

1. PURPOSE

This study aims to provide a qualitative volumetric analysis on the impacts of changes to freshwater releases to the South San Francisco Bay due to the proposed Fish and Aquatic Habitat Collaborative Effort (FAHCE) project. The primary focus of this report is on the impacts to salinity levels on the South San Francisco Bay Estuary.

2. DATASETS

Several datasets were used in this analysis:

I. Water Evaluation and Planning System (WEAP) model outputs, which included two scenarios: a base case[1] scenario and a scenario with the FAHCE project[2] implemented. This dataset contains daily outflows, as well as documenting the water year type[3].

II. Bay Area Aquatic Resources Inventory (BAARI)[4]. This dataset contains a detailed base map of the Bay Area's aquatic features that includes wetlands, open water, streams, ditches, tidal marshes and flats. The tidal flat areas were extracted from this dataset.

III. USGS Report[5] on Salinity in the South San Francisco Bay. This report gave an estimate of estuary area in the South Bay compared to the volume. It also gave some commentary on the characteristics of the South Bay with respect to salinity.

[1] Two base cases, 2015 and 2035 condition were analyzed. The 2035 condition assumes that all dam seismic restrictions are removed – which is the base case used in this analysis. Scenario ran historical years 1990 through 2010 as input.
[2] Two proposed cases are available – FAHCE and FAHCE+. Only FAHCE+ was analyzed in this analysis.
[3] Based on the Sacramento River Index
[4] https://www.sfei.org/data/baari-version-21-gis-data#sthash.xOa9ZvLv.dpbs. Accessed 12/17/21.
[5] Schemel, Laurence E. Salinity and Temperature in South San Francisco Bay, California, at Dumbarton Bridge: Measurements from the 1995-1998 Water Years and Comparisons with Results from the 1990-1993 Water Years. 1998. USGS Report 98-650 in cooperation with CA DWR.

3. METHODOLOGY

To determine changes in freshwater flows to the bay for the FAHCE project, the WEAP dataset was analyzed to determine the percent difference. The additional volume was also compared to the volume of the South Bay estuary to determine possible salinity impacts. All these results are then qualitatively analyzed with findings from the 1998 USGS report in mind.

Overall daily flow exceedances between existing and projected FAHCE project flows are also documented to help determine natural viability since pulse flows are a large driver in the FAHCE project.

4. RESULTS

FAHCE CHANGES TO FRESHWATER FLOWS TO BAY

Monthly average changes in flow for the three river systems affected by FAHCE are detailed below. The largest appreciable increases are for the late Spring months for Guadalupe River and Coyote Creek systems. The Stevens Creek percentage increases are large during the summer, but the overall amount of freshwater is too small to make an impact on salinity. For all watersheds, there are some months that decrease the freshwater contribution to the bay. Overall, freshwater contribution increases over all water years, with Stevens Creek seeing larger increases in the dry years.

TABLE 1: *Monthly Average Change in Flow (cfs and %)*

	Guadalupe River	Stevens Creek	Coyote Creek	Guadalupe River	Stevens Creek	Coyote Creek
Jan	9.0	-0.8	1.7	4.4%	-1.8%	0.9%
Feb	12.8	-0.5	1.2	5.5%	-0.9%	0.5%
Mar	12.3	0.8	14.2	6.9%	2.0%	10.5%
Apr	17.2	0.6	14.3	23.3%	2.8%	21.7%
May	-3.7	0.0	-0.9	-7.9%	-0.3%	-2.2%
Jun	-0.4	0.2	-0.9	-1.4%	5.2%	-2.9%
Jul	-0.5	0.2	-0.8	-2.0%	13.0%	-3.4%
Aug	0.3	0.2	-0.7	1.2%	16.9%	-3.3%
Sep	0.3	0.3	-0.6	1.5%	23.6%	-3.1%
Oct	-0.2	0.3	-0.5	-0.5%	10.7%	-2.1%
Nov	-10.0	0.2	-3.4	-21.4%	2.6%	-8.2%
Dec	2.2	2.8	1.9	2.2%	13.7%	2.2%
Overall Average	**3.2**	**0.4**	**2.1**	**3.8%**	**2.0%**	**2.9%**

TABLE 2: *Average Change in Flow by Water Year Type (%)*

	Guadalupe River	Stevens Creek	Coyote Creek
Above Normal	5.0%	1.5%	5.9%
Below Normal	2.6%	-0.4%	3.7%
Critical Dry	4.2%	10.5%	0.6%
Dry	0.8%	10.8%	2.9%
Wet	4.0%	0.0%	2.2%
Overall Average	**3.8%**	**2.0%**	**2.9%**

ADDITIONAL FAHCE VOLUME IN ESTUARY

Using the analysis presented in Tables 1 and 2, a daily volume was calculated. 1 cubic foot per second of flow per day is equal to approximately 2 acre-ft of volume, or 1,233 cubic meters. To be conservative, the largest monthly average value was used for each stream system:

- Guadalupe River: 17.2 cfs = 21,207 cubic meters / day
- Stevens creek: 2.8 cfs = 3,452 cubic meters / day
- Coyote Creek: 14.3 cfs = 17,632 cubic meters / day

To determine the total volume in the South Bay estuaries, data from the 1998 USGS report was used (Table 3). This area was validated using the BAARI data (Figure 1) at Mean Sea Level.

TABLE 3: *South Bay Estuary Area and Volume from 1998 USGS Report at various sea levels.*

FIGURE 1: *Approximate South Bay Estuary Boundary at Mean Sea Level. Tidal Flat (blue) and Riverine Tidal Prism (Yellow)*

Summing up all the volumes from the three river systems listed before, there is a conservative impact of about 37,291 cubic meters per day. This estimate takes the largest monthly average value for each system and is intended as a high-end envelope value. Comparing that to the total volume of the South Bay Estuary of 86 million cubic meters (Table 3), the net increases is small – about 0.043%.

5. DISCUSSION

USGS ANALYSIS ON BAY SALINITY

During the very wet water years of 1995 through 1998, where several floods of record were observed in Palo Alto and San Jose, salinity was measured and presented in the USGS report (Figure 2). The results show local stream outflow during large storm events have a massive effect on salinity in the Bay. The USGS report states that "*details show a rapid response to local freshwater inflows and the influence of the general freshening of the bay by Delta outflow during the wet winters. Records from both vet and dry years show that salinity and temperature respond to weather events and climate variations over time scales of days to months."*

The conclusions of the USGS study suggest that salinity changes are driven by large storm events, and less so by reservoir releases. The FAHCE impacts are mostly due to increased controlled releases through reservoir outlets of 10 – 20 cfs, which is a miniscule amount of fresh water compared to the total South Bay volume or to the typical runoff from a winter storm event (<1%). The magnitude of freshwater inflow needed to impact salinity far exceeds that of the FAHCE project. Therefore, it can be reasonably concluded this project is unlikely to cause any impacts to the salinity of the South Bay.

FIGURE 2: *Daily Mean Salinity at Dumbarton Bridge and Daily Mean Flow from local streams for water years 1995-1998.*

DAILY FLOW EXCEEDANCES

Figure 3 summarizes daily flow exceedances between existing and proposed FAHCE project conditions for all three river systems near their respective Bay outlets. These plots show that under FAHCE the natural range and frequency of freshwater flows experienced by the river systems do not change, and by inference the ecological habitats in these tidal prism areas should not be affected, as they are well suited to salinity changes based on existing conditions.

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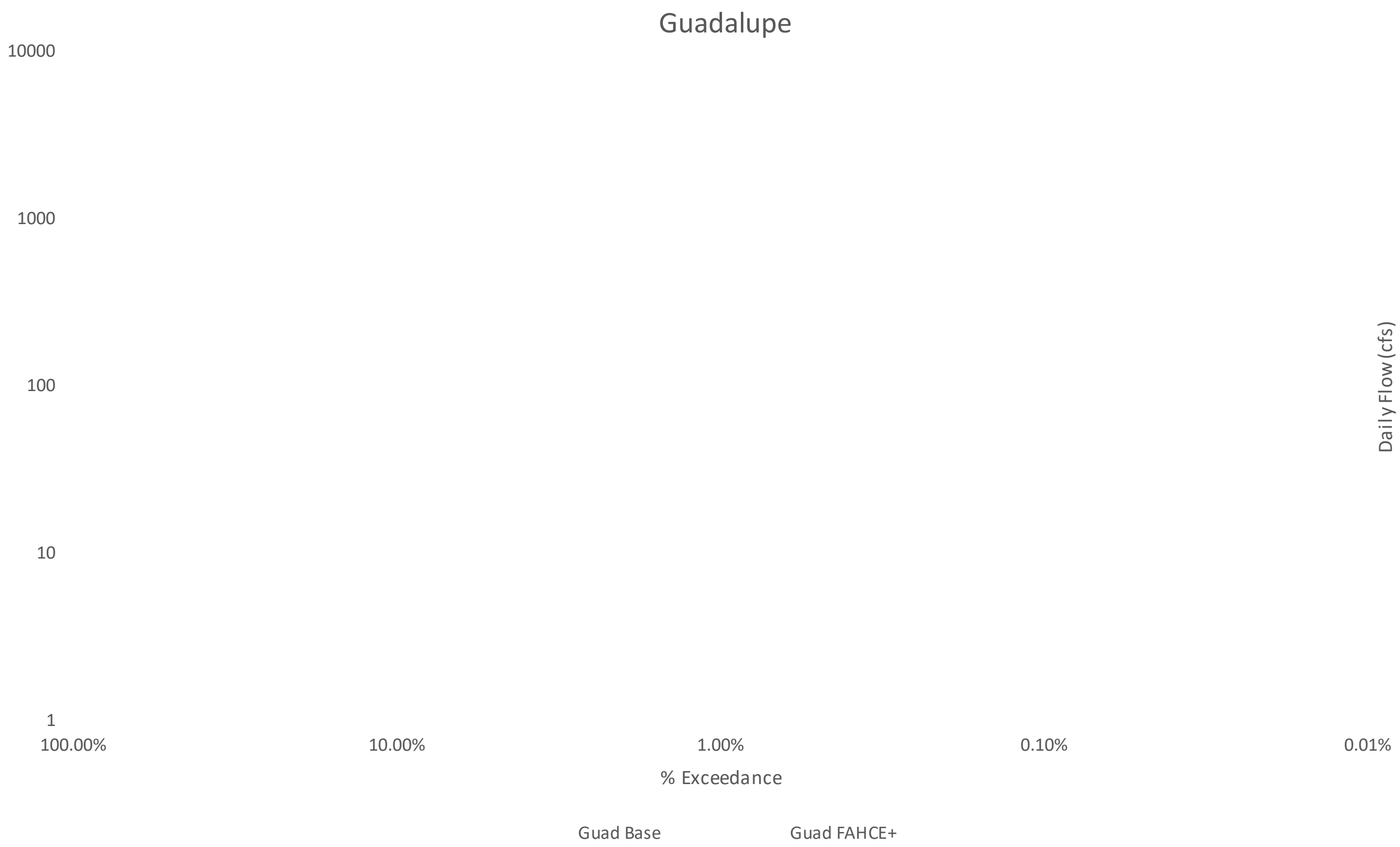
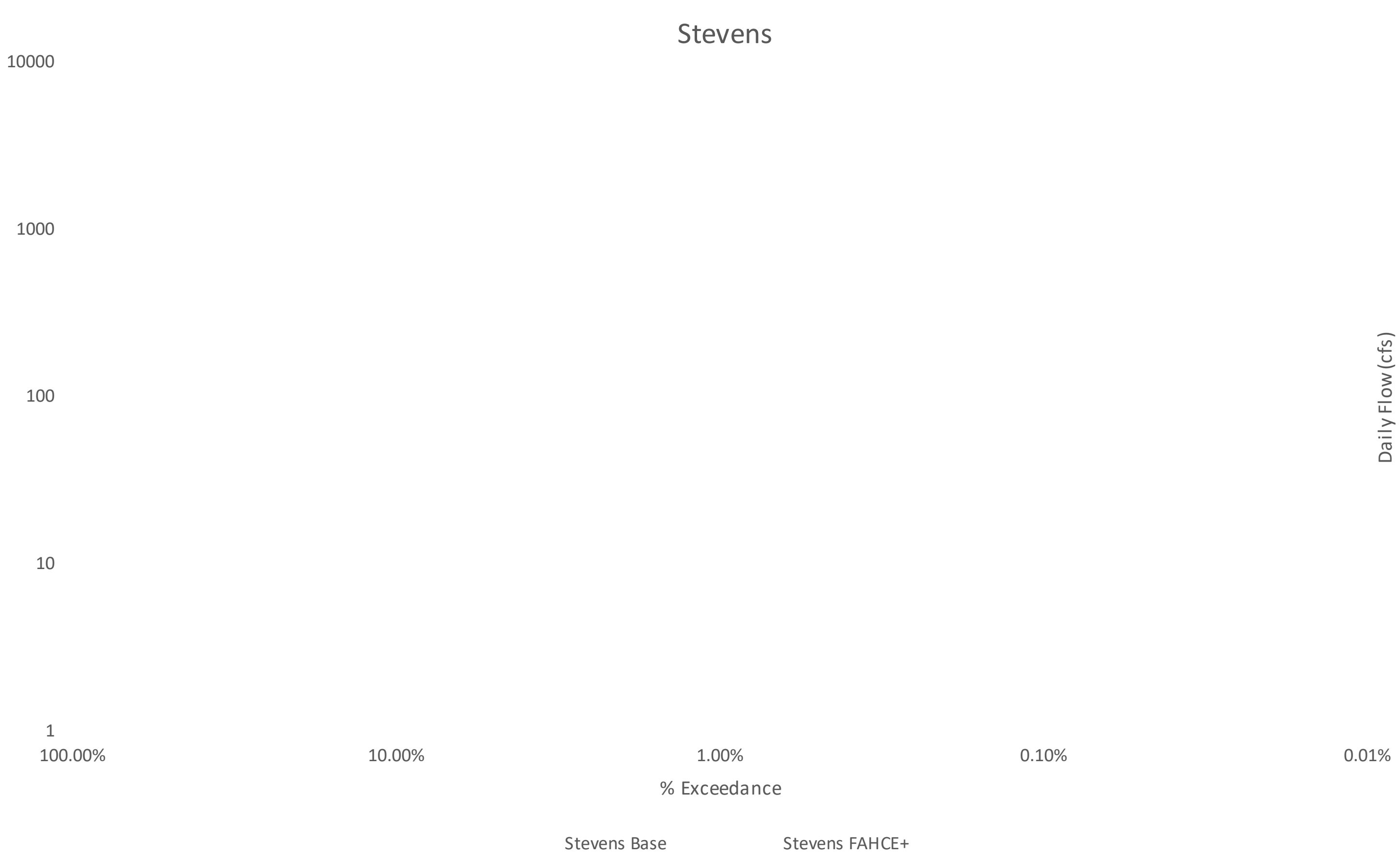
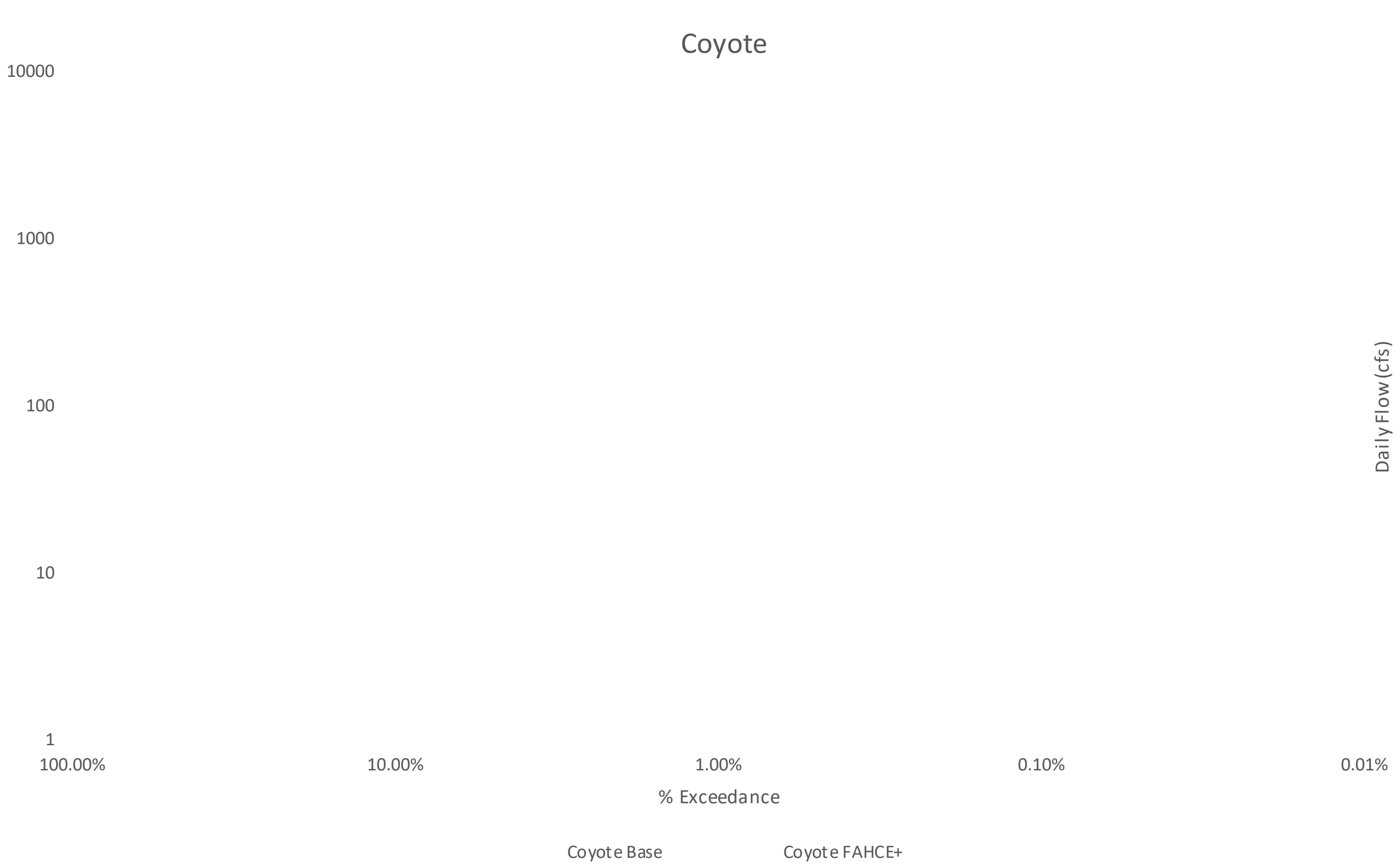
FIGURE 3: *Daily Flow Exceedances (Existing vs. Proposed)*







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Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix M

Noise and Vibration Technical Memorandum

Prepared by
Ramboll Americas Engineering Solutions, Inc.
MEPriorit
Project Number
1690032004

Date
April 7, 2023
First Revision: July 12, 2024
Second Revision: December 31, 2024

ANDERSON DAM SEISMIC RETROFIT PROJECT

NOISE & VIBRATION IMPACT ASSESSMENT

CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

APPENDICES

Appendix 2 – Ambient Sound Level Survey Results

Appendix 3 – Construction Noise Analysis

Acronyms and Abbreviations

ADSRP or Project	Anderson Dam Seismic Retrofit Project
ANSI	American National Standards Institute
ASTM	ASTM International
CadnaA	Computer Aided Noise Abatement software from DataKustik GmbH
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
DSOD	California Department of Water Resources Division of Safety of Dams
dB	Decibel
DMP	Santa Clara Valley Water Dam Maintenance Program
DNL	Day-night average sound level
EIR	Environmental Impact Report
FAHCE	Fish and Aquatic Habitat Collaborative Effort
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
ft	feet
FTA	Federal Transit Authority
GBV	Ground-borne vibration
Hz	hertz
in/sec	inches per second
ISEE	International Society of Explosives Engineers
ISO	International Organization for Standardization
L_{AEQ}	A-weighted time-average sound level
lb	pound
m	meter
mph	miles per hour
NED	National Elevation Dataset
OSHA	Occupational Safety and Health Administration
OSMRE	Office of Surface Mining and Reclamation Enforcement
Pa	pascal (newton per meter squared)
PPV	peak particle velocity
psi	pounds per square inch
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SLM	sound level meter
TNT	Trinitrotoluene
TNTe	Trinitrotoluene equivalent
USBM	US Bureau of Mines
USEPA	United States Environmental Protection Agency
VdB	Decibels of vibration velocity

1. INTRODUCTION

The proposed Anderson Dam Seismic Retrofit Project (Project) involves retrofitting and upgrading Anderson Dam and associated facilities, designed to meet Federal Energy Regulatory Commission (FERC) and California Department of Water Resources Division of Safety of Dams (DSOD) requirements. The Project will include construction work at and around Anderson Dam as well as five conservation measures: Sediment Augmentation Program (downstream of the dam), Ogier Ponds Conservation Measure (approximately 3 miles northwest of the dam), Phase 2 Coyote Percolation Dam Conservation Measure (approximately 9 miles northwest of the dam), Maintenance of the North Channel Reach (downstream of the existing Anderson Dam outlet structure), and Maintenance at the Live Oak Restoration Reach (downstream of the existing dam). Noise-sensitive receptors include residences and William F. James Boys Ranch ("Boys Ranch"), a juvenile detention center.

Project construction will take place over approximately seven years, and construction of the conservation measures areas will span up to 8 years. Site preparation and the start of tunneling for the low-level outlet works (LLOW) will occur in Year 1. Excavation and rebuilding of Anderson Dam will take place from years 2 to 6, and construction at the conservation measures areas will take place from Years 1 to 8. Each year of construction has been divided into activities based on locations of activity and equipment used.

Anderson Dam is owned by the Santa Clara Valley Water District (Valley Water). The California Environmental Quality Act (CEQA) Guidelines require an environmental assessment for potential impacts to surrounding properties during construction and during normal operations once construction is complete. The CEQA Guidelines include several noise-related assessment items.

This technical report provides a summary of noise regulations relevant to Project construction, an analysis of existing conditions, and an assessment of potential noise impacts on noise-sensitive receptors. Operation of Anderson Dam and the conservation measures following construction of the proposed Project would remain essentially unchanged from historical operation. No new long-term operational sources would emit noise or vibration beyond existing conditions; therefore, this technical report evaluates construction noise but does not evaluate future maintenance and operations activities.

The appendix provides additional detail on the noise and vibration environmental setting, methodology and assumptions, and provides the results of the noise and vibration assessment modeling and calculations described in this section.

This technical report has been updated since its original publication to reflect changes to the Project and provide additional information. This report was updated in July 2024 to include extending work hours (including nighttime work), adding some weekend days, and beginning tunnelling for the LLOW in Year 1 rather than Year 2. This second revision includes two additional receptors to represent Rosendin Park and updates to analysis based on minor project revisions. Other changes were made to the report clarify existing information.[1]

[1] Consistent with the approach taken during preparation of the Partially Recirculated Draft EIR, changes to this report from the July 2024 are not presented in underline/strikeout format to improve readability.

2. NOISE & VIBRATION PRINCIPLES AND TERMINOLOGY

This report uses several terms common to noise and vibration analysis. The following section provides a brief summary of acoustic principles and terminology to familiarize the reader.

2.1 Sound

Sound is the transmission of energy in the form of fluctuating pressure waves from a vibrating source through an elastic medium, such as air, that is detectable by the human ear. The pressure fluctuates above and below atmospheric pressure. The amplitude of the pressure fluctuation is typically described in terms of decibels (dB), while the rate of fluctuation per unit time (frequency) is described in hertz (Hz).

The decibel is a logarithmic ratio of a given sound pressure to a reference sound pressure. A logarithmic ratio is used for decibels since human hearing is roughly logarithmic, rather than linear. The reference sound pressure is roughly equal to the threshold of human hearing. Sound pressure levels below the human threshold of hearing are less than 0 dB, while levels above the human threshold of hearing are greater than 0 dB. Differences in sound level are also described in decibels. A 3-dB difference is considered “just noticeable”, a 5-dB difference is considered “clearly noticeable”, while a 10-dB difference is perceived as a doubling (or halving) in loudness. Table 2-1 provides a list of common noise sources, their sound level, and their subjective loudness.

Because the decibel is logarithmic, a doubling of sound energy from a noise source produces a 3-dB increase in sound level from that source, not a doubling of the loudness of the sound (which requires a 10-dB increase). For example, if traffic along a road is causing a 60 dB sound level at some nearby location, doubling the amount traffic on this same road would cause the sound level at this same location to increase to 63 dB. Such an increase might not be discernible in a complex acoustical environment.

The range of frequencies a healthy human ear can hear is approximately 20 Hz to 20,000 Hz. The human ear is not equally sensitive to all frequencies across the audible frequency spectrum. The human ear is most sensitive to mid frequencies (the frequency range associated with speech) and is less sensitive at low frequencies and very high frequencies. To account for this, frequency weighting networks have been developed to approximate the human ear’s frequency response at different sound pressure levels. The A-weighting network is used to approximate the frequency response of the human ear at normal sound levels. Measurements using the A-weighting network are described in terms of A-weighted decibels, often abbreviated colloquially as dBA or dB(A).

Table 2-1. Typical Sound Pressure Levels Associated with Common Noise Sources

140	Deafening	Jet aircraft at 75 feet (ft)	-
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 ft	-
120	Threshold of feeling	-	Hard rock band
110	Extremely Loud	Jet flyover at 1000 ft	-
100	Very Loud	auto horn at 10 ft	-
90		jackhammer at 50 ft	noisy factory
80	Loud	Diesel truck (40 miles per hour (mph)) at 50 ft, noisy urban street	Garbage disposal, cafeteria with sound-reflecting surfaces
70	Moderately Loud	Busy highway at 100 ft	vacuum cleaner
60	Moderate	-	Face-to-face conversation
50 40	Quiet	Small town	Open office area, quiet dishwasher
30	Very quiet	-	Bedroom, typical residence (without TV or sound system)
20		Rustling leaves	Audiometric testing room, whisper
10	Just audible	-	Human breathing
0	Threshold of hearing	-	-

Adapted from Architectural Acoustics, M. David Egan, 1988, and EPA, 1974.

2.2 Sound Level Metrics

To better characterize changes in sound levels over time, several sound level metrics have been developed. The following is a summary of some of the more common metrics.

- Sound environments often vary in level over time. The equivalent-continuous sound level, L_{EQ}, is the steady-state sound level over a given time period that has the same total sound energy as the time-varying sound level measured over that same time period. L_{EQ} is the time-averaged sound energy of a measurement.

- The Day-Night Level, abbreviated as either DNL or L_{DN}, is an equivalent-continuous sound pressure level for a 24-hour period that includes a 10-dB penalty from 10:00 PM to 7:00 AM to reflect people's increased sensitivity to noise at night.

2.3 Noise and its Effects on People

Noise is sound that is considered undesirable or unpleasant. The effects of noise on people depends on a variety of factors, including the type of noise source, the context of the noise, and the sensitivity of the person.

How noticeable a noise source is depends on the following factors:

- The sound level. Louder noise tends to be more annoying. In addition, noise sources that change in sound level over time are more noticeable than those that do not vary over time.
- The duration. Noise that is fairly steady over time tends to be less noticeable, while short, impulsive noises are more noticeable.
- The frequency spectrum. Broadband noise – noise that contains sound energy at many frequencies – is not as noticeable than noise that contains discrete tones. For example, the tone from a backup beeper is more noticeable than noise from a fan, even if they are producing the same overall sound level.
- Masking effects. Noise from one source can be masked – made less noticeable – by noise from one or more louder sources.

The extent to which a noise affects people can vary from subjective (causing annoyance) to physical (causing hearing loss). Where noise is loud enough to cause hearing loss, regulations such as those developed by Occupational Safety and Health Administration (OSHA) have been adopted to mitigate hearing loss. In most environments, noise is not sufficiently loud to cause hearing loss but may still cause annoyance or impact people's productivity and general well-being. Note that the degree of annoyance caused by a given noise varies from person to person.

2.4 Environmental Noise

Environmental noise refers to noise the propagates outdoors. The way in which sound propagates outdoors and the descriptors used to differentiate types of sound and noise sources are summarized below.

2.4.1 Outdoor Sound Propagation

The attenuation of sound over distance outdoors depends on the type of source and environmental factors. In the free field (i.e., no obstructions for the sound), sound from a source that can be considered a point spreads hemispherically, resulting in a sound attenuation rate of 6 dB per doubling of distance. Point sources include, for example, fans and individual vehicles such as trucks. Sound from a line source spreads in the shape of a half cylinder, with a sound attenuation rate of 3 dB per doubling of distance. The most common type of line source is a highway. While highways have many point sources (vehicles), the constant stream of traffic results in the collection of point sources acting as a line source.

The environmental factors that affect the spread of sound outdoors include the following:

- Atmospheric effects. At short distances, atmospheric effects are negligible. However, at large distances, atmospheric effects can significantly impact the propagation of sound.
  - Air absorption. Air absorbs a small amount of sound, primarily at high frequencies. The amount of sound air absorbs depends primarily on the relative humidity, but it also depends on temperature and pressure to a lesser extent. Air absorption can typically be ignored at distances of 100 m or less. At greater distances (e.g., 10,000 m), air absorption has a significant effect that must be accounted for. Air can also refract sound (bend the sound waves in a different direction) when there is a vertical temperature gradient in the atmosphere (i.e., the temperature changes with altitude). Sound waves will refract away from cooler temperatures and towards warmer temperatures.
  - Wind. Wind can also play a role in sound propagation over large distances. Sound refracts in the direction the wind is traveling. The sound traveling downwind propagates more efficiently, resulting in less attenuation, while sound traveling upwind propagates less efficiently, resulting in more attenuation
- Ground absorption. The amount of sound the ground absorbs varies based on the surface. For example, asphalt and bodies of water are more reflective, while soft, porous ground absorbs more sound.
- Vegetation. The amount of sound vegetation absorbs is typically low. However, sound traveling through 100 feet of dense woods or forest can be reduced up to 6 dB.
- Obstructions. Obstructions, such as buildings or hills, which break the line-of-sight between a noise source and receptor reduce sound levels by shielding the receptor from the source.
- Reflections. While obstructions between a source and receptor can reduce sound levels at the receptor, reflections from nearby surfaces (such as a wall or the façade of a building) that do not obstruct the line between the source and receptor can actually increase noise levels. For example, in an urban environment, the densely concentrated buildings create a "canyon effect," where sound bouncing between the buildings can increase noise levels.

2.4.2 Environmental Noise Descriptors

Several descriptors can be used to differentiate types of sound and noise based on the context. Two descriptors relevant to this Project are defined below.

- **Ambient sound**. American National Standards Institute (ANSI) S12.9-2013/Part 1 defines ambient sound as

  > *at a specified time, the all-encompassing sound associated with a given environment, being usually a composite of sound from many sources from many directions, near and far, including the specific sound source(s) of interest.*
- **Ambient noise**. ASTM International (ASTM) C634-13 (R2021) defines ambient noise as

  > *the composite of airborne sound from many sources near and far associated with a given environment. No particular sound is singled out for interest.*

2.5 Vibration

Vibration is the transmission of energy in the form of waves through the ground, man-made structures, or other solid objects. As with sound, the frequencies of vibration are described in hertz (Hz). The amplitude of vibration is typically described either as peak particle velocity (PPV) in units of inches per second (in/sec) or in decibels of vibration velocity, abbreviated as VdB.

Vibration is perceived tactilely, whether through feet or hands or through the whole body while sitting or lying down. Like noise, vibration can be a source of annoyance and can cause sleep disturbance.

Most perceptible indoor vibration is caused by sources within buildings, such as equipment operation, movement of people, or slamming doors. Typical outdoor sources are heavy construction equipment and activities (such as blasting and pile driving), steel-wheeled trains, and heavy trucks on rough roads or offroad. It is unusual for vibration from sources such as buses and trucks on smooth roads to be perceptible, even in nearby locations.

Table 2-2 summarizes common sources of groundborne vibration velocity levels and average response to vibration by a person at rest in quiet surroundings (tolerance to vibration increases considerably during physical activity). The duration of the vibration event affects human response, as does its frequency of occurrence: increases in both result in decreased tolerance. Typical background vibration levels in residential areas are usually 50 VdB or lower, well below the threshold (65 VdB) of perception for most humans.

Table 2-2. Typical Vibration Levels Associated and Associated Average Responses

Threshold for minor cosmetic damage to fragile buildings	100	Blasting, pile driving, vibratory compaction equipment
Difficulty with tasks such as reading a video or computer screen	90	Heavy tracked vehicles (bulldozers, cranes, drill rigs)
Threshold for residential annoyance for infrequent events (e.g., commuter rail)	80	Freight rail, typical Commuter rail, upper range
	70	Rapid transit, upper range
Threshold for residential annoyance for frequent events (e.g., rapid transit)	60	Commuter rail, typical
Approximate threshold for human perception of vibration		Bus or truck over bump or on rough roads
	50	Rapid transit, typical
Limit for vibration sensitive equipment		Typical bus or truck on public road

Source: Federal Transit Administration, 2018

2.6 Ground-borne Noise

Ground-borne noise is noise that is generated by vibration in the ground transmitted to building structures and then to the air within buildings. It is perceived as a low-frequency rumbling. The extent to which ground vibration is perceived as noise depends on the frequency and amplitude of the vibration, as well as the acoustical characteristics of the building environment.

Groundborne noise is quantified by the A-weighted sound level inside the building and is generally 25 to 40 dBA lower than the vibration velocity level in VdB. Groundborne vibration levels of 65 VdB can result in groundborne noise levels up to 40 dBA, which can disturb sleep. Groundborne vibration levels of 85 VdB can result in groundborne noise levels up to 60 dBA, which can be annoying to daytime noise sensitive land uses such as schools (Federal Transit Administration, 2018).

2.7 Blasting

During blasting activity, the majority of the energy of detonations is consumed by rock breakage and movement. However, a small amount of energy is transmitted past the blasting area through vibration and air overpressure.

The total energy released by the detonation of an explosive is typically provided in terms of Trinitrotoluene equivalent (TNTe). Various types of explosives have varying effectiveness factors compared to TNT. Limits for safe air overpressure and vibration from blasting are given in terms of TNTe per delay.

2.7.1 Vibration

Blasting results in groundborne vibration propagating from the blasting area. Blasting creates vibration waves in the ground of varying amplitude, frequency, and speed. Like other forms of groundborne vibration, the frequencies are described in hertz (Hz). The amplitudes are typically described in terms of PPV in/sec. The two most significant factors influencing the amplitude of vibration are the weight of charge and distance from the charge, though factors including timing between charges, geology, and charge confinement also play a role.

Vibration from blasting of sufficient amplitude can cause structures to respond, resulting in rattling within buildings, and excessive vibration from blasting has the potential to cause damage to structures. However, proper planning and monitoring of vibration can mitigate risk to nearby buildings.

2.7.2 Overpressure

Blasting creates vibrations in the air referred to as air overpressure. Air overpressure is the change in air pressure from normal atmospheric pressure generated by a blast. Air overpressure propagates as a pressure wave in the form of compression (positive pressure) followed by rarefaction (negative pressure). Like sound waves, air overpressure can be described in terms of pascals (Pa) or the sound equivalent in decibels (dB).

Much of the acoustic energy from air overpressure is below the range of human hearing (<20 Hz). The portion of an air overpressure below the range of human hearing is perceived as a sudden gust of wind, sometimes referred to as an "airblast" or "air concussion." While most of the airblast energy is below the range of human hearing, it can cause structures to respond, resulting in rattling within buildings.

Factors that influence air overpressure include charge-weight per delay, depth of burial, volume of displaced rock, delay time intervals, type of explosive, atmospheric conditions, and topography.

3. REGULATORY SETTING

The following sections summarize the noise-related laws, regulations, and policies relevant to the Project. For an overview of laws, regulations, and policies relevant to State CEQA Guidelines and the resulting significance thresholds for the Project, see §5.1.

3.1 Federal and International Laws, Regulations, and Policies

3.1.1 U.S. Environmental Protection Agency (USEPA)

In 1972, the Noise Control Act (42 United States Code [U.S.C.] § 4901 et seq.) was passed by Congress to promote noise environments in support of public health and welfare. It also established the U.S. Environmental Protection Agency Office of Noise Abatement and Control to coordinate federal noise control activities. The agency established guidelines for noise levels that would be considered safe for community exposure without the risk of adverse health or welfare effects. The agency found that to prevent hearing loss over the lifetime of a receptor, the yearly average L_{EQ} should not exceed 70 dBA, and the L_{DN} should not exceed 55 dBA in outdoor activity areas or 45 dBA indoors to prevent interference and annoyance. In addition, based on available sleep criteria data, the agency's Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Safety Margin of Safety identified an interior nighttime level of 35 dBA as acceptable in bedrooms (USEPA 1974). In 1982, the agency phased out the office's funding as part of a shift in federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments.

While the Office of Noise Abatement and Control no longer exists, the Noise Control Act has been used as a resource in developing state and local standards for environmental noise.

3.1.2 U.S. Federal Transit Administration (FTA)

The Federal Transit Administration provides guidelines for assessing the potential for adverse community reaction from construction activity. For detailed analysis, the criteria are an 8-hour L_{EQ} of 80 dBA during the day and 70 dBA during nighttime at residential receptors. The FTA states that if these criteria are exceeded, there may be adverse community reaction.

The Federal Transit Administration has adopted vibration criteria for assessment of vibration from construction and operational activities, both for human perception and damage to structures (Transit Noise and Vibration Impact Assessment, 2018). The criteria are summarized in Table 3 and Table 4. These criteria are frequently used as thresholds of significance for CEQA projects.

Table 3. Construction Vibration Damage Criteria

I. Reinforced concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Table 4. Indoor Ground-Borne Vibration Impact Criteria for General Vibration Assessment

Category 1: Buildings where vibration would interfere with interior operations	65 VdB[d)]	65 VdB[d)]	65 VdB[d)]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

[a)] More than 70 events per day

[b)] 30-70 events per day

[c)] Fewer than 30 events per day

[d)] From FTA, 2018: "This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed."

3.2 State Laws, Regulations, and Policies

3.2.1 California Government Code

California Government Code section 65302 requires each local government entity to implement a noise element as part of its general plan. In addition, the California Governor's Office of Planning and Research has developed guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The Cities of San José and Morgan Hill and the County of Santa Clara have adopted noise elements.

3.2.2 California Department of Transportation (Caltrans)

Caltrans' Transportation and Construction Vibration Guidance Manual provides guidelines for determining thresholds for construction vibration and methods to control vibration. Chapter 11 is dedicated to air overpressure and ground vibration from blasting. The relevant section on criteria for air overpressure and ground vibration does not provide any requirements for Caltrans projects but does include discussion of their effects on people and structures and a summary of limits provided by the US Bureau of Mines (USBM) and the Office of Surface Mining and Reclamation Enforcement (OSMRE).

The manual outlines the conclusions of USBM RI 8507 "Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting", including the following:

- The potential for damage to residential structures is greater with low-frequency blast vibration (below 40 Hz) than with high frequency blast vibration (40 Hz and above).
- The type of residential construction is a factor in the vibration amplitude required to cause damage.
- For low-frequency blast vibration, a limit of 0.75 in/sec for modern drywall construction and 0.50 in/sec for older plaster-on-lath construction was proposed. For frequencies above 40 Hz, a limit of 2.0 in/sec for all types of construction was proposed.

Regarding air overpressure, the manual states that USBM RI 8485 recommends a maximum safe overpressure of 0.014 pounds per square inch (psi) (134 dB, linear) for residential structures. In addition, the manual provides the following table from the OSMRE, which provides limits based on the frequency response of the recording device used to measure air overpressure:

Table 5. OSMRE Air Overpressure Limits

Lower limit of 0.1 Hz	134 dB
Lower limit of 2.0 Hz	133 dB
Lower limit of 6.0 Hz	129 dB
C-weighted, slow response*	105 dBC

* To be used only with prior approval of OSMRE

According to the manual, since most modern seismographs with air overpressure recording capability have a frequency response from 2-250 Hz, the limit of 133 dB is appropriate.

3.3 Regional Laws, Regulations, and Policies

3.3.1 County of Santa Clara Code of Ordinances

The County of Santa Clara Noise Ordinance is included in Chapter VIII, Control of Noise and Vibration in the County Code of Ordinances. The intent of the ordinance is to control unnecessary, excessive, and annoying noise and vibration and to prohibit the noise and vibration generated from or by all sources. The ordinance includes exterior and interior noise limits, prohibits specified noise-generating activities, establishes motor vehicle noise limits, and special provisions, including exemptions for construction activities and demolition activities. It is also the intent of the County to maintain quiet in those areas that exhibit low noise levels and to implement programs aimed at reducing noise in those areas where noise levels are above acceptable values. Specific acceptable noise levels established in the ordinance are provided below in §5.1, which discusses regulations relevant to the Project significance criteria.

3.3.2 County of Santa Clara General Plan

The County of Santa Clara General Plan's Safety and Noise Element (2015) contains the following policies relevant to Project noise and vibration:

Policy C-HS 24: Environments for all residents of County of Santa Clara free from noises that jeopardize their health and well-being should be provided through measures which promote noise and land use compatibility.

Policy C-HS 25: Noise impacts from public and private projects should be mitigated.

Policy C-HS(i) 23: Project design review should assess noise impacts on surrounding land uses. (Implementors: County and cities)

Policy C-HS(i) 24: Where necessary, construct sound walls or other noise mitigations. (Implementors: County, cities, and public agencies.)

Policy C-HS(i) 25: Prohibit construction in areas which exceed applicable interior and exterior standards, unless suitable control measures can be implemented. (Implementors: County and cities)

Policy C-HS(i) 26: Require project-specific noise studies to assess actual and protected dB noise contours for proposed land uses likely to generate significant noise. (Implementors: County and cities)

Policy C-HS(i) 27: Take noise compatibility impacts into account in developing local land use plans. (Implementors: County and cities)

Policy C-HS 26: New development in areas of noise impact (areas subject to sound levels of 55 DNL or greater) should be approved, denied, or conditioned so as to achieve a satisfactory noise level for those who will use or occupy the facility (as defined in "Noise Compatibility Standards for Land Use" and "Maximum Interior Noise Levels For Intermittent Noise").

Policy C-HS(i) 28: Incorporate acoustic site planning into the design of new development, particularly large scale, mixed use, or master planned development, through measures which may include: a. separation of noise sensitive buildings from noise generating sources; b. use of natural topography and intervening structure to shield noise sensitive land uses; and c. adequate sound proofing within the receiving structure. (Implementors: County, cities, architects and developers).

Table 6. Santa Clara County Noise Compatibility Standards for Land Use

Land Use	Exterior Noise Exposure (DNL in Decibels)							
	45	**50**	**55**	**60**	**65**	**70**	**75**	**80**
Residential								
Commercial								
Hotel								
Other								
Industrial								
Public or Semi-Public Facilities								
Church, Hospital, and Nursing								
Home								
Schools and Libraries								
Civic Buildings and Other								
Open Space *								
Agriculture								
Parks, Open Space Reserves								
Wildlife Refuges, etc.								
Effect on Humans at this Noise Level	Maximum noise for undisturbed sleep - EPA.			Voice level which permits conversation at 3 meter (10 ft).			Potentially hazardous to health - EPA	

Noise Compatibility Evaluation

Satisfactory **Cautionary** **Unacceptable**

* For open space use, there are no critical noise levels listed. Homes in agricultural areas are not subject to "Residential" standards. Public buildings in parks and open spaces areas shall meet noise standards as listed under "Public or Semi-Public Facilities". For open space use, the maximum level of noise which a new land use may impose on neighboring open space shall be the upper limit of the "Satisfactory Noise Level"

3.3.3 City of San José Municipal Code

§ 20.100.450 of the San José Municipal Code contains the City's restrictions on hours for construction, including the following:

> *Unless otherwise expressly allowed in a Development Permit or other planning approval, no applicant or agent of an applicant shall suffer or allow any construction activity on a site located within 500 feet of a residential unit before 7:00 am or 7:00 pm, Monday through Friday, or at any time on weekends.*

§ 20.30.700 states groundborne vibration (GBV) must not be perceptible (without instruments) at the property lines of residentially-zoned districts.

3.3.4 City of San José General Plan

The City of San José 2040 General Plan (2011, amended 2022) contains the following policies relevant to Project noise and vibration:

Goal EC-1 – Community Noise Levels and Land Use Compatibility

Minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies.

Policy EC-1.1: Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

- For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways.

Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

- For single family residential uses, use a standard of 60 dBA DNL for exterior noise in private usable outdoor activity areas, such as backyards.

Table 7. City of San José Land Use Compatibility Guidelines for Community Noise

Land Use Category	Exterior Noise Exposure (DNL in Decibels)					
	55	**60**	**65**	**70**	**75**	**80**
1. Residential, Hotels and Motels, Hospitals and Residential Care [1]						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

[1] Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required

Normally Acceptable

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable

Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable

New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Policy EC-1.2: Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable"; or
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

Policy EC-1.3: Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

Policy EC-1.4: Include appropriate noise attenuation techniques in the design of all new General Plan streets projected to adversely impact noise sensitive uses.

Policy EC-1.6: Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

Policy EC-1.7: Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

Goal EC-2 – Vibration

Minimize vibration impacts on people, residences, and business operations.

Policy EC-2.1: Near light and heavy rail lines or other sources of ground-borne vibration, minimize vibration impacts on people, residences, and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration. Require new development within 100 feet of rail lines to demonstrate prior to project approval that vibration experienced by residents and vibration sensitive uses would not exceed these guidelines.

Policy EC-2.2: Require new sources of ground-borne vibration, such as transit along fixed rail systems or the operation of impulsive equipment, to minimize vibration impacts on existing sensitive land uses to levels at or below the guidelines of the Federal Transit Administration.

Policy EC-2.3: Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Policy EC-2.4: Consider the effects of ground-borne vibration in the analysis for potential Land Use / Transportation Diagram changes.

3.3.5 City of Morgan Hill Code of Ordinances

Chapter 8.28 of the Morgan Hill Code of Ordinances contains the City's noise ordinance. The noise ordinance provides regulations related to construction noise. §8.28.040 states that construction activities are prohibited other than between the hours of 7 am and 6 pm, Monday through Friday and between the hours of 9 am and 6 pm on Saturday, unless public works projects or determination from chief building official or city council allowing for hours outside of this timing. The Code states that construction activities may not occur on Sundays or federal holidays. The Code defines construction activities as including but not limited to excavation, grading, paving, demolition, construction, alteration or repair of any building, site, street or highway, delivery or removal of construction material to a site, or movement of construction materials on a site.

§18.76.090.A. limits noise levels to those listed in Table 8. However, §18.76.090.B. exempts noise generated by temporary construction, demolition, and vehicles that enter and leave a site (e.g., construction equipment, trucks).

Table 8. City of Morgan Hill Code of Ordinances Maximum Noise Levels

Industrial and Wholesale	70 dBA
Commercial	65 dBA
Residential or Public/Quasi Public	60 dBA

§18.76.130 prohibits GBV that is perceptible without instruments at the lot line but exempts temporary construction, demolition, and vehicles that enter and leave a lot (e.g., construction equipment, trucks).

3.3.6 City of Morgan Hill General Plan

The City of Morgan Hill 2035 General Plan (2016) Safety, Services, and Infrastructure Element (Chapter 9) contains the following goals and policies relevant to Project noise:

Goal SSI-8: Prevention of noise from interfering with human activities or causing health problems.

Policy SSI-8.1: Exterior Noise Level Standards. Require new development projects to be designed and constructed to meet acceptable exterior noise level standards (see Table SSI-1), as follows:

- Apply a maximum exterior noise level of 60 dBA L_{DN} in residential areas where outdoor use is a major consideration (e.g., backyards in single-family housing developments and recreation areas in multi-family housing projects). Where the City determines that providing an L_{DN} of 60 dBA or lower cannot be achieved after the application of reasonable and feasible mitigation, an L_{DN} of 65 dBA may be permitted.
- Indoor noise levels should not exceed an L_{DN} of 45 dBA in new residential housing units.
- Noise levels in new residential development exposed to an exterior L_{DN} 60 dBA or greater should be limited to a maximum instantaneous noise level (e.g., trucks on busy streets, train warning whistles) in bedrooms of 50 dBA. Maximum instantaneous noise levels in all other habitable rooms should not exceed 55 dBA. The maximum outdoor noise level for new residences near the railroad shall be 70 dBA L_{DN}, recognizing that train noise is characterized by relatively few loud events. The impact of a proposed development project on existing land uses should be evaluated in terms of the potential for adverse community response based on significant increase in existing noise levels, regardless of compatibility guidelines.

Policy SSI-8.2: Impact Evaluation. The impact of a proposed development project on existing land uses should be evaluated in terms of the potential for adverse community response based on significant increase in existing noise levels, regardless of compatibility guidelines.

Policy SSI-8.6: Stationary Noise Level Standards. Consider noise levels produced by stationary noise sources associated with new projects significant if they substantially exceed existing ambient noise levels.

3.4 Non-Regulatory Industry Standards

Limits for air overpressure and vibration from blasting activity are not provided in Federal, State, or Local regulations. However, thresholds established by the International Society of Explosives Engineers are available.

3.4.1 International Society of Explosives Engineers

Criteria for air overpressure and vibration damage from blasting activity are found in the International Society of Explosives Engineers (ISEE) Blasters' Handbook, 18th Edition.

3.4.1.1 Air Overpressure

The ISEE Blasters Handbook includes damage criteria for air overpressure, summarized in Table 9.

Table 9. Typical Air Overpressure Damage Criteria

Structural damage possible	20.7	3.0	180
General window breakage	6.9	1.0	171
Occasional window breakage	0.69	0.1	151
Damage threshold at high frequencies	0.2	0.029	140
No damage at low frequencies	0.010	0.0145	134

While Table 9 provides damage criteria for air overpressure, the ISEE Blaster Handbook prescribes a limit of 133 dBL at the location of any building, and notes that "the limit of 133 decibels is primarily based on perception and has no potential to cause damage to buildings."

3.4.1.2 Vibration

The ISEE Blasters Handbook provides the following ground vibration criteria regarding damage to common residential construction materials.

Table 10. Blasting Vibration Damage Criteria for Residential Construction Materials

12.7 mm/s (0.5 in./sec.)	Threshold of damage in plaster-on-lath construction for low frequency vibrations.
19.1 mm/s (0.75 in./sec.)	Threshold of damage in sheetrock construction for low frequency vibrations.
50.8 mm/s (2.0 in./sec.)	Threshold of damage in sheetrock construction for high frequency vibrations near construction and quarry blasting.
137 mm/s (5.4 in./sec.)	Threshold of minor damage to typical residential structures at high frequency sites, including concrete masonry units.
183 mm/s (7.2 in./sec.)	Threshold of major damage to typical residential structures at high frequency sites.
229 mm/s (9 in./sec.)	About 90% probability of minor damage from construction or quarry blasting. Structural damage to some houses. Depends on vibration source, character of the vibrations and the house.
508 mm/s (20 in./sec.)	For close-in construction blasting, minor damage to nearly all houses, structural damage to some. For low frequency vibrations, structural damage to most houses.
>2540 mm/s (>100 in./sec.)	Threshold for damage to concrete pads, driveways, and walkways.

Note that the vibration levels in Table 10 are for frequencies of approximately 3 Hz and above. The ISEE handbook notes that these criteria are generally conservative and are "designed to prevent threshold damage (extensions of existing hairline cracks) to residential structures." The handbook also provides the following blasting criteria, which accounts for vibration amplitude at various frequencies.

Figure 3.1. Vibration Criteria for Blast Vibration Monitoring

Source: International Society of Explosives Engineers, *Blasters' Handbook*, 18th Edition, taken from US Bureau of Mines, *RI 8507*, 1980.

4. ENVIRONMENTAL SETTING

4.1 Anderson Dam and Anderson Lake Area

Anderson Dam and Reservoir is a major water supply facility located adjacent to the City of Morgan Hill, about 18 miles southeast of San José. The existing dam is an earth dam located on the south side of the reservoir. The reservoir is fed by Coyote Creek to the southeast. The creek continues west of the dam towards Ogier Ponds. The reservoir has been drained to deadpool in preparation of the Project and will be completely drained during Project construction.

Figure 4.1. Project Area

4.1.1 Noise-Sensitive Receptors

Surrounding land uses with sensitive receptors include single-family residential, a juvenile correctional facility, and recreational uses. Residential homes and recreational trails along the southwestern bank of the reservoir (i.e., near stockpile area K) and in the south area of the dam are within the City of Morgan Hill and unincorporated Santa Clara County. The juvenile correctional facility is located within the City of San José. There are no noise-sensitive uses located northwest of the dam, within the vicinity of several stockpile areas (areas H, I, J, and L).

Recreational uses at southeastern bank of the reservoir are located within the County of Santa Clara, and recreational uses in northwestern bank and the northern dam area are within the City of San José. Recreational uses that border the Project area including the Anderson Lake County Park to the southwest which includes hiking trails and boating activities within the Project area, the Live Oak Picnic Area also to the southwest, and Rosendin Park to the southeast. These recreational areas will be closed during construction.

4.2 Conservation Measures Areas

4.2.1 Ogier Ponds Conservation Measure

Surrounding land uses with sensitive receptors include single-family residential, and recreational uses. Residential homes are located southwest of the site at Parkway Lakes RV Park. Sensitive receptors also include users of the trails near Ogier Ponds, such as the Coyote Creek Trail.

Ogier Ponds is itself a recreational area, which will be closed during construction.

4.2.2 Sediment Augmentation Program

Surrounding land uses with sensitive receptors include single-family residential, a juvenile correctional facility, and recreational uses. Residential homes are located south of Coyote Creek across Cochrane Road.

4.2.3 Phase 2 Coyote Percolation Dam Conservation Measure

Surrounding land uses with sensitive receptors include single-family residential and recreational uses. Residential homes are located southwest of the percolation dam across Forsum Road. The recreational area is Metcalf Park, which includes a trailhead for Coyote Creek Trail.

4.2.4 Maintenance at the North Channel Reach and Live Oak Restoration Reach

Surrounding land uses with sensitive receptors include single-family residential, a juvenile correctional facility, and recreational uses. Residential homes are located south of Coyote Creek across Cochrane Road. Residential communities are also located north of US 101, approximately 0.1 miles from the Project Area. Sensitive receptors also include users of the trails that are adjacent to Coyote Creek, such as the Coyote Creek Trail.

4.3 Existing Ambient Noise Environment

To quantify the existing ambient noise environment for the purpose of assessing potential impacts from construction noise, Ramboll conducted a site visit in June 2022. The ambient noise level survey included continuous monitoring at eleven (11) near Anderson Dam, Coyote Creek, Ogier Ponds, and the percolation dam. Weather was clear throughout the measurements.
Over the 24-hour ambient survey period, the measured ambient noise levels varied from DNL 45 dB to DNL 64 dB. The louder measurement locations were more exposed to traffic noise,

including both local and highway traffic, while the quieter measurement locations were partially to mostly shielded from traffic noise.

4.3.1 Measurement Procedures

Ramboll conducted a site visit from 13 June to 17 June 2022. 24-hour ambient sound level measurements were made at eight locations around Anderson Dam, one location at Ogier Ponds, and two locations near the percolation dam using six Larson Davis LxT sound level meters (SLMs), which meet ANSI S1.4 requirements for a Type 1 sound level meter. The locations for measurements were chosen based on the locations of future construction activity and the locations of noise-sensitive receptors. The measurements were made in general conformance to ANSI S12.9-1992/Part 2.

The sound level meters were placed in weather-resistant cases, while the microphones were placed on tripods approximately 5 feet above grade. Figure 4.2 shows an example installation.

Figure 4.2. Example Sound Level Meter Deployment

4.3.2 Anderson Dam

Measurement Locations

Measurements were conducted at eight locations around Anderson Dam. The measurement locations were chosen based on the locations of future construction activity and the locations of existing noise-sensitive receptors. The measurement locations are shown in Figure 4.3 and are described in Table 11.

Table 11. Descriptions of Measurement Locations at Anderson Dam

Tag	Location	Measurement Period	Nearest Noise-Sensitive Receptor(s)	Nearest Area(s) of Construction Activity
SLM-1	~60 ft east of Malaguerra Ave and Sycamore Ave intersection	7:00am 06/15/2022 - 8:00am 06/16/2022	Residences along Malaguerra Ave	Staging Area 1, Stockpile Area E, Sediment Augmentation Program
SLM-2	~60 ft northeast of Cochrane Rd-Malaguerra Ave intersection	9:00am 06/16/2022 - 10:00am 06/17/2022	Residences along Cochrane Rd and Malaguerra Ave, juvenile correctional facility	Staging Area 1, Stockpile Area E
SLM-3	Northeast corner of Live Oak Picnic Area near Coyote Creek	9:00am 06/16/2022 - 10:00am 06/17/2022	Residences along Cochrane Rd, juvenile correctional facility	Staging Area 1, Stockpile Area E, North Channel Reach
SLM-4	~80 ft northwest of Cochrane Rd-Via Sebastian intersection	7:00am 06/15/2022 - 8:00am 06/16/2022	Residences along Cochrane Rd	Staging Area 4, Staging Area 1
SLM-5	Southeast corner of Rosendin Park	10:00am 06/15/2022 - 10:00am 06/16/2022	Residences along Holiday Dr	Basalt Hill Borrow Area
SLM-6	Southeast end of lake basin, south side	9:00am 06/15/2022 - 10:00am 06/16/2022	Residences along Holiday Dr	Stockpile K (North)
SLM-7	Southeast end of lake basin, south side	9:00am 06/15/2022 - 10:00am 06/16/2022	Residences along Holiday Dr	Stockpile K (South)
SLM-8	Southeast end of lake basin, north side along E Dunne Ave	10:00am 06/15/2022 - 10:00am 06/16/2022	Residences north of E Dunne Ave	Stockpile K (North and South)

Figure 4.3. Noise Monitoring Locations for Anderson Dam

Results

The results of the measurements are summarized in Table 12.

Table 12. Measurement Results by Location at Anderson Dam

Tag	L_{DN}
SLM-1	50
SLM-2	61
SLM-3	50
SLM-4	54
SLM-5	45
SLM-6	46
SLM-7	48
SLM-8	50

The primary sources of noise were local roads, with insects, birds, and wind also contributing to the noise environment. Based on our observations on site, the intersection of Cochrane Road and Malaguerra Avenue saw more traffic than other road sections near the Project site. As a result, the ambient noise levels measured at SLM-2 were higher than the other monitoring locations. While SLM-2 is located within the City of Morgan Hill limits, it was the only monitoring location by Anderson Dam that would be considered "conditionally acceptable" for residential land uses under the City of San José General Plan. SLM-3 and SLM-4 had partial line-of-sight to the on-going Federal Energy Regulatory Commission Order of Compliance Project (FOCP) activities. Sound levels at SLM-4 were higher than SLM-3 due to traffic along Cochrane Road. Monitoring locations SLM-5 through SLM-6 were shielded from local traffic and had the lowest ambient noise levels.

4.3.3 Ogier Ponds

Measurement Locations

Measurements were conducted at one location at Ogier Ponds. The measurement location was chosen based on the locations of future construction activity and the locations of existing noise-sensitive receptors. The measurement location is shown in Figure 4.4 and are described in Table 13.

Table 13. Description of Measurement Location at Ogier Ponds

Tag	Location	Measurement Period	Nearest Noise-Sensitive Receptor(s)	Nearest Area(s) of Construction Activity
SLM-9	Near Ogier Ave, ~170 ft beyond Barnhart Ave	9:00pm 06/13/2022 - 9:00pm 06/14/2022	Parkway Lakes RV Park	Ogier Ponds

Figure 4.4. Noise Monitoring Location for Ogier Ponds

Results

The results of the measurements are summarized in Table 14.

Table 14. Measurement Results at Ogier Ponds

Tag	L_{DN}
SLM-9	57

The primary source of noise was traffic along US-101, with noise from Monterey Highway, insects, birds, and farm animals also contributing to the noise environment.

4.3.4 Phase 2 Coyote Percolation Dam Conservation Measure

Measurement Locations

Measurements were conducted at two locations near the Phase 2 Coyote Percolation Dam Conservation Measure (Percolation Dam). The measurement locations were chosen based on the locations of future construction activity and the locations of existing noise-sensitive receptors. The measurement locations are shown in Figure 4.5 and are described in Table 15.

Table 15. Descriptions of Measurement Locations at Percolation Dam

Tag	Location	Measurement Period	Nearest Noise-Sensitive Receptor(s)	Nearest Area(s) of Construction Activity
SLM-10	Along Coyote Creek Trail, ~500 ft west of Percolation Dam	7:00pm 06/13/2022 - 12:00pm 06/14/2022	Metcalf Park, residences along Forsum Rd	Percolation Dam
SLM-11	~80 ft west of Percolation Dam	7:30pm 06/13/2022 - 7:30pm 06/14/2022	Metcalf Park, residences along Forsum Rd	Percolation Dam

Figure 4.5. Noise Monitoring Location for Phase 2 Coyote Percolation Dam Conservation Measure

Results

The results of the measurements are summarized in Table 16.

Table 16. Measurement Results by Location at Percolation Dam

Tag	L_{DN}
SLM-10	62
SLM-11	64

The ambient noise levels at the two measurement locations were generally higher than the measurement locations at Ogier Ponds and Anderson Dam. The dominant source of noise at the percolation dam is US-101. Local traffic along Forsum Road and activity at Metcalf Park also contributed to the noise environment.

5. METHODOLOGY AND APPROACH TO IMPACT ANALYSIS

5.1 Thresholds of Significance

5.1.1 Significance Criteria

For the purposes of this analysis, the proposed Project would result in a significant noise or vibration impact if it would result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or generate a substantial incremental increase in noise levels;
b) Generation of excessive ground-borne vibration or ground-borne noise levels;
c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.

Note that the Project is not located within an airport land use plan and there are no public airports or public use airports within two miles of the Project. Also, there are no private airstrips within the Project vicinity. The nearest public or public use airport is the San Martin Airport, approximately five miles south of the Project area. Therefore, there would be no impact from Significance Criteria c), which is not considered further in this analysis.

5.1.2 Specific Thresholds of Significance

This analysis applies the following noise and vibration thresholds. Some of these thresholds are based on standards in local government noise ordinances since they represent noise levels acceptable to the local community, consistent with CEQA Guidelines Appendix G (Question XIII[a]). However, Valley Water is exempt from compliance with the local noise ordinances under either Government Code Secs. 53091(d) or (e) (which state that county or city building and zoning ordinances do not apply to the construction of facilities for water storage or transmission), or for non-building and zoning ordinances, under Hall v. Taft (1956) 47 Cal. 2d 177,189 (which holds that water districts are exempt from municipal police power regulation).

5.1.2.1 Noise

CONSTRUCTION

Project development could have a significant impact to noise-sensitive receptors in San José and Morgan Hill if temporary construction noise exposed noise-sensitive receivers to significantly adverse noise levels. As neither the City of San José nor the City of Morgan Hill have quantitative construction noise limits, for purposes of analyzing impacts from the Project at noise-sensitive receptors located in San José and Morgan Hill, this analysis has adopted FTA construction noise criteria. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in its Transit and Noise Vibration Impact Assessment Manual. For residential uses in San José and Morgan Hill, the daytime noise threshold is an 8-hour time-average sound level (L_{AEQ}) of 80 dBA. To assess potential nighttime construction noise impacts, recommendations from the USEPA's Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Safety Margin of Safety is used. As noted in Section 3.1.1, an interior nighttime level of 35 dBA is considered acceptable (USEPA 1974). Assuming a 15-dBA reduction with a windows-open condition, an exterior noise level of 50 dBA L_{EQ} would be required to maintain an acceptable interior noise environment of 35 dBA. Therefore, for residential uses in San José and Morgan Hill, the nighttime construction noise threshold is 50 dBA L_{EQ}.

For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays from 7:00 a.m. to 7:00 p.m. and 50 dBA at all other times at single-family residences, or if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 65 dBA on weekdays and Saturdays from 7:00 a.m. to 7:00 p.m. and 55 dBA at all other times at multi-family residences, per the County of Santa Clara Municipal Code.

For increases over ambient sound levels from construction noise, the relevant regulations do not provide thresholds. This Technical Report uses a threshold of 10 dBA DNL increase above ambient noise levels to assess temporary construction noise impacts at residential receptors, in coordination with Valley Water.

The City of San José, the City of Morgan Hill, and Santa Clara County do not have quantitative limits for air overpressure from blasting activity. However, Caltrans has provided guidelines. Per Caltrans recommendations, air overpressure from blasting resulting in noise would be significant if it exceeds 133 dB at a sensitive receptor building.

OPERATION

Operational stationary source noise is addressed qualitatively since most equipment under the Project would replace equipment existing under baseline conditions. Noise generated by intermittent release of water at the gateshaft during emergency conditions would be located away from nearby sensitive receptors and is addressed qualitatively.

CONSTRUCTION AND OPERATION TRAFFIC

Construction and operational roadway vehicle noise impacts were analyzed using the Envision San José 2040 General Plan (2011) noise standards and the City of Morgan Hill 2035 General Plan (2016) noise standards. Roadway vehicle noise impacts would be significant where such noise causes an increase of 5 dBA DNL where ambient noise levels are below 60 dBA DNL or causes an increase of 3 dBA DNL where ambient noise levels are 60 dBA DNL or greater. While the applicability of these traffic noise thresholds may be intended for assessing permanent traffic noise increase impacts, this Technical Report conservatively applies these thresholds to Project construction traffic noise as well. In lieu of quantified roadway vehicle noise thresholds in Santa Clara County, the same noise thresholds are applied to sensitive receptors in unincorporated Santa Clara County.

5.1.2.2 Vibration

CONSTRUCTION AND OPERATION

As the City of San José, the City of Morgan Hill, and Santa Clara County do not have quantitative construction vibration limits, criteria from the FTA are used to evaluate potential construction vibration impacts related to potential building damage and indoor human annoyance impacts from construction. Construction vibration impacts of the project would be significant if vibration levels exceed the FTA criteria for building damage (see Table 3). Construction vibration impacts of the project would be significant if vibration levels exceed the FTA criterion for indoor human annoyance of 72 VdB at sensitive receptors.

In addition, potential damage to structures from blasting would be significant if vibration levels exceed 0.1884 in/sec PPV at 1 Hz, 0.5 in/sec PPV at 3 Hz to 40 Hz, and 2.0 in/sec PPV at 40 Hz and above.

Table 17 summarizes relevant significance thresholds for the assessment of noise and vibration impact related to the Project.

Table 17. Thresholds of Significance

CEQA Significance Criteria	Noise/Vibration Source	Significance Threshold	Source / Agency
	Construction Noise	Maximum hourly L_{AEQ} noise level for stationary construction equipment noise affecting single-family residences is 60 dBA on weekdays and Saturdays from 7:00 a.m. to 7:00 p.m., and 50 dBA at all other times.	County of Santa Clara Code
a)	Construction Noise	Maximum hourly L_{AEQ} noise level for stationary construction equipment noise affecting multi-family residences is 65 dBA on weekdays and Saturdays from 7:00 a.m. to 7:00 p.m., and 55 dBA at all other times.	County of Santa Clara Code
	Construction Noise	Maximum 8-hour L_{AEQ} of 80 dBA during the day	FTA, 2018
	Construction Noise	Maximum L_{AEQ} of 50 dBA at night	USEPA, 1974
	Construction Noise	Maximum of 10 dBA DNL above ambient sound level	Valley Water

CEQA Significance Criteria	Noise/Vibration Source	Significance Threshold	Source / Agency
	Blasting Air Overpressure	Damage to structures from blasting: 133 dBL for air overpressure	ISEE, Caltrans
	Construction Roadway Noise	Cause an increase in DNL of 5 dB or more where noise levels would remain "normally acceptable" (60 dBA for residential receptors); cause an increase in DNL of 3 dB or more where noise levels would equal or exceed "normally acceptable" (60 dBA for residential receptors)	City of San José General Plan
b)	Construction Vibration	Vibration impact: 72 VdB	FTA, 2018
	Construction Vibration	Damage to structures: 0.12-0.5 in/sec PPV depending on building materials	FTA, 2018
	Blasting Vibration	Damage to structures from blasting: 0.1884 in/sec PPV at 1Hz, 0.5 in/sec PPV at ~3Hz-40 Hz, 2.0 in/sec PPV 40Hz and above	ISEE, Caltrans

5.2 Project Construction

5.2.1 Construction Plan for the Seismic Retrofit Component

Construction activities would occur intermittently on the Project site and could expose sensitive receptors to temporary or extended duration increases in noise and vibration. Project construction also is anticipated to result in temporary increases in truck traffic noise along routes for hauling of material from borrow and stockpile areas, as well as along off-site roadways.

Construction equipment includes the use of air compressors, backhoes, concrete trucks, cranes, dump trucks, drum rollers, excavators, flatbed trucks, front end loaders, graders, pavers, tractors/dozers, conveyors, vibratory rollers, light carts, portable generators, rock crushers, and water trucks. Project construction activities would be completed using a combination of these types of off-road and portable construction equipment.

Each phase of construction was evaluated separately to identify the potential for impact from each phase with consideration of the factors identified above, specific to each geographic area. Overlapping construction activities were evaluated when activities would overlap in time in the same vicinity. Table 18 provides a brief summary of construction phases, equipment and activities identified in each phase, duration of each phase, and the noise-sensitive receptor areas potentially affected by each construction phase for the seismic retrofit. A more detailed summary of this information and information on the conservation measures construction plan can be found in Appendix 3.

Table 18. Noise Assessment by Seismic Retrofit Construction Phase

Year 1	Construction of haul roads and prepare stockpile areas, dredging at dam toe, and begin tunneling for the LLOW	9	Residences near Staging Areas 1-6 and Stockpile Area E, juvenile detention center, Holiday Lake Estates residences near Stockpile Area K, residences along truck routes
Year 2 (Stage 1a)	Construction of cofferdam, bypass pump system, excavation of upstream and downstream portals, tunnel excavation	12	Residences near Staging Areas 1, 4, Stockpile Area E, and excavation area; juvenile detention center; Holiday Lake Estates residences near Stockpile Area K; residences along truck routes
Year 3 (Stage 1b)	Excavation, demolish spillway, excavation and foundation preparation, HLOW tunnel excavation and lining, gate shaft excavation and lining	12	Residences near Staging Areas 1-4 and excavation area, juvenile detention center, Holiday Lake Estates residences near Stockpile Area K, residences along truck routes
Year 4	Hauling filler and drain material to site, excavation, fill, excavation and foundation preparation, construction of spillway structure, MEP installation, installation of water treatment system	12	Residences near Staging Areas 1-4 and excavation area, juvenile detention center, Holiday Lake Estates residences near Stockpile Area K, residences along truck routes
Year 5 (Stage 3a)	Hauling filler and drain material to site; excavation; fill; excavation, blasting, and hauling of material; construction of spillway structure, sloping intake structure, CIP tunnel; excavate downstream portal trench; downstream MEP installation, water treatment system	12	Residences near Staging Areas 1, 4; juvenile detention center; residences along Barnard Rd; western end of Holiday Lake estates; residences along truck routes
Year 6 (Stage 3b)	Hauling filler and drain material to site; excavation; construct bypass pump system; conveying bypass flows; fill; excavation, blasting, and hauling of material; excavate sloping intake structure; construct pipe supports, lining; MEP installation	12	Residences near Staging Areas 1, 4, and Stockpile Area E, juvenile detention center, residences along Barnard Rd residences near Stockpile Area K, western end of Holiday Lake estates, residences along truck routes
Year 7	Construction of concrete lined channel, restoring parking areas, construction of permanent access roads	10	Residences near Staging Areas 1-4 and excavation area, residences along truck routes

Construction activities would be conducted Monday through Saturday, with limited Sunday work. Sunday work would include up to 12 Sundays in Years 1 through 3, up to 40 Sundays in Year 4, and up to 12 Sundays in Years 5 through 7. Nighttime construction work could occur during excavation and fill of the dam, tunneling for outlet works, paving activities on Cochrane Road, construction of the spillway and conversion of the existing Stage 1 Diversion System into Stage 2 Diversion System, and support production. The nighttime work could occur during all seven years of construction.

5.2.2 Noise Analysis Approach

Noise emissions predicted to occur during construction of the proposed Project were predicted at the nearest sensitive receivers to the project site using the Computer Aided Noise Abatement (CadnaA) software (Datakustik, 2024). The CadnaA environmental noise prediction software enables complete noise modeling of complex facilities using sound propagation factors as adopted by International Organization for Standardization (i.e., ISO 9613, ISO 17534). CadnaA considers distance, topography, intervening structures, atmospheric attenuation, ground effects, and vegetation when estimating sound levels from specific sources at distant receptor locations.

The software tool allows for input of user-defined sound levels for noise sources such as construction equipment. Equipment estimated for each phase of construction were based on assumptions and equipment lists detailed in Appendix 3. Included are stationary or mostly stationary equipment such as generators, excavators, and drill rigs, and mobile equipment such as loaders, graders, and haul trucks. Source sound level data were estimated based on construction equipment noise data published by the U.S. Federal Highway Administration, the Federal Transit Administration, and manufacturers. Where sound data was not available, sound levels were estimated based on horsepower ratings. The construction equipment sound levels are shown in Table 19.

Table 19. Example Construction Equipment Noise Levels

Air Compressor	80
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pile-driver (Impact)	101
Pile-driver (Sonic)	95
Pneumatic Tool	85
Pump	77
Rail Saw	90
Rock Drill	95
Roller	85
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	84

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* September 2018.

Noise emissions from construction activities will vary depending on the type of equipment in use, how many pieces of equipment are operating at any one time, the proximity of equipment to a noise receptor location (i.e., mobile equipment can be moved around a construction site), and the duration of equipment use. In addition, some equipment or activities, such as a pile driving and jackhammering, generate “impulsive” noise emissions (i.e., impact noise). The assessment of construction noise impacts included consideration of these factors. Impacts from blasting are considered separately.

For the purposes of modeling noise from construction equipment and activities, representative noise sources were placed at representative geographic locations within each construction area. Equipment and activity locations were estimated based on the list of construction equipment by phase, activity, and work area plans provided by Valley Water.

Following the assessment of noise impacts, a review was completed of whether noise control measures (i.e., EIR mitigation measures) were warranted. The assessment of control measures was based on sound levels in exceedance of the applicable limits to construction noise and exceedance of applicable temporary or long-term increases over ambient noise levels.

5.2.3 Vibration Analysis Approach

Project-related construction vibration was evaluated using methods identified in the FTA guidance document. Except for pile-driving activities and blasting, groundborne vibration generated by most construction activities typically range from between approximately 0.003 PPV and 0.21 PPV, when measured at 25 feet from the source. Vibration levels for typical construction equipment are shown in Table 20.

Table 20. Example Vibration Source Levels for Construction Equipment

Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.17	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Notes:
* RMS velocity in decibels, VdB re 1 micro-in/sec.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* September 2018.

The calculated vibration levels at each receptor using the above methods were then compared to the impact levels in Table 3 and the structural damage thresholds in Table 4 as identified by the FTA. Construction vibration to receptors more than 500 feet from the edge of the construction sites were not considered. Groundborne vibration and groundborne noise dissipate rapidly over distance and would be minimal at distances greater than 500 feet.

5.2.4 Blasting Analysis Approach
Air overpressure and vibration from blasting at the residential receptor nearest to the Basalt Hill Borrow Area was evaluated using methods found in the ISEE Blasters' Handbook, 18th Edition. The significance thresholds for blasting identified in Table 17 were used as limits to calculate the maximum allowable charge per delay.

5.3 Post-Construction Operations and Maintenance
Operation of the Anderson Dam following construction of the Project would involve implementation of the Fish and Aquatic Habitat Collaborative Effort (FAHCE) rule curves and pulse flows, which would not result in generation of additional noise or vibration sources compared to the existing conditions baseline. Additionally, Valley Water would maintain the newly retrofitted Anderson Dam and Reservoir per Valley Water's existing Dam Maintenance Program (DMP). Maintenance of Anderson Dam facilities was previously evaluated in the Final DMP Environmental Impact Report (EIR) prepared in January 2012 (SCH No. 2011082077; Valley Water 2012). Operational stationary noise sources such as an emergency backup generator proposed at the Diversion Control Structure and air release valves at the LLOW Control Structure and gate shaft are compared to the noise environment under baseline conditions.

6. IMPACT ANALYSIS AND CONTROL MEASURES

6.1 Impact NOI-1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

6.1.1 Seismic Retrofit Construction

6.1.1.1 Analysis
ON-SITE ACTIVITY

To assess on-site construction noise levels, the activity or activities with the highest total noise levels (noise levels of all equipment for that activity) for each year were selected to represent worst-case scenarios for each year of construction. For similar activities across multiple years (e.g., dam excavation and fill activities from Year 2 to Year 6), the year with the loudest activity was selected. For example, Year 4 and Year 5 are not explicitly called out in the construction noise level tables (Table 21 through Table 25), as noise levels in those years are substantially similar to the noise levels in Year 6 given the similar construction activities. The resulting phases assessed were as follows:

- Year 1, Construction of Haul Roads and Preparation of Stockpile Areas, Begin Tunneling of LLOW
- Year 2, Excavation of Downstream Portal
- Year 3, Excavation and Foundation Preparation of Spillway, Construction of Tie-Back Wall at Cochrane Road
- Year 6, Dam Excavation and Fill

- Year 7, Restoration of Parking Areas and Construction of Permanent Access Roads

The results of our analysis using the CadnaA model are summarized in Table 21 through Table 25. Two receptors (R-33 and R-34) have been added to represent receptors at Rosendin Park for informational purposes. Because R-33 and R-34 do not represent occupied buildings, significance thresholds have not been assigned. Additional information regarding equipment noise levels and calculations is provided in Appendix 3.

Table 21. Seismic Retrofit Construction Equipment Noise Level Predictions, Year 1 Construction of Haul Roads and Preparation for Stockpile Areas, Begin Tunnelling of LLOW

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[3], DNL	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-1	61	57	62	71	No	61 / 35	80 / 50	No
R-2	50	68	68	60	Yes	72 / 34	80 / 50	No
R-3	61	71	71	71	No	71 / 35	80 / 50	No
R-4	54	69	69	64	Yes	74 / 38	80 / 50	No
R-5	54	66	67	64	Yes	73 / 39	80 / 50	No
R-6	54	61	62	64	No	68 / 41	80 / 50	No
R-7	54	58	60	64	No	65 / 42	80 / 50	No
R-8	49[2]	57	57	59	No	64 / 49	60[4] / 50	Yes
R-9	49[2]	52	54	59	No	58 / 50	60[4] / 50	Yes
R-10	45	34	45	55	No	41 / 33	80 / 50	No
R-11	46	40	47	56	No	46 / 43	80 / 50	No
R-12	48	36	48	58	No	42 / 40	80 / 50	No
R-13	50	37	50	60	No	46 / 39	80 / 50	No
R-31	49[2]	59	60	59	Yes	66 / 42	60[4] / 50	Yes
R-32	49[2]	58	58	59	No	64 / 43	60[4] / 50	Yes
R-33	49[2]	55	56	-	-	61 / 57	-	-
R-34	45	<30	45	-	-	35 / <30	-	-

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] Linear interpolation of ambient noise levels at SLM-4 and SLM-5.

[3] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[4] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime and any time on Sunday.

Table 22. Seismic Retrofit Construction Equipment Noise Level Predictions, Year 2 Excavation of Downstream Portal

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[3], DNL	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-1	61	61	64	71	No	62 / 62	80 / 50	Yes
R-2	50	70	70	60	Yes	67 / 67	80 / 50	Yes
R-3	61	70	71	71	No	67 / 67	80 / 50	Yes
R-4	54	71	71	64	Yes	70 / 70	80 / 50	Yes
R-5	54	68	68	64	Yes	69 / 69	80 / 50	Yes
R-6	54	69	69	64	Yes	70 / 70	80 / 50	Yes
R-7	54	68	68	64	Yes	69 / 69	80 / 50	Yes
R-8	49[2]	66	66	59	Yes	66 / 66	60[4] / 50	Yes
R-9	49[2]	58	58	59	No	58 / 58	60[4] / 50	Yes
R-10	45	34	45	55	No	35 / 35	80 / 50	No
R-11	46	<30	46	56	No	<30 / <30	80 / 50	No
R-12	48	<30	48	58	No	<30 / <30	80 / 50	No
R-13	50	<30	50	60	No	<30 / <30	80 / 50	No
R-31	49[2]	69	69	59	Yes	69 / 69	60[4] / 50	Yes
R-32	49[2]	72	72	59	Yes	74 / 74	60[4] / 50	Yes
R-33	49[2]	57	57	-	-	58 / 58	-	-
R-34	45	<30	45	-	-	<30 / <30	-	-

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] Linear interpolation of ambient noise levels at SLM-4 and SLM-5.

[3] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[4] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime and any time on Sunday.

Table 23. Seismic Retrofit Construction Equipment Noise Level Predictions, Year 3 Excavation and Foundation Preparation of Spillway, Construction of Tie-Back Wall at Cochrane Road

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[3], DNL	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-1	61	65	66	71	No	66 / 66	80 / 50	Yes
R-2	50	71	71	60	Yes	69 / 69	80 / 50	Yes
R-3	61	72	72	71	Yes	71 / 71	80 / 50	Yes
R-4	54	73	73	64	Yes	72 / 72	80 / 50	Yes
R-5	54	73	73	64	Yes	73 / 73	80 / 50	Yes
R-6	54	74	74	64	Yes	76 / 76	80 / 50	Yes
R-7	54	73	73	64	Yes	74 / 74	80 / 50	Yes
R-8	49[2]	73	73	59	Yes	75 / 75	60[4] / 50	Yes
R-9	49[2]	63	63	59	Yes	64 / 64	60[4] / 50	Yes
R-10	45	33	45	55	No	33 / 33	80 / 50	No
R-11	46	33	46	56	No	35 / 35	80 / 50	No
R-12	48	<30	48	58	No	<30 / <30	80 / 50	No
R-13	50	39	50	60	No	41 / 41	80 / 50	No
R-31	49[2]	74	74	59	Yes	75 / 75	60[4] / 50	Yes
R-32	49[2]	77	77	59	Yes	79 / 79	60[4] / 50	Yes
R-33	49[2]	64	64	-	-	66 / 66	-	-
R-34	45	32	45	-	-	33 / 33	-	-

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] Linear interpolation of ambient noise levels at SLM-4 and SLM-5.

[3] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[4] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime and any time on Sunday.

Table 24. Seismic Retrofit Construction Equipment Noise Level Predictions, Years 6 Dam Excavation and Fill

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[3], DNL	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-1	61	63	65	71	No	62 / 62	80 / 50	Yes
R-2	50	74	74	60	Yes	72 / 72	80 / 50	Yes
R-3	61	78	78	71	Yes	73 / 73	80 / 50	Yes
R-4	54	76	76	64	Yes	73 / 73	80 / 50	Yes
R-5	54	73	73	64	Yes	73 / 73	80 / 50	Yes
R-6	54	69	69	64	Yes	69 / 69	80 / 50	Yes
R-7	54	67	67	64	Yes	68 / 68	80 / 50	Yes
R-8	49[2]	64	64	59	Yes	65 / 65	60[4] / 50	Yes
R-9	49[2]	59	59	59	No	58 / 58	60[4] / 50	Yes
R-10	45	56	56	55	Yes	56 / 56	80 / 50	Yes
R-11	46	58	58	56	Yes	57 / 57	80 / 50	Yes
R-12	48	61	62	58	Yes	63 / 63	80 / 50	Yes
R-13	50	51	54	60	No	52 / 52	80 / 50	Yes
R-31	49[2]	68	68	59	Yes	68 / 68	60[4] / 50	Yes
R-32	49[2]	70	70	59	Yes	72 / 72	60[4] / 50	Yes
R-33	49[2]	67	67	-	-	66 / 66	-	-
R-34	45	45	47	-	-	43 / 43	-	-

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] Linear interpolation of ambient noise levels at SLM-4 and SLM-5.

[3] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[4] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime and any time on Sunday.

Table 25. Seismic Retrofit Construction Equipment Noise Level Predictions, Year 7 Restoration of Parking Areas and Construction of Permanent Access Roads

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[3], DNL	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-1	61	63	65	71	No	62 / 62	80 / 50	Yes
R-2	50	73	73	60	Yes	72 / 72	80 / 50	Yes
R-3	61	74	74	71	Yes	73 / 73	80 / 50	Yes
R-4	54	74	74	64	Yes	75 / 75	80 / 50	Yes
R-5	54	72	72	64	Yes	73 / 73	80 / 50	Yes
R-6	54	70	70	64	Yes	70 / 70	80 / 50	Yes
R-7	54	68	68	64	Yes	67 / 67	80 / 50	Yes
R-8	49[2]	68	68	59	Yes	67 / 67	60[4] / 50	Yes
R-9	49[2]	59	60	59	Yes	58 / 58	60[4] / 50	Yes
R-10	45	33	45	55	No	34 / 34	80 / 50	No
R-11	46	<30	46	56	No	<30 / <30	80 / 50	No
R-12	48	<30	48	58	No	<30 / <30	80 / 50	No
R-13	50	35	50	60	No	37 / 37	80 / 50	No
R-31	49[2]	69	69	59	Yes	69 / 69	60[4] / 50	Yes
R-32	49[2]	72	72	59	Yes	74 / 74	60[4] / 50	Yes
R-33	49[2]	65	65	-	-	66 / 66	-	-
R-34	45	32	45	-	-	33 / 33	-	-

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] Linear interpolation of ambient noise levels at SLM-4 and SLM-5.

[3] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[4] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime and any time on Sunday.

As shown in the tables above, the significance threshold based on a 10-dB increase in DNL above the existing ambient noise level would be exceeded at Receptors R-2, R-4, R-5, and R-31 during Year 1; at Receptors R-2, R-4 through R-8, R-31, and R-32 during Year 2; at Receptors R-2 through R-9, R-31, and R-32 during Year 3; at Receptors R-2 through R-8, R-10 through R-12, R-31, and R-32 during Year 6; and at Receptors R-2 through R-9, R-31, and R-32 during Year 7. The daytime hourly average noise level threshold of 80 dBA for receptors in Morgan Hill would not be exceeded, while the daytime hourly average noise level threshold of 60 dBA for residential receptors in unincorporated Santa Clara County would be exceeded at Receptors R-8, R-31, and R-32 in Year 1, Year 2, Year 6, and Year 7; and at Receptors R-8, R-9, R-31, and R-32 in Year 3. The nighttime hourly average noise level threshold of 50 dBA for all residential receptors would not be exceeded during Year 1. The threshold would be exceeded at Receptors R-1 through R-9, R-31, and R-32 during Year 2, Year 3, and Year 7, and at all residential receptors during Year 6. Sunday work would exceed the Santa Clara County Sunday residential threshold of 50 dBA at Receptors R8, R9, R31, and R-32 during Year 2, Year 3, Year 6, and Year 7.

OFF-SITE ACTIVITY

During construction, off-site noise sources consist of daily truck deliveries of rocks, aggregate, and soil to the Project site, shuttle bus trips for workers between Staging Area 5 and Staging Area 4, and worker vehicle trips to and from staging areas. Noise-sensitive receptors consist of residences near the road segments being used. Delivery of materials to the Project site is limited to the hours of 7:00am to 8:00pm.

An approximately 0.8-mile section of Cochrane Road between Malaguerra Avenue and Coyote Road would be fully or partially closed to through traffic during construction. Vehicles would be routed through a detour along Peet Road, Half Road, Elm Road, and East Main Road.

Predicted Project-related vehicle counts were compared to 2015 traffic data for the City of Morgan Hill (Morgan Hill, 2015). Changes in traffic along US 101 from Project-related traffic were assumed to be negligible. The estimated noise levels for Years 1, 3, and 6 are provided in Table 26 through Table 28. The years were chosen as Year 1 represents typical Project-related activity, Year 3 represents greatest nighttime worker activity (worker vehicle and shuttle bus trips), and Year 6 represents greatest daytime and nighttime truck activity.

The estimated noise levels include the following assumptions, which are generally conservative:

- 2015 Traffic Data
    - 90% of traffic occurs during the day (7:00am to 10:00pm)
    - 10% of traffic occurs at night (10:00pm to 7:00am)
    - 2015 traffic did not include any trucks, buses, or motorcycles
- Project Traffic
    - 100% of truck traffic occurs during the day (7:00 a.m. to 8:00 p.m)
    - The daily maximum estimates were used for analysis

In addition, the areas between US 101 and the Project site have seen significant development since 2015. A traffic study for the Project may yield higher traffic counts, and thus higher existing traffic noise.

Table 26. Off-Site Seismic Retrofit Construction Road Noise at 50 feet, Year 1

Route	Road Segment	Existing Non-Project Traffic, DNL	Overall with Project[1], DNL	Significance Threshold, DNL[4]	Exceed Threshold?
1a – Trucks and Worker Vehicles	Cochrane Rd – US 101 to Peet[2]	58	58	63	No
	Cochrane Rd – Peet to Curve	57	57	62	No
	Cochrane Rd – Malaguerra Curve to Staging Area 1	51	48	56	No
1b – Trucks and Worker Vehicles	Peet – Cochrane Rd to Half Rd	47	52	52	No[5]
	Half Rd – Peet to Cochrane Rd	36	49	41	Yes
	Cochrane Rd – Half Rd to Staging Area 4	45	51[3]	50	Yes
2 – Worker Vehicles to Staging Area 5	E Dunne Ave – US 101 to Hill Rd	61	62	64	No
	Hill Rd – E Dunne Ave to San Pedro Ave	56	56	61	No
3 – Shuttle Bus Route from Staging Area 5 to Staging Area 4	Hill Rd – Diana Ave to San Pedro Ave	56	56	61	No
	Hill Rd – E Main Ave to Diana Ave	55	55	60	No
	E Main Ave – Hill Rd to Cochrane Rd	45	49	50	No
	Cochrane Rd – E Main Ave to Half Rd	45	49	50	No

[1] Overall with Project is the cumulative level of Project Traffic plus Non-Project Traffic.

[2] This road segment is shared with Route 1b.

[3] Includes traffic noise from Project shuttle buses.

[4] Roadway vehicle noise impacts would be significant where such noise causes an increase of 5 dBA DNL where ambient noise levels are below 60 dBA DNL or causes an increase of 3 dBA DNL where ambient noise levels are 60 dBA DNL or greater.

[5] This result appears to be 5 dB or more above the ambient due to rounding

Table 27. Off-Site Seismic Retrofit Construction Road Noise at 50 feet, Year 3

Route	Road Segment	Non-Project Traffic, DNL	Overall with Project[1], DNL	Significance Threshold[4]	Exceed Threshold?
1a – Trucks and Worker Vehicles	Cochrane Rd – US 101 to Peet[2]	58	59	63	No
	Cochrane Rd – Peet to Curve	57	57	62	No
	Cochrane Rd – Malaguerra Curve to Staging Area 1	51	53	56	No
1b – Trucks and Worker Vehicles	Peet – Cochrane Rd to Half Rd	47	53	52	Yes
	Half Rd – Peet to Cochrane Rd	36	48	41	Yes
	Cochrane Rd – Half Rd to Staging Area 4	45	54[3]	50	Yes
2 – Worker Vehicles to Staging Area 5	E Dunne Ave – US 101 to Hill Rd	61	62	64	No
	Hill Rd – E Dunne Ave to San Pedro Ave	56	58	61	No
3 – Shuttle Bus Route from Staging Area 5 to Staging Area 4	Hill Rd – Diana Ave to San Pedro Ave	56	57	61	No
	Hill Rd – E Main Ave to Diana Ave	55	56	60	No
	E Main Ave – Hill Rd to Cochrane Rd	45	52	50	Yes
	Cochrane Rd – E Main Ave to Half Rd	45	52	50	Yes

[1] Overall with Project is the cumulative level of Project Traffic plus Non-Project Traffic.

[2] This road segment is shared with Route 1b.

[3] Includes traffic noise from Project shuttle buses.

[4] Roadway vehicle noise impacts would be significant where such noise causes an increase of 5 dBA DNL where ambient noise levels are below 60 dBA DNL or causes an increase of 3 dBA DNL where ambient noise levels are 60 dBA DNL or greater.

Table 28. Off-Site Seismic Retrofit Construction Road Noise at 50 feet, Year 6

Route	Road Segment	Non-Project Traffic, DNL	Overall with Project[1], DNL	Significance Threshold[4]	Exceed Threshold?
1a – Trucks and Worker Vehicles	Cochrane Rd – US 101 to Peet[2]	58	59	63	No
	Cochrane Rd – Peet to Curve	57	58	62	No
	Cochrane Rd – Malaguerra Curve to Staging Area 1	51	53	56	No
1b – Trucks and Worker Vehicles	Peet – Cochrane Rd to Half Rd	47	54	52	Yes
	Half Rd – Peet to Cochrane Rd	36	49	41	Yes
	Cochrane Rd – Half Rd to Staging Area 4	45	54[3]	50	Yes
2 – Worker Vehicles to Staging Area 5	E Dunne Ave – US 101 to Hill Rd	61	62	64	No
	Hill Rd – E Dunne Ave to San Pedro Ave	56	57	61	No
3 – Shuttle Bus Route from Staging Area 5 to Staging Area 4	Hill Rd – Diana Ave to San Pedro Ave	56	57	61	No
	Hill Rd – E Main Ave to Diana Ave	55	56	60	No
	E Main Ave – Hill Rd to Cochrane Rd	45	51	50	Yes
	Cochrane Rd – E Main Ave to Half Rd	45	51	50	Yes

[1] Overall with Project is the cumulative level of Project Traffic plus Non-Project Traffic.

[2] This road segment is shared with Route 1b.

[3] Includes traffic noise from Project shuttle buses.

[4] Roadway vehicle noise impacts would be significant where such noise causes an increase of 5 dBA DNL where ambient noise levels are below 60 dBA DNL or causes an increase of 3 dBA DNL where ambient noise levels are 60 dBA DNL or greater.

As shown in the tables above, there would be a significant impact during all 3 years for the road segments of Route 1b for worker vehicles and trucks. There would also be a significant impact from detour traffic along E Main Avenue between Hill Road and Cochrane Road and on Cochrane Road between E Maine Avenue and Half Road (Route 3). Finally, during Year 6 there is also a significant impact along the section of Cochrane Road closed to through traffic, mainly due to truck noise (Route 3).

6.1.1.2 Recommended Control Measures

ON-SITE AND OFF-SITE ACTIVITY

To reduce the impact of noise from on-site and off-site activity, the following control measures are recommended:

NOI-1 Implement Construction Noise Reduction Measures

Valley Water should include the following construction noise reduction measures in the Construction Management Plan:

- At least 30 days prior to the start of construction activities, all off-site businesses and residents within 500 feet of the Project Area will be notified of the planned construction activities. The notification will include a brief description of the Project, the activities that would occur, the hours when construction would occur, and the construction period's overall duration. The notification will include the telephone numbers of Valley Water's and the contractor's authorized representatives that are assigned to respond in the event of a noise complaint.
- At least 30 days prior to the start of construction activities, a sign will be posted at each construction site entrance, or other conspicuous location, that includes a 24-hour telephone number for project information, and a procedure in which a construction manager will respond to and investigate noise complaints and take corrective action, if necessary, in a timely manner. The sign will have a minimum dimension of 48 inches wide by 24 inches high with a one-inch minimum font height and will also include contact information for Valley Water staff. The sign will be placed five feet above ground level.
- If a construction noise complaint(s) is registered and if Valley Water or its contractor are not available to make noise measurements, Valley Water will retain a noise consultant to conduct noise measurements at the properties that registered the complaint. The noise measurements will be conducted for a minimum of one hour. Valley Water will prepare a letter report summarizing the measurements, calculation data used in determining impacts, and potential measures to reduce noise levels to the maximum extent feasible.
- Prior to the start of and for the duration of construction, the contractor will properly maintain and tune all construction equipment in accordance with the manufacturer's recommendations to minimize noise emissions.
- Prior to use of any construction equipment, the contractor will fit all equipment with properly operating mufflers, air intake silencers, and engine shrouds no less effective than as originally equipped by the manufacturer.
- Material hauling and deliveries will be coordinated by the construction contractor to reduce the potential of trucks waiting to unload for protracted periods of time.
- To the extent feasible, hydraulic equipment will be used instead of pneumatic impact tools, and electric powered equipment will be used instead of diesel-powered equipment.
- Stationary noise sources (e.g., generators) will be located as far from sensitive receptors as practicable, and they will be muffled and enclosed within temporary sheds, or insulation barriers.
- The use of bells, whistles, alarms, and horns will be restricted to safety warning purposes only.
- Signs will be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment will be turned off if not in use for more than two minutes. The construction manager will be responsible for enforcing this.

NOI-2 Implement Seismic Retrofit Construction Noise Reduction Measures

Valley Water and/or its contractor will implement the following noise mitigation measures as part of the Seismic Retrofit construction component:

- For Staging Area 1, as much as is feasible, limit activity of construction equipment within 300 feet of nearby residences.
- Install temporary noise barriers between Staging Area 1 and noise-sensitive receptors, as feasible. The barriers should be at least 12 feet high and have no cracks or gaps, except where access is required (e.g., options for noise barriers include field-constructed wood or masonry walls, manufactured noise curtains [e.g., Kinetics KBC], and semi-truck trailers) and provide a minimum noise reduction of 15 dBA.
- For track drill rigs, when they are not in a tunnel or shaft, install manufacturer-provided or third-party noise reduction systems, or install a sound barrier between the track drill rigs and noise-sensitive receptors to reduce noise levels to 86 dBA at 50 feet.
- Limit activity at Stockpile Areas K North and South to daytime (7:00am to 5:00pm) hours as feasible.
- To reduce off-site construction noise, the following measures should be implemented:
  - Route truck traffic and worker vehicles along Route 1a and avoid Route 1b to the extent feasible.
  - Temporarily reduce worker vehicle and truck speeds along E Main Avenue between Hill Road and Cochrane Road and on Cochrane Road between East Main Avenue and Half Road by 5 mph below the speed limit.
  - Reduce worker vehicle and truck speeds along the section of Cochrane Road closed to through traffic from the currently posted speed limit 45 mph to 35 mph.
- Prior to the start of construction, Valley Water will retain a qualified acoustical consultant to conduct construction noise monitoring during the nighttime work of Project construction at select locations in the surrounding community. The number and location of monitoring positions will be determined by Valley Water in consultation with the acoustical consultant. All sound level meters used during monitoring will satisfy the American National Standards Institute (ANSI) standard of Type 2 instrumentation or higher. All measurements shall be at least 5 feet above the ground and away from reflective surfaces. The noise monitoring data and results will be submitted in a memorandum to Valley Water on a weekly basis along with comparison to the 50 dBA L_{eq} nighttime construction noise limit. If exceedances of the construction noise limit are found, the construction contractor will modify construction techniques and equipment to reduce the construction noise below the 50 dBA L_{eq} limit, to the degree feasible.

6.1.2 Ogier Ponds Conservation Measure Construction

6.1.2.1 Analysis

ON-SITE ACTIVITY

To assess on-site construction noise levels, several phases were selected based on total noise levels, number of pieces of equipment, and proximity to noise-sensitive receptors to represent phases of greatest activity. The following phases were assessed:

- Construction of the Haul Roads and Preparation of Stockpile Areas (Year 6)
- Dewater Pond 1 (Year 6)
- Pond 1 Fill Borrow Hill Excavation (Year 6)
- Pond 1 Fill Import from Basalt Hill Excavation (Year 6)
- Spillway (Year 8)

For the purposes of noise modeling, locations of equipment were generally distributed around the site, with some sources concentrated at certain locations (e.g., dump trucks filling Pond 1). The results of our analysis using the CadnaA model are summarized in Table 29 through Table 33. Additional information regarding equipment noise levels and calculations is provided in Appendix 3.

Table 29. Ogier Ponds Conservation Measure Construction Equipment Noise Level Predictions, Construction of Haul Roads and Preparation of Stockpile Areas

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[2]	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-14	57	49	58	67	No	57 / -	80 / 50	No
R-15	57	59	61	67	No	66 / -	80 / 50	No
R-16	57	64	65	67	No	72 / -	80 / 50	No
R-17	57	63	64	67	No	71 / -	80 / 50	No
R-18	57	64	64	67	No	71 / -	80 / 50	No
R-19	57	62	63	67	No	70 / -	80 / 50	No
R-20	57	62	63	67	No	69 / -	60[3] / 50	Yes

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[3] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime.

Table 30. Ogier Ponds Conservation Measure Construction Equipment Noise Level Predictions, Dewater Pond 1

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[2]	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-14	57	44	57	67	No	51 / -	80 / 50	No
R-15	57	48	57	67	No	55 / -	80 / 50	No
R-16	57	52	58	67	No	59 / -	80 / 50	No
R-17	57	55	59	67	No	62 / -	80 / 50	No
R-18	57	58	61	67	No	65 / -	80 / 50	No
R-19	57	63	64	67	No	70 / -	80 / 50	No
R-20	57	64	65	67	No	71 / -	60[3] / 50	Yes

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[3] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime.

Table 31. Ogier Ponds Conservation Measure Construction Equipment Noise Level Predictions, Pond 1 Fill Borrow Hill Excavation

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[2]	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-5	54	51	56	64	No	57 / -	80 / 50	No
R-6	54	54	57	64	No	59 / -	80 / 50	No
R-7	54	56	58	64	No	61 / -	80 / 50	No
R-8	49	58	58	59	No	62 / -	60[3] / 50	Yes
R-9	49	50	52	59	No	56 / -	60[3] / 50	No

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[3] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime.

Table 32. Ogier Ponds Conservation Measure Construction Equipment Noise Level Predictions, Pond 1 Fill Import from Basalt Hill Excavation

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[2]	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-14	57	45	57	67	No	52 / -	80 / 50	No
R-15	57	55	59	67	No	63 / -	80 / 50	No
R-16	57	59	61	67	No	67 / -	80 / 50	No
R-17	57	62	63	67	No	69 / -	80 / 50	No
R-18	57	62	63	67	No	69 / -	80 / 50	No
R-19	57	62	63	67	No	69 / -	80 / 50	No
R-20	57	67	67	67	No	74 / -	60[3] / 50	Yes

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[3] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime.

Table 33. Ogier Ponds Conservation Measure Construction Equipment Noise Level Predictions, Spillway

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[2]	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-14	57	40	57	67	No	48 / -	80 / 50	No
R-15	57	52	58	67	No	61 / -	80 / 50	No
R-16	57	57	60	67	No	65 / -	80 / 50	No
R-17	57	61	62	67	No	69 / -	80 / 50	No
R-18	57	63	64	67	No	73 / -	80 / 50	No
R-19	57	66	66	67	No	75 / -	80 / 50	No
R-20	57	60	62	67	No	70 / -	60[3] / 50	Yes

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

[3] For noise-sensitive receptors located in unincorporated Santa Clara County, construction noise impacts would be significant if maximum hourly L_{AEQ} noise levels from stationary construction equipment noise exceed 60 dBA on weekdays and Saturdays during the daytime and 50 dBA during the nighttime.

As shown in the tables above, the significance threshold based on the existing ambient noise level would not be exceeded, while the significance threshold based on absolute construction noise levels was exceeded at R-20 during activities at Ogier Ponds and at R-8 during the Pond 1 Fill Borrow Hill Excavation.

OFF-SITE ACTIVITY

During construction, off-site noise sources consist primarily of daily truck deliveries of rocks, aggregate, and soil to the Ogier Ponds Conservation Measure site from the Basalt Hill Borrow Area, with worker vehicles traveling to and from the site also contributing. Noise-sensitive receptors consist of residences near the road segments being used.

Predicted Project-related vehicle counts were compared to 2015 traffic data for the City of Morgan Hill (Morgan Hill, 2015). Changes in traffic along US 101 from Project-related traffic were assumed to be negligible. The estimated noise levels for Year 6 Pond 1 Fill – Borrow Hill excavation, Year 6 Pond 1 Fill Import – Import from Basalt Hill Excavation, and Year 7 Import of materials from Holiday Lakes Estates Bench Excavation are provided in Table 34 through Table 36. The other phases of Ogier Ponds Conservation Measure work would result in fewer than one truck delivery per hour on average, which would have a less than significant impact.

Table 34. Ogier Ponds Conservation Measure Off-Site Construction Road Noise at 50 feet, Year 6, Pond 1 Fill – Borrow Hill Excavation

Road Segment	Non-Project Traffic, DNL	Overall with Project[1], DNL	Significance Threshold[2], DNL	Exceed Threshold?
Cochrane Rd – Staging Area 1 to Malaguerra	51	58	56	Yes
Cochrane Road – Malaguerra to Peet Rd	57	60	62	No
Cochrane Rd – Peet Rd to US 101	58	60	63	No
Cochrane Rd – US 101 to Monterey Hwy	63	64	66	No
Monterey Hwy – Cochrane Rd to Barnhart Ave	64	65	67	No

[1] Overall with Project is the cumulative level of Project Traffic plus Non-Project Traffic.

[2] Roadway vehicle noise impacts would be significant where such noise causes an increase of 5 dBA DNL where ambient noise levels are below 60 dBA DNL or causes an increase of 3 dBA DNL where ambient noise levels are 60 dBA DNL or greater

[3] To Ramboll's knowledge, traffic data for Barnhart Avenue is not available and therefore is not included.

Table 35. Ogier Ponds Conservation Measure Off-Site Construction Road Noise at 50 feet, Year 6, Pond 1 Fill – Import from Basalt Hill Excavation

Road Segment	Non-Project Traffic, DNL	Overall with Project[1], DNL	Significance Threshold[2], DNL	Exceed Threshold?
Cochrane Rd – Staging Area 1 to Malaguerra	51	55	56	No
Cochrane Road – Malaguerra to Peet Rd	57	59	62	No
Cochrane Rd – Peet Rd to US 101	58	59	63	No
Cochrane Rd – US 101 to Monterey Hwy	63	64	66	No
Monterey Hwy – Cochrane Rd to Barnhart Ave	64	65	67	No

[1] Overall with Project is the cumulative level of Project Traffic plus Non-Project Traffic.

[2] Roadway vehicle noise impacts would be significant where such noise causes an increase of 5 dBA DNL where ambient noise levels are below 60 dBA DNL or causes an increase of 3 dBA DNL where ambient noise levels are 60 dBA DNL or greater

[3] To Ramboll's knowledge, traffic data for Barnhart Avenue is not available and therefore is not included.

Table 36. Ogier Ponds Conservation Measure Off-Site Construction Road Noise at 50 feet, Year 7, Import and Sort Creek Materials from Bench Excavation

Road Segment	Non-Project Traffic, DNL	Overall with Project[1], DNL	Significance Threshold[2], DNL	Exceed Threshold?
Cochrane Rd – Staging Area 1 to Malaguerra	51	54	56	No
Cochrane Road – Malaguerra to Peet Rd	57	58	62	No
Cochrane Rd – Peet Rd to US 101	58	59	63	No
Cochrane Rd – US 101 to Monterey Hwy	63	63	66	No
Monterey Hwy – Cochrane Rd to Barnhart Ave	64	64	67	No

[1] Overall with Project is the cumulative level of Project Traffic plus Non-Project Traffic.

[2] Roadway vehicle noise impacts would be significant where such noise causes an increase of 5 dBA DNL where ambient noise levels are below 60 dBA DNL or causes an increase of 3 dBA DNL where ambient noise levels are 60 dBA DNL or greater

[3] To Ramboll's knowledge, traffic data for Barnhart Avenue is not available and therefore is not included.

6.1.2.2 Recommended Control Measures

ON-SITE ACTIVITY

To reduce the impact of noise from on-site and off-site activity, the following noise control measure is recommended:

NOI-3 Implement Ogier Ponds CM Construction Noise Reduction Measures

Valley Water and/or its contractor should implement the following noise mitigation measures as part of the Ogier Ponds CM construction component:

- Install temporary noise barriers between regions of significant activity and noise-sensitive receptors. The barriers will be at least 12 feet high and have no cracks or gaps, except where access is required (e.g., options for noise barriers include field-constructed wood or masonry walls, manufactured noise curtains [e.g., Kinetics KBC]), and semi-truck trailers) and provide a minimum noise reduction of 15 dBA.

6.1.3 Phase 2 Coyote Percolation Dam Conservation Measure Construction

6.1.3.1 Analysis

ON-SITE ACTIVITY

For the Phase 2 Coyote Percolation Dam Conservation Measure, areas of mobile equipment vibration for construction activity consist of work at the dam, the staging area, and the haul road between the dam and staging area. The results are summarized in Table 37 and Table 38.

Table 37. Phase 2 Coyote Percolation Dam Conservation Measure Construction Equipment Noise Level Predictions, Haul Roads & Preparation of Stockpile Areas

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-21	62	59	64	72	No	70 / -	80 / 50	No
R-22	62	59	64	72	No	69 / -	80 / 50	No
R-23	64	63	66	74	No	73 / -	80 / 50	No
R-24	64	61	66	74	No	72 / -	80 / 50	No
R-25	64	57	65	74	No	67 / -	80 / 50	No

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

Table 38. Phase 2 Coyote Percolation Dam Conservation Measure Construction Equipment Noise Level Predictions, Roughened Ramp

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-21	62	62	65	72	No	69 / -	80 / 50	No
R-22	62	52	62	72	No	60 / -	80 / 50	No
R-23	64	55	64	74	No	63 / -	80 / 50	No
R-24	64	50	64	74	No	58 / -	80 / 50	No
R-25	64	44	64	74	No	52 / -	80 / 50	No

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

As shown in the tables above, the significance thresholds are not exceeded at the nearest sensitive receptors. Therefore, noise from construction activity for Phase 2 Coyote Percolation Dam Conservation Measure would have a less than significant impact.

OFF-SITE ACTIVITY

Haul trips and worker trips related to construction of the Phase 2 Coyote Percolation Dam CM would involve access to the site from Metcalf Road using an access road and would not be routed through the local neighborhoods. Traffic increases along Metcalf Road and Monterey Road would be minimal compared to existing traffic. Therefore, off-site construction noise impacts related to Phase 2 Coyote Percolation Dam CM would be less than significant.

6.1.4 Sediment Augmentation Program Construction

6.1.4.1 Analysis

ON-SITE ACTIVITY

The Sediment Augmentation Program along Coyote Creek would take place after completion of ADSRP construction (assumed to occur in Year 8) within the Live Oak Restoration Reach. The nearest sensitive receptors is the William James Boys Ranch. The results of the analysis are summarized in Table 39. Sediment Augmentation Program Construction Equipment Noise Level Predictions, Activity Near Cochrane Road and Malaguerra Ave

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project1, DNL	Significance Threshold2, DNL	Exceed Threshold?	Project Construction, Max 1-hr LAEQ Day / Night	Significance Threshold, Day / Night	E Thr
R-3	61	61	64	71	No	64 / -	80 / 50	
R-2	50	67	67	60	Yes	70 / -	80 / 50	
R-1	61	55	62	71	No	58 / -	80 / 50	
R-26	50	55	56	60	No	62 / -	80 / 50	
R-27	50	53	55	60	No	59 / -	80 / 50	
R-28	57	52	58	67	No	59 / -	80 / 50	
R-29	57	45	57	67	No	52 / -	80 / 50	
R-30	57	<30	57	67	No	35 / -	80 / 50	
R-18	57	<30	57	67	No	<30 / -	80 / 50	
R-17	57	<30	57	67	No	<30 / -	80 / 50	
R-16	57	<30	57	67	No	<30 / -	80 / 50	

1 Overall with Project is the cumulative level of Project construction plus ambient levels.

2 A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

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Table 39. Sediment Augmentation Program Construction Equipment Noise Level Predictions, Activity Near Cochrane Road and Malaguerra Ave

Noise-Sensitive Receptor	Ambient, DNL	Project Construction, DNL	Overall with Project[1], DNL	Significance Threshold[2], DNL	Exceed Threshold?	Project Construction, Max 1-hr L_{AEQ} Day / Night	Significance Threshold, Day / Night	Exceed Threshold?
R-3	61	61	64	71	No	64 / -	80 / 50	No
R-2	50	67	67	60	Yes	70 / -	80 / 50	No
R-1	61	55	62	71	No	58 / -	80 / 50	No
R-26	50	55	56	60	No	62 / -	80 / 50	No
R-27	50	53	55	60	No	59 / -	80 / 50	No
R-28	57	52	58	67	No	59 / -	80 / 50	No
R-29	57	45	57	67	No	52 / -	80 / 50	No
R-30	57	<30	57	67	No	35 / -	80 / 50	No
R-18	57	<30	57	67	No	<30 / -	80 / 50	No
R-17	57	<30	57	67	No	<30 / -	80 / 50	No
R-16	57	<30	57	67	No	<30 / -	80 / 50	No

[1] Overall with Project is the cumulative level of Project construction plus ambient levels.

[2] A significance threshold of 10 dBA over ambient is used for assessing on-site construction equipment noise.

The results show that the noise impact at most sensitive receptors will be less than significant. The exception is one receptor (R-2) near Staging Area 1, where the significance threshold based on the existing ambient noise level was exceeded.

OFF-SITE ACTIVITY

Haul trips and worker trips related to construction of the Sediment Augmentation Program would be minimal. Therefore, off-site construction noise impacts related to the Sediment Augmentation Program would be less than significant.

6.1.4.2 Recommended Control Measures

To reduce noise levels at sensitive receptors around the Sediment Augmentation Program, Implementation of noise control measure NOI-1 above is recommended.

6.1.5 Maintenance of the North Channel Reach and Live Oak Restoration Reach

Maintenance of the North Channel Reach and Live Oak Restoration Reach would be downstream of the existing Anderson Dam outlet structure and would primarily involve minor and intermittent maintenance activities including vegetation management, replacement plantings, and gravel placement. The work would coincide with the seismic retrofit construction and would be significantly smaller in scale. As a result, the noise analysis and control measures for the seismic retrofit construction would also apply to Maintenance of the North Channel Reach and Live Oak Restoration Reach. Therefore, no additional noise analysis has been conducted specific to Maintenance of the North Channel Reach and Live Oak Restoration Reach.

6.1.6 Operations and Maintenance

As discussed in Section 5.3, post-construction operations and maintenance of the Anderson Dam Facilities and Conservation Measures, as well as ADSRP and FAHCE Adaptive Management Program, would result in negligible sources of noise. A diesel generator is proposed at the new outlet works which would replace an existing diesel generator in the same general area north of Via Sebastian. Noise from the proposed generator would generate similar noise levels to the existing generator due to occasional testing and in the case of power loss. In addition, air release valves are proposed at the LLOW, which would intermittently generate noise. However, noise from the air release valves is anticipated to be similar to noise levels generated by the existing AMF facility air release valves, which would be replaced with the Project. The existing facility and proposed facility are located in the same general area north of Cochrane Road. Finally, the gateshaft located at northern end of the top of the dam would potentially produce noise from the infrequent release of water during water level events. However, at a distance of approximately 1,000 feet from the nearest residences south of Cochrane Road, noise levels would not be significant. Therefore, operational noise impacts would be less than significant, and no mitigation is required.

6.1.7 Combined Impacts from Project Multiple Project Components

Based on our analysis, combined noise impacts from multiple project components are not expected. While some of the work for various areas will occur simultaneously, the project components are geographically separated, and phases with greater activity and greater associated noise are not expected to overlap in such a way as to result in a significant impact.

6.2 Impact NOI-2: Generation of excessive groundborne vibration or groundborne noise levels?

6.2.1 Seismic Retrofit Construction

6.2.1.1 Analysis

ON-SITE ACTIVITY

Vibration from construction equipment was considered activity areas within 500 feet of any sensitive receptors. The following activity areas were more 500 feet from any sensitive receptors, and therefore were not considered:

- Basalt Hill Borrow Area (BHBA)
- Coffer Dam
- Dredging
- Packwood Gravel Borrow Area
- Reservoir Disposal Area
- Spillway
- Boat ramp parking area
- Dam toe parking area
- Staging Area 3
- Stockpile Area B
- Stockpile Area C
- Stockpile Area H
- Stockpile Area L
- Stockpile Area M

The results of our analysis for construction activity areas within 500 feet of sensitive receptors, based on FTA calculation guidelines, are summarized in Table 40. For a more detailed analysis of vibration for each piece of equipment at each activity area, see Appendix 4.

Table 40. On-Site Seismic Retrofit Construction Equipment Vibration

Receptor	Activity Area	Distance	Maximum Vibration			Significance Thresholds		Exceed Structural Damage Threshold?	Exceed Indoor Impact Threshold?
			Amplitude (PPV, in/sec)	Level (VdB)	Source	Structural Damage (PPV, in/sec)	Indoor Impact (VdB)		
R-6	Excavation	480	0.002	56	Padfoot roller	0.2	72	No	No
	Staging Area 4	340	0.004	60	Road-header	0.2	72	No	No
R-1	Staging Area 4	270	0.006	63	Padfoot roller	0.2	72	No	No
R-4	Staging Area 1	180	0.011	69	Padfoot roller	0.2	72	No	No
	Stockpile Area E	290	0.005	62	Padfoot roller	0.2	72	No	No
R-2	Staging Area 1	120	0.020	74	Padfoot roller	0.2	72	No	Yes
	Stockpile Area E	250	0.007	64	Padfoot roller	0.2	72	No	No
Nearby Vineyard	Staging Area 2	180	0.005	61	Loader	0.2	75	No	No
R-11	Stockpile Area K - North	320	0.005	61	Padfoot roller	0.2	72	No	No
R-12	Stockpile Area K - South	310	0.005	62	Padfoot roller	0.2	72	No	No
R-32	Staging Area 4	110	0.023	75	Padfoot roller	0.2	72	No	Yes

As shown in Table 40, the only locations with a significant impact are R-2 and R-32, where the indoor impact was exceeded by 2 VdB and 3 VdB, respectively.

OFF-SITE ACTIVITY

Off-site vibration sources consist of haul trucks, worker vehicles, and bus shuttles traveling to and from the site. The most significant vibration would come from the trucks. However, according to FTA's Transit Noise and Vibration Impact Assessment Manual, vibration from trucks along roadways is unlikely to be perceptible, even if the receptor is close to a major roadway (FTA, 2018).

GROUNDBORNE NOISE

For typical construction activity, airborne noise levels are much higher than groundborne noise levels. According to the FTA's Transit Noise and Vibration Impact Assessment Manual, groundborne noise is typically only an issue for underground activity where there is no airborne noise path or for buildings with significant sound insulation such as recording studios (FTA, 2018). As a result, groundborne noise is not considered further.

6.2.1.2 Recommended Control Measures

To reduce vibration at nearby sensitive receptors, we recommend implementing the following control measure:

NOI-4 Seismic Retrofit and Sediment Augmentation Program Construction Vibration Reduction

Valley Water and/or its contractor should implement the following vibration mitigation measures for the Seismic Retrofit and Sediment Augmentation Program construction:

- Use of oscillatory or static rollers (which maintains constant contact with the ground) in lieu of vibratory rollers (which lifts off and pounds the ground) for compaction near residential structures (within 150 feet).

6.2.2 Ogier Ponds Conservation Measure

6.2.2.1 Analysis

ON-SITE ACTIVITY

The area of activity comprising the Ogier Ponds Conservation Measure work borders the properties of several sensitive receptors. The analysis compares vibration of individual pieces of equipment at an 80-foot setback from vibration-sensitive receptors. A summary of the results is provided in Table 41.

Table 41. On-Site Construction Equipment Vibration – Ogier Ponds Conservation Measure

Description	Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Long-reach excavator	Bulldozer	Tamping foot roller	Concrete pump truck	Bobcat	Manlift	Crane 150t	Concrete vibrator	Silent Pile Driver*	Threshold
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.089	0.076	0.076	0.089	0.089	0.089	0.076	0.003	0.003	0.008	0.035	0.091	--
Structural Damage	80	0.001	0.016	0.016	0.016	0.016	0.013	0.013	0.016	0.016	0.016	0.013	0.001	0.001	0.001	0.006	0.016	0.2
FTA Reference Vibration	25	58	87	87	87	87	86	86	87	87	87	86	58	58	66	79	87	--
Indoor Vibration	80	42	72	72	72	72	70	70	72	72	72	70	42	42	51	64	72	72

* Source: Leung, et al., *Noise and Vibration Monitoring for Silent Piling in Singapore*, 2018.

As shown in Table 41, there would be no exceedance of the structural damage threshold or the indoor threshold for buildings 80 feet or further from the construction activity. Because construction activity at Ogier Ponds would be at least 80 feet from sensitive receptors, the thresholds would not be exceeded.

OFF-SITE ACTIVITY

Off-site vibration sources consist of haul trucks and worker vehicles traveling to and from the site. The most significant vibration would come from the trucks. However, according to FTA's Transit Noise and Vibration Impact Assessment Manual, vibration from trucks along roadways is unlikely to be perceptible, even if the receptor is close to a major roadway (FTA, 2018).

GROUNDBORNE NOISE

For typical construction activity, airborne noise levels are much higher than groundborne noise levels. According to the FTA's Transit Noise and Vibration Impact Assessment Manual, groundborne noise is typically only an issue for underground activity where there is no airborne noise path or for buildings with significant sound insulation such as recording studios (FTA, 2018). As a result, groundborne noise is not considered further.

6.2.3 Phase 2 Coyote Percolation Dam Conservation Measure

6.2.3.1 Analysis

For the Phase 2 Coyote Percolation Dam Conservation Measure, areas of mobile equipment vibration for construction activity consist of work at the dam, the staging area, and the haul road between the dam and staging area. Both the haul road and the staging area are more than 500 feet from the nearest sensitive receptor; therefore, analysis was limited to work at the percolation dam. A summary of the results is provided in Table 42 and Table 43.

Table 42. On-Site Construction Equipment Vibration, Structural Damage – Phase 2 Coyote Percolation Dam Conservation Measure

Description	Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Small backhoe	Track drill rig	Articulated dump truck	Water truck	Bulldozer	Long-reach excavator	Bobcat	Threshold (PPV, in/sec)	Exceed Threshold?
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.003	0.089	0.076	0.076	0.089	0.089	0.003	--	--
R-21	350	0.000	0.002	0.002	0.002	0.000	0.002	0.001	0.001	0.002	0.002	0.000	0.2	No

Table 43. On-Site Construction Equipment Vibration, Indoor Impact – Phase 2 Coyote Percolation Dam Conservation Measure

Description	Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Small backhoe	Track drill rig	Articulated dump truck	Water truck	Bulldozer	Long-reach excavator	Bobcat	Threshold (VdB)	Exceed Threshold?
FTA Reference Vibration	25	58	87	87	87	58	87	86	86	87	87	58	--	--
R-21	350	23	53	53	53	23	53	51	51	53	53	23	72	No

As shown in the tables above, the significance thresholds are not exceeded at the nearest sensitive receptor. Therefore, no control measures are needed.

GROUNDBORNE NOISE

For typical construction activity, airborne noise levels are much higher than groundborne noise levels. According to the FTA's Transit Noise and Vibration Impact Assessment Manual, groundborne noise is typically only an issue for underground activity where there is no airborne noise path or for buildings with significant sound insulation such as recording studios (FTA, 2018). As a result, groundborne noise is not considered further.

6.2.4 Sediment Augmentation Program

6.2.4.1 Analysis

A discussion of the areas of activity and assumptions can be found in Section 6.1.4.1. A summary of the vibration analysis results is provided in Table 44 and Table 45.

Table 44. On-Site Construction Equipment Vibration, Structural Damage – Sediment Augmentation Program

Description	Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Articulated dump truck	Water truck	Threshold (PPV, in/sec)	Exceed Threshold?
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.076	0.076	--	--
R-2	60	0.001	0.024	0.024	0.024	0.020	0.020	0.2	No
R-3	340	0.000	0.002	0.002	0.002	0.002	0.002	0.2	No
Malaguerra Ave Residence	80	0.001	0.016	0.016	0.016	0.013	0.013	0.2	No
Morning Star Dr Residence	155	0.000	0.006	0.006	0.006	0.005	0.005	0.2	No
Eagle View Dr Residence	275	0.000	0.002	0.002	0.002	0.002	0.002	0.2	No
Coyote Creek Visitor Center at Anderson Lake	145	0.000	0.006	0.006	0.006	0.005	0.005	0.2	No

Table 45. On-Site Construction Equipment Vibration, Indoor Impact – Sediment Augmentation Program

Description	Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Articulated dump truck	Water truck	Threshold (VdB)	Exceed Threshold?
FTA Reference Vibration	25	58	87	87	87	86	86	--	--
R-2	60	46	76	76	76	74	74	72	Yes
R-3	340	23	53	53	53	52	52	72	No
Malaguerra Ave Residence	80	42	72	72	72	70	70	72	No
Morning Star Dr Residence	155	34	63	63	63	62	62	72	No
Eagle View Dr Residence	275	26	56	56	56	54	54	72	No
Coyote Creek Visitor Center at Anderson Lake	145	35	64	64	64	63	63	75	No

As shown in Table 44, there is no risk of structural damage to any of the sensitive receptors. However, Table 45 shows that the threshold for indoor vibration is exceeded at receptor R-2.

GROUNDBORNE NOISE

For typical construction activity, airborne noise levels are much higher than groundborne noise levels. According to the FTA's Transit Noise and Vibration Impact Assessment Manual, groundborne noise is typically only an issue for underground activity where there is no airborne noise path or for buildings with significant sound insulation such as recording studios (FTA, 2018). As a result, groundborne noise is not considered further.

6.2.4.2 Recommended Control Measures

To reduce vibration at receptor R-2 during the Sediment Augmentation Program, implementation of control measure NOI-4 above is recommended.

6.2.5 Maintenance of the North Channel Reach and Live Oak Restoration Reach

Maintenance of the North Channel Reach and Live Oak Restoration Reach would be downstream of the existing Anderson Dam outlet structure and would primarily involve minor and intermittent maintenance activities including vegetation management, replacement plantings, and gravel placement. The work would coincide with the seismic retrofit construction and would be significantly smaller in scale. As a result, the vibration analysis and control measures for the seismic retrofit construction would also apply to Maintenance of the North Channel Reach and Live Oak Restoration Reach. Therefore, no additional vibration analysis has been conducted specific to Maintenance of the North Channel Reach or Live Oak Restoration Reach.

6.2.6 Combined Impacts from Multiple Project Components

Based on our analysis, combined vibration impacts from multiple project components are not expected. While some of the work for various areas will occur simultaneously, the project components are geographically separated, and phases with greater activity and greater associated vibration are not expected to overlap in such a way as to result in a significant impact.

6.3 Blasting Air Overpressure and Vibration

This section discusses potential impacts from blasting overpressure and vibration. It has been separated from the sections above for two reasons. Firstly, blasting as a source of noise and vibration is unique in terms of its energy, in particular low frequency energy. Secondly, the purpose of the analysis was to determine the upper limit for charge weight per delay based on recommended thresholds, rather than assessing potential impacts from a given charge weight per delay.

6.3.1 Blasting Plan

Blasting would take place at the Basalt Hill Borrow Area. The area was previously used to construct the upstream shell of the dam during its original construction in the early 1950s. The floor of the borrow area is currently a parking lot.

Material obtained from blasting will be used for the replacement dam. Blasting will be restricted to the hours of 8:00am to 5:00pm. The approximate extent of blasting activity is shown in Figure 6.1.

Figure 6.1. Basalt Hill Borrow Area Blasting Overview

The nearest sensitive receptor is a residence located at 18051 Barnard Road. The minimum slant distance between the edge of the blasting area and the nearest sensitive receptor is approximately 240 feet.

6.3.2 Analysis

Based on the distance to the nearest receptor of 240 feet, then the maximum loading to not exceed the vibration threshold of 0.1884 in/sec PPV is 7.5 pounds (lb). TNTe per delay (~3.4 kg). If the blasting does not generate significant energy below 3Hz, then the maximum loading to not exceed the vibration threshold of 0.5 in/sec PPV is 25.4 lb. TNTe per delay (~11.5 kg). For the air overpressure threshold of 133 dBL, the maximum loading is 98 lb. TNTe per delay (~45 kg). The allowable explosive loading in lb. TNTe per delay should be converted to explosive material used on the project, using the published relative effectiveness factor (R.E. factor). The calculations can be found in Appendix 5.

The analysis above is for the distance between the edge of the blasting area and the closest sensitive receptor. At greater distances, the limit in charge weight per delay would increase. However, additional analysis would be required to determine the limits at other distances. The analysis assumes a proper drilling pattern and sequential initiation sequence so that wave reinforcement does not occur.

6.3.3 Limitations

Please note that the assessment above is based on limited information available regarding blasting activity at the Basalt Hill Borrow Area. Further, the criteria used are related to structural damage, including cosmetic damage, but do not address the annoyance or complaints from people living near the blasting area. The extent of annoyance and complaints is influenced by many factors, including sociological factors and individuals' varying sensitivities.

Monitoring of vibration and air overpressure should be conducted during blasting. The field measurement results should be used to adjust the blast loading limits.

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APPENDIX 1 – ANALYSIS METHODS

INTRODUCTION

This appendix summarizes the noise and vibration analysis and methodology for the Anderson Dam Seismic Retrofit Project (ADSRP) and associated conservation measures. Analysis included an ambient sound level survey and evaluation of potential noise and vibration impacts from on-site construction and off-site traffic related to construction.

EXISTING NOISE ENVIRONMENT

Section 4.3 provides a summary of the ambient noise survey, including measurement procedures. Hourly ambient noise levels are provided in Appendix 2.

ENVIRONMENTAL NOISE ANALYSIS

Potential noise emissions from on-site construction and off-site traffic related to construction were analyzed using specialized software (Computer Aided Noise Abatement (CadnaA) model, Build 189.5221). CadnaA enables analysis of environmental noise emissions using sound propagation factors as adopted by International Organization for Standardization (i.e., ISO 9613, ISO 17534). CadnaA considers distance, topography, intervening structures, atmospheric attenuation, ground effects, and vegetation when estimating sound levels from specific sources at distant receptor locations. On-site and off-site truck sound levels were analyzed based on the traffic sound levels and methodologies inherent in CadnaA's FHWA TNM module. The analysis was developed using the following steps:

- Collect sound data for all noise sources to be included in the analysis. Sound data for most construction noise sources was obtained from the FHWA and FTA. Other sound data was obtained from manufacturer cutsheets, reports for other projects, or were estimated based on horsepower rating of the equipment.
- Create a 3-dimensional map of the project site and surrounding area. Elevation data is based on the US National Elevation Dataset (NED) and bathymetry data provided by Horizon Water and Environment.
- Build equipment noise sources in the model based on the project construction areas (e.g., BHBA, staging areas, stockpile areas) and phasing and assign the appropriate sound level to each source.
- Create point source receivers in the 3-dimensional model representing the nearest noise-sensitive receptors to each area of construction.
- Calculate the sound levels to the noise-sensitive receptors.

Details regarding construction noise sources are provided in Appendix 3.

VIBRATION ANALYSIS

Groundborne vibration from construction was analyzed based on the FTA's Transit Noise and Vibration Impact Assessment. For the ADSRP analysis, the reference vibration amplitudes and analysis are provided in Appendix 4. For the conservation measures areas, the reference vibration amplitudes and analysis are given in the results tables in the body of the report.

Vibration amplitudes at each sensitive receptor were calculated for each piece of equipment using the reference vibration data and the following equation:

$$PPV_{equip} = PPV_{ref}\left(\frac{25}{D}\right)^{1.5}$$

where PPV_{equip} is the peak particle velocity of the equipment at the receptor, in/sec, PPV_{ref} is the source reference vibration amplitude at 25 feet, and *D* is the distance from the equipment to the receptor in feet.

BLASTING ANALYSIS

Groundborne vibration and air overpressure from blasting activity were analyzed based on the ISEE's Blasters' Handbook, 18th Edition. The calculations are provided in Appendix 5.

APPENDIX 2 – AMBIENT SOUND LEVEL SURVEY RESULTS

Table A- 1. SLM-1 Hourly Sound Levels

2022-06-15	06:24:58	00:35:01.1	54	66	57	55	47	44	43
2022-06-15	07:00:00	01:00:00.0	45	54	51	48	43	40	39
2022-06-15	08:00:00	01:00:00.0	46	56	51	49	42	39	38
2022-06-15	09:00:00	01:00:00.0	45	54	50	48	40	38	37
2022-06-15	10:00:00	01:00:00.0	48	57	53	50	45	41	39
2022-06-15	11:00:00	01:00:00.0	46	55	52	49	42	39	38
2022-06-15	12:00:00	01:00:00.0	46	54	51	49	42	38	37
2022-06-15	13:00:00	01:00:00.0	46	56	50	48	43	40	39
2022-06-15	14:00:00	01:00:00.0	49	57	51	49	44	41	39
2022-06-15	15:00:00	01:00:00.0	49	56	53	51	47	44	42
2022-06-15	16:00:00	01:00:00.0	51	58	55	53	50	46	44
2022-06-15	17:00:00	01:00:00.0	49	57	53	52	47	44	42
2022-06-15	18:00:00	01:00:00.0	48	56	51	50	46	43	41
2022-06-15	19:00:00	01:00:00.0	47	54	51	50	45	42	40
2022-06-15	20:00:00	01:00:00.0	46	55	49	47	44	42	40
2022-06-15	21:00:00	01:00:00.0	44	50	47	46	43	41	40
2022-06-15	22:00:00	01:00:00.0	44	53	48	45	41	39	38
2022-06-15	23:00:00	01:00:00.0	41	51	43	41	38	37	36
2022-06-16	00:00:00	01:00:00.0	38	43	40	39	37	36	35
2022-06-16	01:00:00	01:00:00.0	38	41	40	39	37	36	36
2022-06-16	02:00:00	01:00:00.0	39	45	42	41	38	36	36
2022-06-16	03:00:00	01:00:00.0	39	44	41	40	38	37	36
2022-06-16	04:00:00	01:00:00.0	42	46	43	43	41	39	38
2022-06-16	05:00:00	01:00:00.0	45	54	49	46	43	41	40
2022-06-16	06:00:00	01:00:00.0	47	56	52	49	44	43	42
2022-06-16	07:00:00	01:00:00.0	47	57	52	49	42	40	39
2022-06-16	08:00:00	00:29:10.9	46	55	50	48	42	40	39

Table A- 2. SLM-2 Hourly Sound Levels

2022-06-16	09:13:09	00:46:50.4	61	72	67	64	54	48	47
2022-06-16	10:00:00	01:00:00.0	60	71	66	63	53	48	47
2022-06-16	11:00:00	01:00:00.0	61	72	66	63	53	49	47

2022-06-16	12:00:00	01:00:00.0	61	72	67	64	54	49	47
2022-06-16	13:00:00	01:00:00.0	59	69	65	62	52	48	47
2022-06-16	14:00:00	01:00:00.0	61	72	68	65	55	48	47
2022-06-16	15:00:00	01:00:00.0	59	70	65	62	52	48	47
2022-06-16	16:00:00	01:00:00.0	67	72	66	63	53	48	47
2022-06-16	17:00:00	01:00:00.0	59	68	65	62	54	49	47
2022-06-16	18:00:00	01:00:00.0	58	69	64	62	53	49	47
2022-06-16	19:00:00	01:00:00.0	57	67	63	60	52	48	47
2022-06-16	20:00:00	01:00:00.0	57	68	63	60	50	48	46
2022-06-16	21:00:00	01:00:00.0	57	67	60	57	48	46	46
2022-06-16	22:00:00	01:00:00.0	54	65	58	55	47	46	45
2022-06-16	23:00:00	01:00:00.0	51	63	55	50	46	45	45
2022-06-17	00:00:00	01:00:00.0	48	58	47	46	45	45	45
2022-06-17	01:00:00	01:00:00.0	46	48	46	46	45	45	45
2022-06-17	02:00:00	01:00:00.0	46	49	46	46	45	45	45
2022-06-17	03:00:00	01:00:00.0	50	60	47	46	46	45	45
2022-06-17	04:00:00	01:00:00.0	47	51	47	47	46	45	45
2022-06-17	05:00:00	01:00:00.0	53	64	57	53	47	46	46
2022-06-17	06:00:00	01:00:00.0	59	70	64	61	50	47	46
2022-06-17	07:00:00	01:00:00.0	59	70	65	62	51	47	46
2022-06-17	08:00:00	01:00:00.0	61	71	67	64	55	48	46
2022-06-17	09:00:00	01:00:00.0	61	71	67	64	54	47	46
2022-06-17	10:00:00	00:02:15.2	60	70	67	64	54	47	46

Table A- 3. SLM-3 Hourly Sound Levels

2022-06-16	09:54:30	00:05:29.4	57	68	62	58	49	45	44
2022-06-16	10:00:00	01:00:00.0	50	61	54	51	47	45	43
2022-06-16	11:00:00	01:00:00.0	50	57	54	52	48	45	43
2022-06-16	12:00:00	01:00:00.0	49	56	53	51	47	45	43
2022-06-16	13:00:00	01:00:00.0	48	56	52	50	47	45	43
2022-06-16	14:00:00	01:00:00.0	48	55	52	50	47	44	42
2022-06-16	15:00:00	01:00:00.0	51	59	53	51	47	44	42
2022-06-16	16:00:00	01:00:00.0	48	56	53	51	47	43	41
2022-06-16	17:00:00	01:00:00.0	49	56	53	52	47	43	41
2022-06-16	18:00:00	01:00:00.0	48	56	53	51	46	42	40

2022-06-16	19:00:00	01:00:00.0	47	55	52	50	45	41	40
2022-06-16	20:00:00	01:00:00.0	45	53	49	48	43	40	39
2022-06-16	21:00:00	01:00:00.0	43	55	46	44	40	39	38
2022-06-16	22:00:00	01:00:00.0	42	50	45	43	40	39	38
2022-06-16	23:00:00	01:00:00.0	41	48	44	43	40	38	38
2022-06-17	00:00:00	01:00:00.0	39	44	42	41	38	37	37
2022-06-17	01:00:00	01:00:00.0	39	43	41	40	38	37	37
2022-06-17	02:00:00	01:00:00.0	39	45	42	41	38	37	37
2022-06-17	03:00:00	01:00:00.0	39	45	43	42	38	38	37
2022-06-17	04:00:00	01:00:00.0	40	45	43	42	39	38	37
2022-06-17	05:00:00	01:00:00.0	44	52	48	47	42	40	39
2022-06-17	06:00:00	01:00:00.0	44	53	48	46	42	40	39
2022-06-17	07:00:00	01:00:00.0	47	55	52	50	45	41	39
2022-06-17	08:00:00	01:00:00.0	50	59	53	51	47	45	43
2022-06-17	09:00:00	01:00:00.0	49	57	53	51	47	44	42
2022-06-17	10:00:00	00:20:03.5	49	56	51	50	46	43	41

Table A- 4. SLM-4 Hourly Sound Levels

2022-06-15	07:36:35	00:23:24.5	56	63	60	58	53	48	46
2022-06-15	08:00:00	01:00:00.0	55	64	59	57	52	48	44
2022-06-15	09:00:00	01:00:00.0	54	63	59	57	52	49	46
2022-06-15	10:00:00	01:00:00.0	55	63	59	57	51	47	44
2022-06-15	11:00:00	01:00:00.0	55	64	59	57	51	48	44
2022-06-15	12:00:00	01:00:00.0	54	62	58	56	50	47	43
2022-06-15	13:00:00	01:00:00.0	55	65	59	56	50	47	44
2022-06-15	14:00:00	01:00:00.0	54	64	59	56	51	46	43
2022-06-15	15:00:00	01:00:00.0	55	66	59	57	51	48	45
2022-06-15	16:00:00	01:00:00.0	57	64	59	56	50	44	41
2022-06-15	17:00:00	01:00:00.0	52	63	57	55	45	39	37
2022-06-15	18:00:00	01:00:00.0	52	61	55	52	43	39	37
2022-06-15	19:00:00	01:00:00.0	49	60	54	50	42	37	36
2022-06-15	20:00:00	01:00:00.0	48	60	54	50	39	36	35
2022-06-15	21:00:00	01:00:00.0	43	55	48	45	38	36	36
2022-06-15	22:00:00	01:00:00.0	44	54	48	44	37	35	35
2022-06-15	23:00:00	01:00:00.0	42	53	44	39	35	34	34

2022-06-16	00:00:00	01:00:00.0	36	45	39	37	34	33	33
2022-06-16	01:00:00	01:00:00.0	37	41	38	37	35	34	33
2022-06-16	02:00:00	01:00:00.0	41	44	39	38	35	34	33
2022-06-16	03:00:00	01:00:00.0	35	40	38	37	35	34	33
2022-06-16	04:00:00	01:00:00.0	41	44	41	40	38	36	34
2022-06-16	05:00:00	01:00:00.0	46	57	48	46	41	39	38
2022-06-16	06:00:00	01:00:00.0	51	65	57	53	42	40	39
2022-06-16	07:00:00	01:00:00.0	53	65	58	55	47	41	40
2022-06-16	08:00:00	00:39:31.1	59	69	64	62	54	50	49

Table A- 5. SLM-5 Hourly Sound Levels

2022-06-15	10:08:46	00:51:13.6	49	60	53	49	40	36	34
2022-06-15	11:00:00	01:00:00.0	44	56	48	44	38	34	33
2022-06-15	12:00:00	01:00:00.0	41	50	46	44	38	34	32
2022-06-15	13:00:00	01:00:00.0	45	55	49	47	42	37	35
2022-06-15	14:00:00	01:00:00.0	45	53	50	48	42	36	32
2022-06-15	15:00:00	01:00:00.0	46	55	51	49	42	37	34
2022-06-15	16:00:00	01:00:00.0	47	55	52	50	44	38	36
2022-06-15	17:00:00	01:00:00.0	49	56	53	52	47	41	36
2022-06-15	18:00:00	01:00:00.0	49	57	54	52	47	42	38
2022-06-15	19:00:00	01:00:00.0	45	53	50	49	42	33	31
2022-06-15	20:00:00	01:00:00.0	38	52	42	36	31	30	29
2022-06-15	21:00:00	01:00:00.0	38	49	42	39	31	30	30
2022-06-15	22:00:00	01:00:00.0	36	48	40	35	30	29	29
2022-06-15	23:00:00	01:00:00.0	35	48	37	32	30	29	29
2022-06-16	00:00:00	01:00:00.0	33	44	35	33	29	29	28
2022-06-16	01:00:00	01:00:00.0	29	35	31	30	29	28	28
2022-06-16	02:00:00	01:00:00.0	31	40	35	31	29	29	28
2022-06-16	03:00:00	01:00:00.0	30	35	32	31	30	29	28
2022-06-16	04:00:00	01:00:00.0	33	36	35	34	33	30	29
2022-06-16	05:00:00	01:00:00.0	36	39	37	37	35	34	33
2022-06-16	06:00:00	01:00:00.0	39	47	42	40	37	36	35
2022-06-16	07:00:00	01:00:00.0	41	52	47	44	37	35	34
2022-06-16	08:00:00	01:00:00.0	43	54	48	45	35	32	30
2022-06-16	09:00:00	01:00:00.0	43	54	49	46	36	32	31

2022-06-16	10:00:00	00:54:12.1	44	56	49	46	38	34	33

Table A- 6. SLM-6 Hourly Sound Levels

2022-06-15	09:30:39	00:29:20.4	52	62	54	51	38	33	32
2022-06-15	10:00:00	01:00:00.0	44	56	50	46	36	33	32
2022-06-15	11:00:00	01:00:00.0	42	53	46	43	35	33	32
2022-06-15	12:00:00	01:00:00.0	41	52	47	44	35	33	32
2022-06-15	13:00:00	01:00:00.0	44	55	49	47	38	34	33
2022-06-15	14:00:00	01:00:00.0	47	56	52	50	42	36	33
2022-06-15	15:00:00	01:00:00.0	49	57	54	53	46	38	35
2022-06-15	16:00:00	01:00:00.0	52	60	58	56	49	43	39
2022-06-15	17:00:00	01:00:00.0	49	57	54	52	45	39	37
2022-06-15	18:00:00	01:00:00.0	48	56	53	51	44	39	36
2022-06-15	19:00:00	01:00:00.0	47	56	53	51	43	37	34
2022-06-15	20:00:00	01:00:00.0	44	53	49	47	40	36	35
2022-06-15	21:00:00	01:00:00.0	41	50	46	44	38	35	35
2022-06-15	22:00:00	01:00:00.0	37	48	40	37	34	33	32
2022-06-15	23:00:00	01:00:00.0	36	49	38	35	33	32	31
2022-06-16	00:00:00	01:00:00.0	34	43	36	34	32	32	31
2022-06-16	01:00:00	01:00:00.0	33	36	33	33	32	32	31
2022-06-16	02:00:00	01:00:00.0	34	41	37	34	32	32	31
2022-06-16	03:00:00	01:00:00.0	33	36	34	33	32	32	31
2022-06-16	04:00:00	01:00:00.0	34	36	35	35	33	32	32
2022-06-16	05:00:00	01:00:00.0	35	41	37	36	35	34	33
2022-06-16	06:00:00	01:00:00.0	39	49	43	40	37	35	34
2022-06-16	07:00:00	01:00:00.0	41	52	47	44	38	35	34
2022-06-16	08:00:00	01:00:00.0	44	55	49	44	36	33	32
2022-06-16	09:00:00	01:00:00.0	43	53	48	46	37	33	32
2022-06-16	10:00:00	00:38:07.8	48	57	53	51	44	38	35

Table A- 7. SLM-7 Hourly Sound Levels

2022-06-15	09:02:08	00:58:20.2	47	56	50	48	43	40	38

2022-06-15	10:00:00	01:00:00.0	55	59	58	58	55	46	43
2022-06-15	11:00:00	01:00:00.0	51	58	57	56	49	47	42
2022-06-15	12:00:00	01:00:00.0	46	56	51	48	43	41	39
2022-06-15	13:00:00	01:00:00.0	47	56	53	51	42	37	35
2022-06-15	14:00:00	01:00:00.0	44	52	47	45	40	36	34
2022-06-15	15:00:00	01:00:00.0	45	53	49	48	42	38	37
2022-06-15	16:00:00	01:00:00.0	48	56	53	51	45	41	39
2022-06-15	17:00:00	01:00:00.0	45	54	50	48	42	39	37
2022-06-15	18:00:00	01:00:00.0	45	54	49	47	41	38	37
2022-06-15	19:00:00	01:00:00.0	44	53	48	46	40	36	34
2022-06-15	20:00:00	01:00:00.0	41	52	44	42	37	34	33
2022-06-15	21:00:00	01:00:00.0	38	46	43	41	36	33	32
2022-06-15	22:00:00	01:00:00.0	37	47	42	38	33	32	31
2022-06-15	23:00:00	01:00:00.0	42	52	49	47	34	31	30
2022-06-16	00:00:00	01:00:00.0	34	43	36	34	31	30	30
2022-06-16	01:00:00	01:00:00.0	31	37	34	32	30	30	30
2022-06-16	02:00:00	01:00:00.0	32	40	36	34	31	30	30
2022-06-16	03:00:00	01:00:00.0	32	36	34	33	31	30	30
2022-06-16	04:00:00	01:00:00.0	34	40	36	35	33	31	30
2022-06-16	05:00:00	01:00:00.0	37	43	40	39	36	35	34
2022-06-16	06:00:00	01:00:00.0	44	50	44	42	39	37	36
2022-06-16	07:00:00	01:00:00.0	49	61	54	52	43	38	37
2022-06-16	08:00:00	01:00:00.0	47	60	49	45	38	35	33
2022-06-16	09:00:00	01:00:00.0	50	57	51	48	42	36	33
2022-06-16	10:00:00	00:26:58.5	47	56	50	48	44	41	38

Table A- 8. SLM-8 Hourly Sound Levels

2022-06-15	10:25:00	00:36:40.6	48	57	52	48	38	33	32
2022-06-15	11:25:00	01:00:00.0	42	52	47	44	37	33	32
2022-06-15	12:25:00	01:00:00.0	46	54	52	50	43	38	35
2022-06-15	13:25:00	01:00:00.0	48	56	53	52	45	38	33
2022-06-15	14:25:00	01:00:00.0	51	59	56	54	49	42	38
2022-06-15	15:25:00	01:00:00.0	56	63	61	60	54	47	39
2022-06-15	16:25:00	01:00:00.0	57	63	61	60	56	52	47
2022-06-15	17:25:00	01:00:00.0	55	62	60	58	54	49	45

2022-06-15	18:25:00	01:00:00.0	54	60	58	57	52	47	44
2022-06-15	19:25:00	01:00:00.0	50	57	55	53	49	41	38
2022-06-15	20:25:00	01:00:00.0	45	53	51	50	41	38	36
2022-06-15	21:25:00	01:00:00.0	43	53	49	47	39	36	34
2022-06-15	22:25:00	01:00:00.0	38	49	43	39	35	33	32
2022-06-15	23:25:00	01:00:00.0	35	43	37	36	33	32	31
2022-06-16	00:25:00	01:00:00.0	34	44	37	35	32	30	30
2022-06-16	01:25:00	01:00:00.0	33	41	36	34	31	30	30
2022-06-16	02:25:00	01:00:00.0	32	39	35	34	31	30	29
2022-06-16	03:25:00	01:00:00.0	33	37	35	34	32	30	30
2022-06-16	04:25:00	01:00:00.0	37	45	40	39	36	34	33
2022-06-16	05:25:00	01:00:00.0	43	52	49	46	40	38	37
2022-06-16	06:25:00	01:00:00.0	43	51	48	46	42	40	39
2022-06-16	07:25:00	01:00:00.0	43	52	47	46	41	39	37
2022-06-16	08:25:00	01:00:00.0	43	54	47	45	39	35	33
2022-06-16	09:25:00	01:00:00.0	48	56	53	52	44	38	34
2022-06-16	10:25:00	00:49:53.9	52	59	57	55	50	44	39

Table A- 9. SLM-9 Hourly Sound Levels

2022-06-13	20:30:50	00:29:09.1	61	71	61	58	52	49	47
2022-06-13	21:00:00	01:00:00.0	52	61	54	52	49	46	45
2022-06-13	22:00:00	01:00:00.0	47	52	50	49	47	45	44
2022-06-13	23:00:00	01:00:00.0	47	52	50	49	46	44	43
2022-06-14	00:00:00	01:00:00.0	48	53	51	50	47	42	40
2022-06-14	01:00:00	01:00:00.0	43	49	46	45	42	40	38
2022-06-14	02:00:00	01:00:00.0	46	57	50	46	42	39	37
2022-06-14	03:00:00	01:00:00.0	47	54	50	49	46	43	40
2022-06-14	04:00:00	01:00:00.0	51	56	54	53	51	49	47
2022-06-14	05:00:00	01:00:00.0	53	57	55	55	53	51	49
2022-06-14	06:00:00	01:00:00.0	53	57	56	55	53	52	51
2022-06-14	07:00:00	01:00:00.0	52	59	54	53	50	49	47
2022-06-14	08:00:00	01:00:00.0	48	56	51	49	46	44	43
2022-06-14	09:00:00	01:00:00.0	49	56	52	51	48	46	44
2022-06-14	10:00:00	01:00:00.0	62	58	54	53	49	46	44
2022-06-14	11:00:00	01:00:00.0	53	59	56	55	51	48	46

2022-06-14	12:00:00	01:00:00.0	54	61	58	57	52	48	46
2022-06-14	13:00:00	01:00:00.0	54	62	59	58	53	49	47
2022-06-14	14:00:00	01:00:00.0	53	59	57	56	52	49	47
2022-06-14	15:00:00	01:00:00.0	54	61	59	57	53	49	47
2022-06-14	16:00:00	01:00:00.0	56	63	61	59	55	50	48
2022-06-14	17:00:00	01:00:00.0	56	62	60	59	55	51	48
2022-06-14	18:00:00	01:00:00.0	56	63	61	59	55	51	48
2022-06-14	19:00:00	01:00:00.0	53	60	57	56	52	49	48
2022-06-14	20:00:00	00:55:59.1	52	59	54	52	49	47	45

Table A- 10. SLM-10 Hourly Sound Levels

2022-06-13	18:52:47	00:07:12.5	61	70	65	62	58	56	54
2022-06-13	19:00:00	01:00:00.0	59	64	62	61	58	55	53
2022-06-13	20:00:00	01:00:00.0	57	63	60	59	56	54	52
2022-06-13	21:00:00	01:00:00.0	56	61	58	58	55	53	51
2022-06-13	22:00:00	01:00:00.0	55	59	57	57	54	52	50
2022-06-13	23:00:00	01:00:00.0	55	60	58	58	55	52	50
2022-06-14	00:00:00	01:00:00.0	51	57	55	54	50	45	42
2022-06-14	01:00:00	01:00:00.0	49	56	54	52	48	44	40
2022-06-14	02:00:00	01:00:00.0	50	56	54	53	49	43	40
2022-06-14	03:00:00	01:00:00.0	53	60	56	55	52	49	46
2022-06-14	04:00:00	01:00:00.0	55	60	59	58	55	51	49
2022-06-14	05:00:00	01:00:00.0	60	64	62	62	60	58	55
2022-06-14	06:00:00	01:00:00.0	60	63	62	62	60	57	54
2022-06-14	07:00:00	01:00:00.0	54	58	56	56	54	52	49
2022-06-14	08:00:00	01:00:00.0	53	58	56	56	53	50	48
2022-06-14	09:00:00	01:00:00.0	55	60	58	57	54	52	50
2022-06-14	10:00:00	01:00:00.0	55	60	58	57	54	52	50
2022-06-14	11:00:00	01:00:00.0	56	61	59	58	55	53	50

Table A- 11. SLM-11 Hourly Sound Levels

2022-06-13	19:10:52	00:49:07.4	60	67	63	61	59	57	55

2022-06-13	20:00:00	01:00:00.0	58	63	61	60	58	55	53
2022-06-13	21:00:00	01:00:00.0	57	62	60	59	57	55	53
2022-06-13	22:00:00	01:00:00.0	56	61	59	58	56	53	51
2022-06-13	23:00:00	01:00:00.0	56	61	59	59	56	53	50
2022-06-14	00:00:00	01:00:00.0	53	59	57	56	52	47	44
2022-06-14	01:00:00	01:00:00.0	52	58	56	55	50	45	40
2022-06-14	02:00:00	01:00:00.0	52	59	56	55	51	45	40
2022-06-14	03:00:00	01:00:00.0	55	62	58	57	53	49	47
2022-06-14	04:00:00	01:00:00.0	58	63	62	60	57	53	49
2022-06-14	05:00:00	01:00:00.0	61	65	64	63	61	59	57
2022-06-14	06:00:00	01:00:00.0	61	64	62	62	60	58	57
2022-06-14	07:00:00	01:00:00.0	58	61	60	59	57	56	54
2022-06-14	08:00:00	01:00:00.0	57	60	59	59	56	54	52
2022-06-14	09:00:00	01:00:00.0	57	61	60	59	57	54	52
2022-06-14	10:00:00	01:00:00.0	57	62	60	59	57	54	52
2022-06-14	11:00:00	01:00:00.0	58	62	60	60	57	55	53
2022-06-14	12:00:00	01:00:00.0	57	63	60	60	56	53	51
2022-06-14	13:00:00	01:00:00.0	59	65	61	60	58	56	55
2022-06-14	14:00:00	01:00:00.0	58	63	61	60	58	56	54
2022-06-14	15:00:00	01:00:00.0	59	63	61	60	58	56	55
2022-06-14	16:00:00	01:00:00.0	59	63	61	61	59	57	55
2022-06-14	17:00:00	01:00:00.0	60	65	62	61	59	58	56
2022-06-14	18:00:00	01:00:00.0	60	65	62	61	59	57	56
2022-06-14	19:00:00	00:46:06.5	59	63	61	61	58	56	55

APPENDIX 3 – CONSTRUCTION NOISE ANALYSIS ADSRP

A. EQUIPMENT LIST AND SOUND LEVELS

Table A- 12. Anderson Dam Equipment List

Anderson Dam Seismic Retrofit Project Estimate of On-Site Equipment

#	Project Component	Activity ID	Construction Activity	Construction Phase	Approx. Duration (months)	Utilization Factor	Number of Workers	Equipment Quantity	Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)	Operating Hours/Day	Days/ Week
5	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	2	2	Medium Bulldozer	CAT D8T	cat.com	Diesel	354	10	5
6	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	2	2	Medium excavator	CAT 330	cat.com	Diesel	273	10	5
7	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	1	1	Motor grader	CAT 16	cat.com	Diesel	290	10	5
8	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	4	2	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5
9	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	3	3	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
10	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	5	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
11	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	2	2	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
12	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	2	2	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
13	Haul Roads and Stockpile Area preparations	2	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	4	0.9	1	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	1	1	Crane 150t	GROVE GRT9165	manitowoc.com	Diesel	300	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	1	1	Small backhoe	Cat 310	cat.com	Diesel	70	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	-	2	Jacklegs	-	-	Air	-	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	2	1	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	-	1	Compressor	Doosan HP450	doosanportablepower.com	Diesel	173	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	1	1	Shotcrete batch plant	fibo intercon F2200	fibointercon.com	Deisel	75	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	1	1	Loader	CAT 966M XE	cat.com	Diesel	298	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	1	1	Telehandler	JLG 1043	jlg.com	Diesel	110	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	1	-	1	Pump	GODWIN CD75	xylem.com	Diesel	17	24	7
	LLOW		Upstream Shaft excavation	Year 1	3	1	-	1	Ventilation fan	Tunnel Drilling fan (AXC...GC)	systemair.com	Electrical	-	24	6
	LLOW		Upstream Shaft excavation	Year 1	3	1	-	1	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	24	7
	LLOW		Upstream Shaft excavation	Year 1	3	0.7	1	1	Articulated dump truck	CAT 745	cat.com	Diesel	496	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	1	1	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	1	5	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	20	6
	LLOW		Upstream Shaft excavation	Year 1	3	1		-	No Equipment - Crew	-	-	-	-	20	6
63	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	0.9	1	1	Large excavator	Cat 365 FEL	machinerytrader.com	Diesel	410	10	5
64	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	0.7	2	1	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5
65	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	0.7	-	1	Compressor	Doosan HP450	doosanportablepower.com	Diesel	173	10	5

Anderson Dam Seismic Retrofit Project Estimate of On-Site Equipment

#	Project Component	Activity ID	Construction Activity	Construction Phase	Approx. Duration (months)	Utilization Factor	Number of Workers	Equipment Quantity	Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)	Operating Hours/Day	Days/ Week
66	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	0.7	1	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
67	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	0.7	1	1	Manlift	JLG 600AJ	jlg.com	Diesel	67	10	5
68	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	1	-	1	Pump	GODWIN CD75	xylem.com	Diesel	17	10	5
69	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	1	-	1	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	10	5
70	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	0.9	2	2	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
71	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	1	1	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
72	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	1	3	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
73	HLOW	9	Excavate downstream portal	Year 2 (Stage 1a)	4	1	-	-	No Equipment - Crew	-	-	-	-	10	5
171	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	0.5	-	1	Medium excavator	Cat 330	Use 330 at dam	Diesel	410	10	5
172	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	0.5	2	2	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5
173	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	0.5	-	1	Compressor	Doosan HP450	doosanportablepower.com	Diesel	173	10	5
174	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	0.5	-	-	Shotcrete batch plant	-	Import ready mix	-	-	10	5
175	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	0.5	1	1	Concrete pump truck	Liebherr 42 M5 XXT	liebherr.com	Diesel	500	10	5
176	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	0.5	1	1	Manlift	JLG 600AJ	jlg.com	Diesel	67	10	5
177	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	1	-	1	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	10	5
178	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	0.5	-	-	Articulated dump truck	CAT 745	Use 745s at dam	-	-	10	5
179	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	1	1	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
180	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	1	4	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
181	Tie-back Wall at Cochrane Road	18	Construction of the tie-back wall at Cochrane Road	Year 3 (Stage 1b)	2.5	1		-	No Equipment - Crew	-	-	-	-	10	5
192	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	0.25	1	1	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
193	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	0.7	1	1	Medium excavator	Cat 330	cat.com	Diesel	273	10	5
194	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	0.7	1	1	Mini excavator	Cat 305 CR	cat.com	Diesel	45	10	5
195	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	0.7	2	2	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5
196	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	0.7	-	1	Compressor	Doosan HP450	doosanportablepower.com	Diesel	173	10	5
197	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	0.7	1	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
198	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	1	-	1	Pump	GODWIN CD75	xylem.com	Diesel	17	10	5
199	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	1	-	1	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	10	5
200	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	0.5	1	1	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
201	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	1	1	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
202	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	1	5	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
203	Spillway	20	Excavation and foundation preparation	Year 3 (Stage 1b)	3	1	-	-	No Equipment - Crew	-	-	-	-	10	5

Anderson Dam Seismic Retrofit Project Estimate of On-Site Equipment

#	Project Component	Activity ID	Construction Activity	Construction Phase	Approx. Duration (months)	Utilization Factor	Number of Workers	Equipment Quantity	Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)	Operating Hours/Day	Days/ Week
532	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	1	1	Large excavator	Komatsu PC1600	ritchiespecs.com	Diesel	810	20	5.5
533	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	1	1	Medium excavator	Cat 365 FEL	machinerytrader.com	Diesel	410	20	5.5
534	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	2	2	Medium excavator	Cat 330	cat.com	Diesel	273	20	5.5
535	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	2	2	Small backhoe	Cat 310	cat.com	Diesel	70	20	5.5
536	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	1	1	Loader	CAT 966M XE	cat.com	Diesel	298	20	5.5
537	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	1	1	Motor grader	CAT 16	cat.com	Diesel	290	20	5.5
538	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	1	1	Bulldozer	CAT D10T2	cat.com	Diesel	722	20	3.3
539	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	2	2	Bulldozer w/discs	CAT D8T	cat.com	Diesel	354	20	5.5
540	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	2	2	Bulldozer	CAT D8T	cat.com	Diesel	354	20	5.5
541	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	1	1	Bulldozer	CAT D6	cat.com	Diesel	215	20	5.5
542	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	2	2	Vibratory smooth drum roller	CAT CS76	fs.usda.gov	Diesel	174	20	5.5
543	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	4	4	Padfoot roller	CAT CP76	fs.usda.gov	Diesel	174	20	5.5
544	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	4	4	Tamping foot roller	CAT 825K	cat.com	Diesel	405	20	5.5
545	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	-	2	Compressor	Doosan HP450	doosanportablepower.com	Diesel	173	20	5.5
546	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	-	2	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	20	5.5
547	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	3	3	Large rigid-body dump truck	CAT 773	cat.com	Diesel	719	20	5.5
548	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	5	5	Articulated dump truck	CAT 745	cat.com	Diesel	496	20	5.5
549	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	6	6	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	20	5.5
550	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	0.5	-	10	Light plant for night work	RNT-WCDE-4-MHL-4TN4000	www.larsonelectronics.com	Diesel	25	20	5.5
551	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	6	6	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	20	5.5
552	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	1	8	2	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	20	5.5
553	Dam	53	Stage 3b Fill (incl. work at stockpile areas & reservoir disposal)	Year 6 (Stage 3b)	6	-	-	-	No Equipment - Crew	-	-	-	-	20	5.5
660	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.25	1	1	Concrete pump truck	Liebherr 42 M5 XXT	liebherr.com	Diesel	500	10	5
661	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.7	2	2	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
662	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.7	1	1	Medium excavator	Cat 330	cat.com	Diesel	273	10	5
663	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.7	1	1	Bulldozer	CAT D8T	cat.com	Diesel	354	10	5
664	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	3	0.7	2	1	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5

Anderson Dam Seismic Retrofit Project Estimate of On-Site Equipment

#	Project Component	Activity ID	Construction Activity	Construction Phase	Approx. Duration (months)	Utilization Factor	Number of Workers	Equipment Quantity	Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)	Operating Hours/Day	Days/ Week
665	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	3	0.7	-	1	Compressor	Doosan HP450	doosanportablepower.com	Diesel	173	10	5
666	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	1	1	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
667	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	3	0.7	1	1	Manlift	JLG 600AJ	jlg.com	Diesel	67	10	5
668	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.7	1	1	Motor grader	CAT 16	cat.com	Diesel	290	10	5
669	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.3	1	1	Padfoot roller	CAT CP76	fs.usda.gov	Diesel	174	10	5
670	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.3	1	1	Tamping foot roller	CAT 825K	cat.com	Diesel	405	10	5
671	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.3	1	1	Vibratory smooth drum roller	CAT CS76	fs.usda.gov	Diesel	174	10	5
672	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.7	1	1	Asphalt paving machine	CAT AP1000F	cat.com	Diesel	225	10	5
673	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.7	1	1	Asphalt compactor	CAT CW16 11-wheel	cat.com	Diesel	100	10	5
674	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.5	1	1	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
675	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	0.5	-	2	Concrete vibrator	1.5 Inch x 18 Foot Flexible	californiatoolsandequipment.com	Gasoline	6.5	10	5
676	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	1	-	1	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	10	5
677	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	1	2	2	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
678	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	1	8	2	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
679	Permanent Access Roads	65	Restoring parking areas and construction of permanent access roads	Year 7	9	1	-	-	No Equipment - Crew	-	-	-	-	10	5

Notes

1 Estimated equipment is based on engineering judgment; estimated equipment can be reviewed following completion of the 90% design construction cost estimate.

2 Project components, construction activities, construction phase, and approximate duration are based on the ADSRP Construction Sequencing Plan dated 5/28/21 with the addition of dredging in Year 1 and the unlined spillway in Years 6 and 7.

3 Net HP used if available; gross used if net not available

Table A- 13. Anderson Dam Equipment Sound Levels

Medium excavator	85	40	81	FTA, 2018
Loader	80	40	76	FTA, 2018
Light truck - Forman	75	10	65	FHWA, 2006
Light truck - Crew	75	10	65	FHWA, 2006
Medium Bulldozer	85	40	81	FTA, 2018
Motor grader	85	40	81	FTA, 2018
Track drill rig	95	20	88	FTA, 2018
Articulated dump truck	84	40	80	FTA, 2018
Water truck	84	40	80	FTA, 2018
Light truck - Personnel	75	10	65	FHWA, 2006
Boat - 30' Work Boat	82	40	78	Laymon Miller eqns 7-12 & 7-13[1]
Boat - 16' Whaler	77	40	73	Laymon Miller eqns 7-12 & 7-13[1]
Boat - 16' Skiff	73	40	69	Laymon Miller eqns 7-12 & 7-13[1]
Crane - 275t	83	16	77	FTA, 2018
Crane - 70t	83	16	77	FTA, 2018
Dredge Pump	77	50	78	FTA, 2018
Long-reach excavator	85	40	81	FTA, 2018
Crane 150t	83	16	77	FTA, 2018
Vibratory sheetpile driver	95	20	88	FTA, 2018
Concrete vibrator	76	20	69	FTA, 2018
Generator (80 kW)	68	50	65	Manufacturer Cutsheet[2]
Concrete pump truck	84	20	78	FTA, 2018
Vibratory plate	76	40	72	FTA, 2018
Tamper	83	40	79	FTA, 2018
Pump	77	50	78	FTA, 2018
Generator (80 kW)	68	50	65	Manufacturer Cutsheet[2]
15 cfs capacity pump	77	50	78	FTA, 2018
Site generator (2,000 kW)	75	50	72	Manufacturer Cutsheet[3]
Large excavator	85	40	81	FTA, 2018
Compressor	80	40	76	FHWA, 2006
Manlift	85	20	78	FHWA, 2006
3,000 gpm treatment system	77	100	77	Laymon Miller Table 7-12[1]
Bulldozer	85	40	81	FTA, 2018
Bulldozer w/discs	85	40	81	FTA, 2018
Grizzly to screen transition	81	50	78	GHD report[4]
Large rigid-body dump truck	84	40	80	FTA, 2018
Light plant for night work	68	100	68	Manufacturer Cutsheet[5]
Bobcat	80	40	76	FTA, 2018
Shotcrete batch plant	83	15	75	FHWA, 2006
Telehandler	80	40	76	FTA, 2018
Ventilation fan	85	100	85	FHWA, 2006
Robotic shotcrete machine	85	50	82	FHWA, 2006
Scooptrams	85	40	81	FTA, 2018
Jackhammer	88	20	82	FTA, 2018
Padfoot roller	85	20	78	FTA, 2018
Tamping foot roller	85	20	78	FTA, 2018
Excavator-mounted hoe-ram	90	20	83	FHWA, 2006

Mini excavator	85	40	81	FTA, 2018
Small backhoe	82	40	78	FTA, 2018
Jacklegs	88	20	82	FTA, 2018
Loader	80	40	76	FTA, 2018
Highway dump truck	84	40	80	FTA, 2018
Vibratory smooth drum roller	85	20	78	FTA, 2018
Light truck - Carpenters	75	10	65	FHWA, 2006
Bulldozers w/riper	85	40	81	FTA, 2018
Explosives truck	84	40	80	FTA, 2018
Bulldozer w/discs	85	40	81	FTA, 2018
Asphalt paving machine	85	50	82	FTA, 2018
Asphalt compactor	82	20	76	FTA, 2018
Silent Piler	-	-	65	Leung, 2018[6]

1 Laymon Miller, *Noise Control for Buildings and Manufacturing Plants*, 1981.
2 Kohler KG80R. https://resources.kohler.com/power/kohler/residential/pdf/g4285.pdf
3 Caterpillar XGC1900. https://www.cat.com/en_US/products/new/power-systems/electric-power/mobile-generator-sets/105220.html
4 TNG Limited, *Mount Peake Project, Noise and Vibration Assessment Report, Appendix J*¸December 2015. https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/289119/mt_peake_draft_eis_appendixJ_noise_vibration_assess_report.pdf
5 Larson Electric RNT-WCDE-4-MHL-4TN4000. https://www.larsonelectronics.com/product/242288/rent-6000w-generator-water-cooled-diesel-engine-30-telescoping-tower-4-mh-fixtures-mining-grade
6 Leung, et al., *Noise and Vibration Monitoring for Silent Piling in Singapore*, 2018. L_{AEQ} at 50 ft. calculated from measurements at 5 m.

B. CADNAA INPUTS AND RESULTS

Table A- 14. ADSRP CadnaA On-Site construction Noise Point Sources, DNL Calculation

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Medium Bulldozer	!010100!	115.8	Lw	MBDOZ		(none)	6.56	r	2037583.53	13498273.1	455.12
Medium Bulldozer	!010100!	115.8	Lw	MBDOZ		(none)	6.56	r	2039585.64	13496976.17	491.63
Medium Excavator	!010100!	115.8	Lw	MEXC		(none)	6.56	r	2037794.74	13498246.69	451.21
Medium Excavator	!010100!	115.8	Lw	MEXC		(none)	6.56	r	2040672.92	13497294.59	679.38
Motor Grader	!010100!	115.8	Lw	MGRAD		(none)	6.56	r	2037117.05	13497868.24	400.86
Track Drill Rig	!010100!	122.8	Lw	TDRIG		(none)	6.56	r	2040764.32	13499131.34	461.56
Track Drill Rig	!010100!	122.8	Lw	TDRIG		(none)	6.56	r	2042218.6	13498629.08	524.18
Loader	!010100!	110.8	Lw	LOAD		(none)	6.56	r	2037473.5	13497939.75	405.91
medium_excavator	!010100!	119	Lw	119	500	(none)	6.56	r	2036985.27	13497550.33	406.91
light_truck_1	!010100!	103	Lw	103	500	(none)	6.56	r	2037266.37	13497621.98	407.1
light_truck_2	!010100!	103	Lw	103	500	(none)	6.56	r	2037299.44	13497619.23	407.15
articulated_dump_truck	!010100!	118	Lw	118	500	(none)	6.56	r	2037164.4	13497671.59	405.52
motor_grader	!010100!	119	Lw	119	500	(none)	6.56	r	2037619.78	13497726.71	406.82
water_truck	!010100!	118	Lw	118	500	(none)	6.56	r	2037616.4	13497613.71	406.82
loader	!010100!	114	Lw	114	500	(none)	6.56	r	2036659.65	13497499.44	403.9
light_truck_1	!010101!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039992.14	13498408.45	507.77
Track Drill rig - 5 dB shielding from tunnel/shaft	!010101!	117.8	Lw	TDRIG		(none)	1	r	2039702.49	13498435.66	578.01
Compressor	!010101!	110.8	Lw	COMP		(none)	6.56	r	2039907.85	13498507.35	549.84
Loader	!010101!	110.8	Lw	LOAD		(none)	6.56	r	2039611.04	13498419.76	611.13
Pump	!010101!	112.8	Lw	PUMP		(none)	6.56	r	2039874.48	13498365.57	524.61
Generator	!010101!	99.8	Lw	GEN		(none)	6.56	r	2039824.1	13498462.35	556.09
light_truck_2	!010101!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039698.67	13498507.24	598.99
light_truck_1	!010101!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039764.86	13498336.29	538.62
light_truck_2	!010101!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039814.19	13498517.75	569.3
ventilation fan	!010101!	119.8	Lw	VENTFAN	500	(none)	6.56	r	2039649.95	13498461.23	603.26
jacklegs	!010101!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039811.77	13498389.73	545.19
shotcrete batch plant	!010101!	109.8	Lw	SBATCHP	500	(none)	6.56	r	2039752.81	13498378.44	558.72
light_truck_2	!010101!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039678.71	13498357.18	572.14
light_truck_1	!010101!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039830.09	13498313.71	522.43
jacklegs	!010101!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039744.03	13498421.09	569.73
small backhoe	!010101!	112.8	Lw	SBHOE_1	500	(none)	6.56	r	2039721.45	13498429.87	577.35

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
150t crane	!010101!	111.8	Lw	CRANE150T	500	(none)	6.56	r	2039672.53	13498547.79	613.28
telehandler	!010101!	110.8	Lw	TELEHAND	500	(none)	6.56	r	2039653.71	13498398.51	590.11
articulated_dump_truck	!010200!	118	Lw	118	500	(none)	6.56	r	2037164.4	13497671.59	405.52
light_truck_1	!010200!	103	Lw	103	500	(none)	6.56	r	2037266.37	13497621.98	407.1
light_truck_2	!010200!	103	Lw	103	500	(none)	6.56	r	2037299.44	13497619.23	407.15
Large Excavator	!010200!	115.8	Lw	LEXC		(none)	6.56	r	2039264.24	13498060.74	578.74
Track Drill rig	!010200!	122.8	Lw	TDRIG		(none)	6.56	r	2039292.76	13498178.4	609.57
Compressor	!010200!	110.8	Lw	COMP		(none)	6.56	r	2039128.77	13498063.28	532.62
Loader	!010200!	110.8	Lw	LOAD		(none)	6.56	r	2039267.59	13498210.85	609.64
Man Lift	!010200!	112.8	Lw	MLIFT		(none)	6.56	r	2039372.92	13497993.52	603.6
Pump	!010200!	112.8	Lw	PUMP		(none)	6.56	r	2039293.58	13497983.31	572.76
Generator	!010200!	99.8	Lw	GEN		(none)	6.56	r	2039333.86	13498100.52	608.59
light_truck_1	!010200!	103	Lw	103	500	(none)	6.56	r	2039408.46	13498181.44	641
light_truck_2	!010200!	103	Lw	103	500	(none)	6.56	r	2039771.51	13497318.04	584.26
articulated_dump_truck	!010200!	118	Lw	118	500	(none)	6.56	r	2039607.22	13497117.06	514.99
Loader	!010200!	110.8	Lw	LOAD		(none)	6.56	r	2037473.5	13497939.75	405.91
Medium Excavator	!010300!	115.8	Lw	MEXC		(none)	6.56	r	2037783.98	13497652.48	406.82
Track Drill Rig	!010300!	122.8	Lw	TDRIG		(none)	6.56	r	2038782.43	13497847.93	461.25
Track Drill Rig	!010300!	122.8	Lw	TDRIG		(none)	6.56	r	2039524.06	13497005.28	497.87
Compresor	!010300!	110.8	Lw	COMP		(none)	6.56	r	2039427.18	13497218.43	485.05
Man Lift	!010300!	112.8	Lw	MLIFT		(none)	6.56	r	2039655.83	13496892.89	477.72
Generator	!010300!	99.8	Lw	GEN		(none)	6.56	r	2039008.63	13497633.1	437.47
light_truck_1	!010300!	103	Lw	103	500	(none)	6.56	r	2039893.9	13496746.66	526.34
light_truck_2	!010300!	103	Lw	103	500	(none)	6.56	r	2039915.77	13496957.85	560.96
concrete pump truck	!010300!	112.8	Lw	CPUMPTRU	500	(none)	6.56	r	2039757.02	13497270.41	581.09
Medium Excavator	!010301!	115.8	Lw	MEXC		(none)	6.56	r	2039654.39	13497881.1	627.19
Mini Excavator	!010301!	115.8	Lw	MINIEXC		(none)	6.56	r	2039326.3	13497840.09	557.87
Track Drill Rig	!010301!	122.8	Lw	TDRIG		(none)	6.56	r	2039593.85	13497453.41	557.78
Track Drill Rig	!010301!	122.8	Lw	TDRIG		(none)	6.56	r	2039957.79	13498310.1	495.46
Compressor	!010301!	110.8	Lw	COMP		(none)	6.56	r	2040013.73	13497326.47	631.84
Loader	!010301!	110.8	Lw	LOAD		(none)	6.56	r	2039666.11	13498281.45	550.04
Pump	!010301!	112.8	Lw	PUMP		(none)	6.56	r	2040076.22	13497656.51	560.63
Generator	!010301!	99.8	Lw	GEN		(none)	6.56	r	2039888.74	13498000.23	521.98
Medium Excavator	!010301!	115.8	Lw	MEXC		(none)	6.56	r	2037794.74	13498246.69	451.21

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Loader	!010301!	110.8	Lw	LOAD		(none)	6.56	r	2037473.5	13497939.75	405.91
light_truck_1	!010301!	103	Lw	103	500	(none)	6.56	r	2037266.37	13497621.98	407.1
light_truck_2	!010301!	103	Lw	103	500	(none)	6.56	r	2037299.44	13497619.23	407.15
articulated_dump_truck	!010301!	118	Lw	118	500	(none)	6.56	r	2037164.4	13497671.59	405.52
light_truck_1	!010301!	103	Lw	103	500	(none)	6.56	r	2040031.28	13496806.4	554.71
light_truck_2	!010301!	103	Lw	103	500	(none)	6.56	r	2039812.23	13497107.19	584.57
articulated_dump_truck	!010301!	118	Lw	118	500	(none)	6.56	r	2039730.8	13496946.57	515.22
water_truck	!010301!	118	Lw	118	500	(none)	6.56	r	2039636.12	13497104.83	517.87
Large Excavator	!010700!	115.8	Lw	LEXC2		(none)	6.56	r	2040734.22	13497222.82	687.97
Medium Excavator	!010700!	115.8	Lw	MEXC2		(none)	6.56	r	2040062.96	13498073.07	461.56
Medium Excavator	!010700!	115.8	Lw	MEXC		(none)	6.56	r	2039375.32	13498213.52	638.41
Medium Excavator	!010700!	115.8	Lw	MEXC		(none)	6.56	r	2039946.26	13498435.67	523.92
Small Back Hoe	!010700!	115.8	Lw	SBHOE		(none)	6.56	r	2042204.17	13499372.96	466.56
Small Back Hoe	!010700!	115.8	Lw	SBHOE		(none)	6.56	r	2040871.18	13497451.07	765
Loader	!010700!	110.8	Lw	LOAD		(none)	6.56	r	2041158.78	13497099.56	853
Motor Grader	!010700!	115.8	Lw	MGRAD		(none)	6.56	r	2042827.87	13498847.62	466.56
Bulldozer	!010700!	115.8	Lw	BOZ		(none)	6.56	r	2041985.05	13499391.22	466.56
Bulldozer with Discs	!010700!	115.8	Lw	BDOZWITHDISCS		(none)	6.56	r	2039862.26	13497690.19	602.14
Tamping Foot Roller	!010700!	112.8	Lw	TAMPFROLL		(none)	6.56	r	2050094.41	13493464.97	542.93
Bulldozer	!010700!	115.8	Lw	MBDOZ		(none)	6.56	r	2040715.96	13496994.57	717.35
Bulldozer	!010700!	115.8	Lw	MBDOZ		(none)	6.56	r	2047992.67	13494575.65	516.56
Bulldozer	!010700!	115.8	Lw	BDOZ2		(none)	6.56	r	2042814.5	13499256.03	466.56
Vibratory Smooth Drum Roller	!010700!	112.8	Lw	VIBSDROLL		(none)	6.56	r	2039566.02	13497614.56	593.98
Vibratory Smooth Drum Roller	!010700!	112.8	Lw	VIBSDROLL		(none)	6.56	r	2039365.25	13497658.66	539.12
Padfoot Roller	!010700!	112.8	Lw	PADROLL		(none)	6.56	r	2039223.44	13497952.99	543.11
Padfoot Roller	!010700!	112.8	Lw	PADROLL		(none)	6.56	r	2039439.54	13497914.09	610.95
Padfoot Roller	!010700!	112.8	Lw	PADROLL		(none)	6.56	r	2039551.76	13498145.39	612.3
Padfoot Roller	!010700!	112.8	Lw	PADROLL		(none)	6.56	r	2041556.39	13500380.85	561.49
Tamping Foot Roller	!010700!	112.8	Lw	TAMPFROLL		(none)	6.56	r	2039873.57	13497506.04	640.62
Tamping Foot Roller	!010700!	112.8	Lw	TAMPFROLL		(none)	6.56	r	2039740.15	13498355.18	553.77
Tamping Foot Roller	!010700!	112.8	Lw	TAMPFROLL		(none)	6.56	r	2039620.61	13497764.37	637.91
Compressor	!010700!	110.8	Lw	COMP		(none)	6.56	r	2040994.43	13497336.95	793.78
Compressor	!010700!	110.8	Lw	COMP		(none)	6.56	r	2042655.43	13499112.75	466.56
Generator	!010700!	99.8	Lw	GEN		(none)	6.56	r	2040820.96	13497063.04	715.46

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Generator	!010700!	99.8	Lw	GEN		(none)	6.56	r	2041811.58	13499322.75	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2037131.14	13497657.55	405.26
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2037724.55	13498222.49	440.94
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2048286.16	13494304.04	522.37
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2050533.36	13493287.09	552.27
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2040903.13	13496976.31	788.07
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2042390.14	13499358.89	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2041848.1	13499514.48	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2042341.13	13499140.15	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2039626.01	13497991.75	614.76
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2041002.5	13501025.29	563.13
medium_excavator	!010700!	119	Lw	119	500	(none)	6.56	r	2036985.27	13497550.33	406.91
light_truck_1	!010700!	103	Lw	103	500	(none)	6.56	r	2037266.37	13497621.98	407.1
light_truck_2	!010700!	103	Lw	103	500	(none)	6.56	r	2037299.44	13497619.23	407.15
articulated_dump_truck	!010700!	118	Lw	118	500	(none)	6.56	r	2037164.4	13497671.59	405.52
water_truck	!010700!	118	Lw	118	500	(none)	6.56	r	2037616.4	13497613.71	406.82
Bulldozer with Discs	!010700!	115.8	Lw	BDOZWITHDISCS	500	(none)	6.56	r	2049657.08	13493491.93	540.3
Medium Excavator	!010800!	115.8	Lw	MEXC		(none)	6.56	r	2040629.23	13497222.82	678.06
Bulldozer	!010800!	115.8	Lw	MBDOZ		(none)	6.56	r	2040706.83	13497090.43	694.61
Track Drill Rig	!010800!	122.8	Lw	TDRIG		(none)	6.56	r	2040436.91	13497542.45	648.02
Compressor	!010800!	110.8	Lw	COMP		(none)	6.56	r	2040784.44	13497158.91	693.56
Loader	!010800!	110.8	Lw	LOAD		(none)	6.56	r	2040254.89	13497318.69	656.27
Man Lift	!010800!	112.8	Lw	MLIFT		(none)	6.56	r	2040624.67	13497341.5	671.36
Motor Grader	!010800!	115.8	Lw	MGRAD		(none)	6.56	r	2040496.84	13497706.72	635.98
Padfoot Roller	!010800!	112.8	Lw	PADROLL		(none)	6.56	r	2040610.97	13498021.71	587.79
Tamping Foot Roller	!010800!	112.8	Lw	TAMPFROLL		(none)	6.56	r	2040510.54	13497880.19	612.39
Vibratory Smooth Drum Roller	!010800!	112.8	Lw	VIBSDROLL		(none)	6.56	r	2038808.09	13497707.73	436.43
Asphalt Paving Machine	!010800!	116.8	Lw	ASHPAVMAC		(none)	6.56	r	2040761.61	13496930.65	737.45
Asphalt Compactor	!010800!	110.8	Lw	ASHCOM		(none)	6.56	r	2038809.09	13497631.28	424.93
Concrete Vibrator	!010800!	103.8	Lw	CONVIB		(none)	6.56	r	2038777.86	13497662.59	429.75
Concrete Vibrator	!010800!	103.8	Lw	CONVIB		(none)	6.56	r	2040560.75	13497209.12	678.65
Generator	!010800!	99.8	Lw	GEN		(none)	6.56	r	2040469.45	13497619.98	642.6
articulated_dump_truck	!010800!	118	Lw	118	500	(none)	6.56	r	2037164.4	13497671.59	405.52
light_truck_1	!010800!	103	Lw	103	500	(none)	6.56	r	2037266.37	13497621.98	407.1

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
light_truck_2	!010800!	103	Lw	103	500	(none)	6.56	r	2037299.44	13497619.23	407.15
Vibratory Smooth Drum Roller	!010800!	112.8	Lw	VIBSDROLL		(none)	6.56	r	2037446.09	13497590.92	407.53
Bulldozer	!010800!	115.8	Lw	MBDOZ		(none)	6.56	r	2036789.85	13497551.5	404.03
Medium Excavator	!010800!	115.8	Lw	MEXC		(none)	6.56	r	2037783.98	13497652.48	406.82
light_truck_1	!010800!	103	Lw	103	500	(none)	6.56	r	2039893.9	13496746.66	526.34
light_truck_2	!010800!	103	Lw	103	500	(none)	6.56	r	2039915.77	13496957.85	560.96
water_truck	!010800!	118	Lw	118	500	(none)	6.56	r	2039636.12	13497104.83	517.87
articulated_dump_truck	!010800!	118	Lw	118	500	(none)	6.56	r	2039730.8	13496946.57	515.22
concrete pump truck	!010800!	112.8	Lw	CPUMPTRU	500	(none)	6.56	r	2039757.02	13497270.41	581.09
Large Excavator	!0109!	115.8	Lw	LEXC2		(none)	6.56	r	2040734.22	13497222.82	687.97
Loader	!0109!	110.8	Lw	LOAD		(none)	6.56	r	2041158.78	13497099.56	853
Bulldozer	!0109!	115.8	Lw	BOZ		(none)	6.56	r	2040662.64	13497102.98	692.36
light_truck_1	!0109!	103	Lw	103	500	(none)	6.56	r	2040031.28	13496806.4	554.71
light_truck_2	!0109!	103	Lw	103	500	(none)	6.56	r	2039812.23	13497107.19	584.57
water_truck	!0109!	118	Lw	118	500	(none)	6.56	r	2040160.43	13497242.81	650.64
Pump	!0109!	112.8	Lw	PUMP		(none)	6.56	r	2040576.41	13497361.78	661.8
Track Drill rig - 5 dB shielding from tunnel/shaft	!010A00!	117.8	Lw	TDRIG		(none)	1	r	2039702	13498436	578.01
Compressor	!010A00!	110.8	Lw	COMP		(none)	6.56	r	2039908	13498507	549.84
Loader	!010A00!	110.8	Lw	LOAD		(none)	6.56	r	2039611	13498420	611.13
Pump	!010A00!	112.8	Lw	PUMP		(none)	6.56	r	2039874	13498366	524.61
Generator	!010A00!	99.8	Lw	GEN		(none)	6.56	r	2039824	13498462	556.09
light_truck_2	!010A00!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039699	13498507	598.99
light_truck_1	!010A00!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039765	13498336	538.62
light_truck_2	!010A00!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039814	13498518	569.3
ventilation fan	!010A00!	119.8	Lw	VENTFAN	500	(none)	6.56	r	2039650	13498461	603.26
jacklegs	!010A00!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039812	13498390	545.19
shotcrete batch plant	!010A00!	109.8	Lw	SBATCHP	500	(none)	6.56	r	2039753	13498378	558.72
light_truck_2	!010A00!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039679	13498357	572.14
light_truck_1	!010A00!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039830	13498314	522.43
jacklegs	!010A00!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039744	13498421	569.73
small backhoe	!010A00!	112.8	Lw	SBHOE	500	(none)	6.56	r	2039721	13498430	577.35
150t crane	!010A00!	111.8	Lw	CRANE150T	500	(none)	6.56	r	2039673	13498548	613.28
telehandler	!010A00!	110.8	Lw	TELEHAND	500	(none)	6.56	r	2039654	13498399	590.11

Table A- 15. ADSRP CadnaA On-Site Construction Noise Results, DNL Calculation

Receiver		Height		Coordinates			Year 1	Year 2	Year 3	Year 6	Year 7	Year 2
Name	ID			X	Y	Z	Day	Day	Day	Day	Day	Day
		(ft)		(ft)	(ft)	(ft)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R01	!02!R01	9.84	r	2036199.3	13497205	405.6	60.8	57	60.4	58.8	58.3	57
R02	!02!R02	9.84	r	2036734.8	13497862.8	415.5	71.7	65.7	66.6	69.6	68.9	65.7
R03	!02!R03	9.84	r	2036918.8	13497344.7	412.3	74.4	66	67.5	73.5	69.9	66
R04	!02!R04	9.84	r	2037464	13497357.4	414.5	73.1	66.4	69.1	71.4	69.9	66.4
R05	!02!R05	9.84	r	2037852.9	13497314.4	417.5	70.3	63.9	69.1	68.5	67.7	63.9
R06	!02!R06	9.84	r	2038345.2	13497255.2	424.4	65.3	64.5	69.4	64.7	65.3	64.5
R07	!02!R07	9.84	r	2038757.9	13496747	447.1	61.9	63.9	69.3	62.4	63.8	63.9
R08	!02!R08	9.84	r	2039941.4	13496201.6	573.7	60.4	62	68.5	59.5	63.9	62
R09	!02!R09	9.84	r	2040681.1	13496192.9	708.6	56	53.5	58.6	54.2	54.8	53.5
R10	!02!R10	9.84	r	2043416.6	13496287	748	37.5	29.3	29.4	51.4	29	29.3
R11	!02!R11	9.84	r	2048115.5	13493744	659.6	43.5	14.5	28.7	53.2	20.8	14.5
R12	!02!R12	9.84	r	2049896.4	13492799.2	659.6	40.3	-80.2	-80.2	57	-80.2	-80.2
R13	!02!R13	9.84	r	2049085.4	13496052.6	849.7	41.2	14	34.5	47.1	30.6	14
R31	!02!R31	9.84	r	2038638.7	13496936.6	442.6	63	64.3	69.4	63.3	64.6	64.3
R32	!02!R32	9.84	r	2038976	13497455.3	430.6	61.5	67.8	72.8	66.1	67.8	67.8
R33	R33	5.00	r	2041289.4	13497588.6	885.5	59.1	52.3	59.9	62.5	60.9	52.3
R34	R34	5.00	r	2042208	13496699.5	753	32.8	24.4	27.6	38.8	28	24.4

Table A- 16. ADSRP CadnaA On-Site Construction Noise Point Sources, FTA Calculation

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
light_truck_2	!010100!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2037466.96	13497725.11	406.82
motor_grader	!010100!	119.8	Lw	MGRAD	500	(none)	6.56	r	2037619.78	13497726.71	406.82
loader	!010100!	114.8	Lw	LOAD	500	(none)	6.56	r	2037178.01	13497796.55	403.08
Medium Bulldozer	!010100!	119.8	Lw	MBDOZ		(none)	6.56	r	2037583.53	13498273.1	455.12
Medium Bulldozer	!010100!	119.8	Lw	MBDOZ		(none)	6.56	r	2039585.64	13496976.17	491.63
Medium Excavator	!010100!	119.8	Lw	MEXC		(none)	6.56	r	2037794.74	13498246.69	451.21
Medium Excavator	!010100!	119.8	Lw	MEXC		(none)	6.56	r	2040672.92	13497294.59	679.38
Motor Grader	!010100!	119.8	Lw	MGRAD		(none)	6.56	r	2037117.05	13497868.24	400.86
Track Drill Rig	!010100!	129.8	Lw	TDRIG		(none)	6.56	r	2040764.32	13499131.34	461.56

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Track Drill Rig	!010100!	129.8	Lw	TDRIG		(none)	6.56	r	2042218.6	13498629.08	524.18
Loader	!010100!	114.8	Lw	LOAD		(none)	6.56	r	2037473.5	13497939.75	405.91
Medium Excavator	!010100!	119.8	Lw	MEXC		(none)	6.56	r	2037783.98	13497652.48	406.82
light_truck_1	!010100!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2037433.89	13497727.87	406.82
articulated_dump_truck	!010100!	118.8	Lw	ADT	500	(none)	6.56	r	2037346.15	13497775.89	405.47
water_truck	!010100!	118.8	Lw	WTRUCK	500	(none)	6.56	r	2037545.29	13497718.02	406.82
Loader	!010100!	111.8	Lw	LOAD-3		(none)	6.56	r	2048337.25	13493386.15	656.24
Loader	!010100!	110.8	Lw	LOAD_1	500	(none)	6.56	r	2048266.13	13493351.33	673.16
light_truck_1	!010101!	99.8	Lw	LTRUFOR_1	500	(none)	6.56	r	2039992.14	13498408.45	507.77
Track Drill rig - 5 dB shielding from tunnel/shaft	!010101!	117.8	Lw	TDRIG_1		(none)	1	r	2039702.49	13498435.66	578.01
Compressor	!010101!	110.8	Lw	COMP_1		(none)	6.56	r	2039907.85	13498507.35	549.84
Loader	!010101!	110.8	Lw	LOAD_1		(none)	6.56	r	2039611.04	13498419.76	611.13
Pump	!010101!	112.8	Lw	PUMP_1		(none)	6.56	r	2039874.48	13498365.57	524.61
Generator	!010101!	99.8	Lw	GEN_1		(none)	6.56	r	2039824.1	13498462.35	556.09
light_truck_2	!010101!	99.8	Lw	LTRUCREW_1	500	(none)	6.56	r	2039698.67	13498507.24	598.99
light_truck_1	!010101!	99.8	Lw	LTRUFOR_1	500	(none)	6.56	r	2039764.86	13498336.29	538.62
light_truck_2	!010101!	99.8	Lw	LTRUCREW_1	500	(none)	6.56	r	2039814.19	13498517.75	569.3
ventilation fan	!010101!	119.8	Lw	VENTFAN	500	(none)	6.56	r	2039649.95	13498461.23	603.26
jacklegs	!010101!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039811.77	13498389.73	545.19
shotcrete batch plant	!010101!	109.8	Lw	SBATCHP_1	500	(none)	6.56	r	2039752.81	13498378.44	558.72
light_truck_2	!010101!	99.8	Lw	LTRUCREW_1	500	(none)	6.56	r	2039678.71	13498357.18	572.14
light_truck_1	!010101!	99.8	Lw	LTRUFOR_1	500	(none)	6.56	r	2039830.09	13498313.71	522.43
jacklegs	!010101!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039744.03	13498421.09	569.73
small backhoe	!010101!	112.8	Lw	SBHOE_1	500	(none)	6.56	r	2039721.45	13498429.87	577.35
150t crane	!010101!	111.8	Lw	CRANE150T	500	(none)	6.56	r	2039672.53	13498547.79	613.28
telehandler	!010101!	110.8	Lw	TELEHAND	500	(none)	6.56	r	2039653.71	13498398.51	590.11
articulated_dump_truck	!010200!	118.8	Lw	ADT	500	(none)	6.56	r	2037346.15	13497775.89	405.47
light_truck_1	!010200!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2037433.89	13497727.87	406.82
Large Excavator	!010200!	119.8	Lw	LEXC		(none)	6.56	r	2039241.64	13498080.84	575.11
Track Drill rig	!010200!	129.8	Lw	TDRIG		(none)	6.56	r	2039284.11	13498175.74	606.71
Compressor	!010200!	114.8	Lw	COMP		(none)	6.56	r	2039128.77	13498063.28	532.62
Loader	!010200!	114.8	Lw	LOAD		(none)	6.56	r	2039247.51	13498195.83	601.4
Man Lift	!010200!	119.8	Lw	MLIFT		(none)	6.56	r	2039372.92	13497993.52	603.6

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Pump	!010200!	115.8	Lw	PUMP		(none)	6.56	r	2039296.06	13497995.89	576.3
Generator	!010200!	102.8	Lw	GEN		(none)	6.56	r	2039326.32	13498123.15	609.81
Loader	!010200!	114.8	Lw	LOAD		(none)	6.56	r	2037473.5	13497939.75	405.91
light_truck_2	!010200!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2037466.96	13497725.11	406.82
light_truck_1	!010200!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2039405.03	13498196.73	642.48
light_truck_2	!010200!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2039760.56	13497283.06	581.84
articulated_dump_truck	!010200!	118.8	Lw	ADT	500	(none)	6.56	r	2039605.44	13497119.58	514.94
Track Drill Rig	!010300!	129.8	Lw	TDRIG		(none)	6.56	r	2038782.43	13497847.93	461.25
Track Drill Rig	!010300!	129.8	Lw	TDRIG		(none)	6.56	r	2039524.06	13497005.28	497.87
Compresor	!010300!	114.8	Lw	COMP		(none)	6.56	r	2039427.18	13497218.43	485.05
Man Lift	!010300!	119.8	Lw	MLIFT		(none)	6.56	r	2039655.83	13496892.89	477.72
Generator	!010300!	102.8	Lw	GEN		(none)	6.56	r	2039008.63	13497633.1	437.47
concrete pump truck	!010300!	119.8	Lw	CPUMPTRU	500	(none)	6.56	r	2039747.96	13497262.31	578.76
water_truck	!010301!	118.8	Lw	WTRUCK	500	(none)	6.56	r	2039582.77	13497116.82	511.19
Medium Excavator	!010301!	119.8	Lw	MEXC		(none)	6.56	r	2039654.39	13497881.1	627.2
Mini Excavator	!010301!	119.8	Lw	MINIEXC		(none)	6.56	r	2039326.3	13497840.09	557.87
Track Drill Rig	!010301!	129.8	Lw	TDRIG		(none)	6.56	r	2039593.85	13497453.41	557.78
Track Drill Rig	!010301!	129.8	Lw	TDRIG		(none)	6.56	r	2039957.79	13498310.1	495.46
Compressor	!010301!	114.8	Lw	COMP		(none)	6.56	r	2040013.73	13497326.47	631.84
Loader	!010301!	114.8	Lw	LOAD		(none)	6.56	r	2039666.11	13498281.45	550.04
Pump	!010301!	115.8	Lw	PUMP		(none)	6.56	r	2040076.22	13497656.51	560.63
Generator	!010301!	102.8	Lw	GEN		(none)	6.56	r	2039888.74	13498000.23	521.98
Medium Excavator	!010301!	119.8	Lw	MEXC		(none)	6.56	r	2037794.74	13498246.69	451.21
Loader	!010301!	114.8	Lw	LOAD		(none)	6.56	r	2037473.5	13497939.75	405.91
light_truck_1	!010301!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2037433.89	13497727.87	406.82
light_truck_2	!010301!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2037466.96	13497725.11	406.82
articulated_dump_truck	!010301!	118.8	Lw	ADT	500	(none)	6.56	r	2037346.15	13497775.89	405.47
light_truck_1	!010301!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2039915.58	13496964.7	561.97
light_truck_2	!010301!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2039808.16	13497117.48	586.02
articulated_dump_truck	!010301!	118.8	Lw	ADT	500	(none)	6.56	r	2040024.34	13496826.15	556.25
light_truck_1	!010301!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2039868.17	13496784.53	529.77
light_truck_2	!010301!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2039719.66	13496926.25	507.4
Large Excavator	!010700!	119.8	Lw	LEXC2		(none)	6.56	r	2040734.22	13497222.82	687.97
Medium Excavator	!010700!	119.8	Lw	MEXC2		(none)	6.56	r	2040062.96	13498073.07	461.56

Name	ID	Result. PWL (dBA)	Lw / Li Type	Value	Freq. (Hz)	Direct.	Height (ft)		Coordinates X (ft)	Y (ft)	Z (ft)
Medium Excavator	!010700!	119.8	Lw	MEXC		(none)	6.56	r	2039375.32	13498213.52	638.41
Medium Excavator	!010700!	119.8	Lw	MEXC		(none)	6.56	r	2039946.26	13498435.67	523.92
Small Back Hoe	!010700!	116.8	Lw	SBHOE		(none)	6.56	r	2040871.18	13497451.07	765
Loader	!010700!	114.8	Lw	LOAD		(none)	6.56	r	2041158.78	13497099.56	853
Motor Grader	!010700!	119.8	Lw	MGRAD		(none)	6.56	r	2042811.53	13498864.97	466.56
Bulldozer	!010700!	119.8	Lw	BOZ		(none)	6.56	r	2041985.05	13499391.22	466.56
Bulldozer with Discs	!010700!	119.8	Lw	BDOZWITHDISCS		(none)	6.56	r	2039862.26	13497690.19	602.14
Bulldozer with Discs	!010700!	119.8	Lw	BDOZWITHDISCS		(none)	6.56	r	2049657.09	13493491.93	540.3
Bulldozer	!010700!	119.8	Lw	MBDOZ		(none)	6.56	r	2040715.96	13496994.57	717.35
Bulldozer	!010700!	119.8	Lw	MBDOZ		(none)	6.56	r	2047992.67	13494575.65	516.56
Vibratory Smooth Drum Roller	!010700!	119.8	Lw	VIBSDROLL		(none)	6.56	r	2039612.54	13497663.66	616.75
Vibratory Smooth Drum Roller	!010700!	119.8	Lw	VIBSDROLL		(none)	6.56	r	2039360.76	13497701.7	545.91
Padfoot Roller	!010700!	119.8	Lw	PADROLL		(none)	6.56	r	2039223.44	13497952.99	543.11
Padfoot Roller	!010700!	119.8	Lw	PADROLL		(none)	6.56	r	2039451.74	13497941.92	617.45
Padfoot Roller	!010700!	119.8	Lw	PADROLL		(none)	6.56	r	2039563.31	13498153.93	607.16
Padfoot Roller	!010700!	119.8	Lw	PADROLL		(none)	6.56	r	2041556.39	13500380.85	561.49
Tamping Foot Roller	!010700!	119.8	Lw	TAMPFROLL		(none)	6.56	r	2039912.97	13497489.4	645.86
Tamping Foot Roller	!010700!	119.8	Lw	TAMPFROLL		(none)	6.56	r	2039740.15	13498355.18	553.77
Tamping Foot Roller	!010700!	119.8	Lw	TAMPFROLL		(none)	6.56	r	2039607.89	13497806.61	641.33
Tamping Foot Roller	!010700!	119.8	Lw	TAMPFROLL		(none)	6.56	r	2050094.42	13493464.96	542.93
Compressor	!010700!	114.8	Lw	COMP		(none)	6.56	r	2040994.43	13497336.95	793.78
Compressor	!010700!	114.8	Lw	COMP		(none)	6.56	r	2042622.93	13499117.16	466.56
Generator	!010700!	102.8	Lw	GEN		(none)	6.56	r	2040820.96	13497063.04	715.46
Generator	!010700!	102.8	Lw	GEN		(none)	6.56	r	2041811.58	13499322.75	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2037312.89	13497761.85	404.94
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2037724.55	13498222.49	440.94
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2048286.16	13494304.04	522.37
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2050533.36	13493287.09	552.27
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2040903.13	13496976.31	788.07
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2042204.17	13499372.96	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2042341.13	13499140.15	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2039626.01	13497991.75	614.76
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK		(none)	6.56	r	2041002.5	13501025.29	563.13
Medium Excavator	!010700!	119.8	Lw	MEXC		(none)	6.56	r	2037783.98	13497652.48	406.82

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Bulldozer	!010700!	119.8	Lw	BDOZ2		(none)	6.56	r	2036783.76	13497534.99	404.6
light_truck_1	!010700!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2037433.89	13497727.87	406.82
light_truck_2	!010700!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2037466.96	13497725.11	406.82
articulated_dump_truck	!010700!	118.8	Lw	ADT	500	(none)	6.56	r	2037346.15	13497775.89	405.47
water_truck	!010700!	118.8	Lw	WTRUCK	500	(none)	6.56	r	2037545.29	13497718.02	406.82
Bulldozer	!010700!	119.8	Lw	BDOZ2	500	(none)	6.56	r	2042790.93	13499272.29	466.56
Light Plant for Night Work	!010700!	102.8	Lw	LPLANTNWORK	500	(none)	6.56	r	2041848.1	13499514.48	466.56
Small Back Hoe	!010700!	116.8	Lw	SBHOE	500	(none)	6.56	r	2042354.82	13499295.36	466.56
Medium Excavator	!010800!	119.8	Lw	MEXC		(none)	6.56	r	2040629.23	13497222.82	678.06
Bulldozer	!010800!	119.8	Lw	MBDOZ		(none)	6.56	r	2040706.83	13497090.43	694.61
Track Drill Rig	!010800!	129.8	Lw	TDRIG		(none)	6.56	r	2040436.91	13497542.45	648.01
Compressor	!010800!	114.8	Lw	COMP		(none)	6.56	r	2040784.44	13497158.91	693.56
Loader	!010800!	114.8	Lw	LOAD		(none)	6.56	r	2040254.89	13497318.69	656.27
Man Lift	!010800!	119.8	Lw	MLIFT		(none)	6.56	r	2040624.67	13497341.5	671.36
Motor Grader	!010800!	119.8	Lw	MGRAD		(none)	6.56	r	2040496.84	13497706.72	635.97
Padfoot Roller	!010800!	119.8	Lw	PADROLL		(none)	6.56	r	2040610.97	13498021.71	587.79
Tamping Foot Roller	!010800!	119.8	Lw	TAMPFROLL		(none)	6.56	r	2040510.54	13497880.19	612.39
Vibratory Smooth Drum Roller	!010800!	119.8	Lw	VIBSDROLL		(none)	6.56	r	2038808.09	13497707.73	436.43
Asphalt Paving Machine	!010800!	119.8	Lw	ASHPAVMAC		(none)	6.56	r	2040761.61	13496930.65	737.45
Asphalt Compactor	!010800!	117.8	Lw	ASHCOM		(none)	6.56	r	2038809.09	13497631.28	424.93
Concrete Vibrator	!010800!	110.8	Lw	CONVIB		(none)	6.56	r	2038777.86	13497662.59	429.75
Concrete Vibrator	!010800!	110.8	Lw	CONVIB		(none)	6.56	r	2040560.75	13497209.12	678.65
Generator	!010800!	102.8	Lw	GEN		(none)	6.56	r	2040469.45	13497619.98	642.6
articulated_dump_truck	!010800!	118.8	Lw	ADT	500	(none)	6.56	r	2037346.15	13497775.89	405.47
Medium Excavator	!010800!	119.8	Lw	MEXC		(none)	6.56	r	2037783.98	13497652.48	406.82
Bulldozer	!010800!	119.8	Lw	BDOZ2		(none)	6.56	r	2036783.76	13497534.99	404.6
light_truck_1	!010800!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2037433.89	13497727.87	406.82
light_truck_2	!010800!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2037466.96	13497725.11	406.82
Vibratory Smooth Drum Roller	!010800!	119.8	Lw	VIBSDROLL		(none)	6.56	r	2037491.79	13497573.75	407.71
articulated_dump_truck	!010800!	118.8	Lw	ADT	500	(none)	6.56	r	2040024.34	13496826.15	556.25
water_truck	!010800!	118.8	Lw	WTRUCK	500	(none)	6.56	r	2039582.77	13497116.82	511.19
concrete pump truck	!010800!	119.8	Lw	CPUMPTRU	500	(none)	6.56	r	2039747.96	13497262.31	578.76
light_truck_1	!010800!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2039868.17	13496784.53	529.77
light_truck_2	!010800!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2039719.66	13496926.25	507.4

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
light_truck_1	!0109!	109.8	Lw	LTRUFOR	500	(none)	6.56	r	2039915.58	13496964.7	561.97
light_truck_2	!0109!	109.8	Lw	LTRUCREW	500	(none)	6.56	r	2039808.16	13497117.48	586.02
Pump	!0109!	115.8	Lw	PUMP		(none)	6.56	r	2040535.31	13497352.96	656.17
water_truck	!0109!	118.8	Lw	WTRUCK	500	(none)	6.56	r	2040089.52	13497244.76	650.44
Loader	!0109!	114.8	Lw	LOAD		(none)	6.56	r	2041158.78	13497099.56	853
Bulldozer	!0109!	119.8	Lw	MBDOZ		(none)	6.56	r	2040715.96	13496994.57	717.35
Large Excavator	!0109!	119.8	Lw	LEXC2		(none)	6.56	r	2040734.22	13497222.82	687.97
light_truck_1	!010A00!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039992	13498408	507.77
Track Drill rig - 5 dB shielding from tunnel/shaft	!010A00!	117.8	Lw	TDRIG		(none)	1	r	2039702	13498436	578.01
Compressor	!010A00!	110.8	Lw	COMP		(none)	6.56	r	2039908	13498507	549.84
Loader	!010A00!	110.8	Lw	LOAD		(none)	6.56	r	2039611	13498420	611.13
Pump	!010A00!	112.8	Lw	PUMP		(none)	6.56	r	2039874	13498366	524.61
Generator	!010A00!	99.8	Lw	GEN		(none)	6.56	r	2039824	13498462	556.09
light_truck_2	!010A00!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039699	13498507	598.99
light_truck_1	!010A00!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039765	13498336	538.62
light_truck_2	!010A00!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039814	13498518	569.3
ventilation fan	!010A00!	119.8	Lw	VENTFAN	500	(none)	6.56	r	2039650	13498461	603.26
jacklegs	!010A00!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039812	13498390	545.19
shotcrete batch plant	!010A00!	109.8	Lw	SBATCHP	500	(none)	6.56	r	2039753	13498378	558.72
light_truck_2	!010A00!	99.8	Lw	LTRUCREW	500	(none)	6.56	r	2039679	13498357	572.14
light_truck_1	!010A00!	99.8	Lw	LTRUFOR	500	(none)	6.56	r	2039830	13498314	522.43
jacklegs	!010A00!	116.8	Lw	JACKLG	500	(none)	6.56	r	2039744	13498421	569.73
small backhoe	!010A00!	112.8	Lw	SBHOE	500	(none)	6.56	r	2039721	13498430	577.35
150t crane	!010A00!	111.8	Lw	CRANE150T	500	(none)	6.56	r	2039673	13498548	613.28
telehandler	!010A00!	110.8	Lw	TELEHAND	500	(none)	6.56	r	2039654	13498399	590.11

Table A- 17. ADSRP CadnaA On-Site Construction Noise Results, FTA Calculation

Receiver		Height		Coordinates			Year 1		V3	V7	V8	V9	V10
Name	ID			X	Y	Z	Day	Night	Day/ Night	Day/ Night	Day/ Night	Day/ Night	Day/ Night
		(ft)		(ft)	(ft)	(ft)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R01	!02!R01	9.84	r	2036199.3	13497205	405.6	60.5	34.9	61.5	65.8	62.2	62	61.5
R02	!02!R02	9.84	r	2036734.8	13497862.8	415.5	71.9	33.9	67.1	68.2	71.6	71.6	67.1

Receiver		Height		Coordinates			Year 1		V3	V7	V8	V9	V10
								Night	Day/	Day/	Day/	Day/	Day/
Name	ID			X	Y	Z	Day		Night	Night	Night	Night	Night
		(ft)		(ft)	(ft)	(ft)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R03	!02!R03	9.84	r	2036918.8	13497344.7	412.3	71	35.4	67.2	70	73.2	73.3	67.2
R04	!02!R04	9.84	r	2037464	13497357.4	414.5	74.4	37.6	70	72.4	72.7	75.4	70
R05	!02!R05	9.84	r	2037852.9	13497314.4	417.5	72.9	38.7	68.8	72.8	72	72.6	68.8
R06	!02!R06	9.84	r	2038345.2	13497255.2	424.4	67.9	41.2	69.8	75.3	69.3	70.2	69.8
R07	!02!R07	9.84	r	2038757.9	13496747	447.1	64.5	42.4	68.8	75.2	67.5	67	68.8
R08	!02!R08	9.84	r	2039941.4	13496201.6	573.7	63.5	49	66.3	74.5	65.2	66.9	66.3
R09	!02!R09	9.84	r	2040681.1	13496192.9	708.6	57.5	49.9	57.9	64.3	58.4	58.2	57.9
R10	!02!R10	9.84	r	2043416.6	13496287	748	41.2	32.6	35.1	34.1	55.5	33.7	35.1
R11	!02!R11	9.84	r	2048115.5	13493744	659.6	46	42.5	20.3	34.9	57.3	26.9	20.3
R12	!02!R12	9.84	r	2049896.4	13492799.2	659.6	42.3	39.6	-80.2	-80.2	62.7	-80.2	-80.2
R13	!02!R13	9.84	r	2049085.4	13496052.6	849.7	45.6	38.6	12.8	40.9	51.5	36.9	12.8
R31	!02!R31	9.84	r	2038638.7	13496936.6	442.6	65.6	42.2	69.4	75.4	68.2	68.9	69.4
R32	!02!R32	9.84	r	2038976	13497455.3	430.6	63.9	43	73.7	79.3	72	74.3	73.7
R33	R33	5.00	r	2041289.4	13497588.6	885.5	60.6	57.3	58.1	66.1	66.4	66.3	58.1
R34	R34	5.00	r	2042208	13496699.5	753	35.1	29.4	27.9	32.8	42.9	32.5	27.9

OGIER PONDS

A. EQUIPMENT LIST AND SOUND LEVELS

Table A- 18. Ogier Ponds Equipment List

Ogier Ponds Restoration Conservation Measure Estimate of On-Site Equipment (02/03/2022)

#	Construction Activity	Construction Phase	Approx. Duration (months)	Utilization Factor	Equipment Quantity	Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)^3	Operating Hours/Day	Days/ Week
5	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	1	Medium Bulldozer	CAT D8T	cat.com	Diesel	354	10	5
6	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	1	Medium excavator	CAT 330	cat.com	Diesel	273	10	5
7	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	1	Motor grader	CAT 16	cat.com	Diesel	290	10	5
8	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	1	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5
9	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	2	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
10	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	2	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
11	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	2	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
12	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	2	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
13	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	1.0	1	Pump for water trucks	GODWIN CD150M	xylem.com	Diesel	74	10	5
14	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	0.9	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
15	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 6	3	1.0	-	No Equipment - Crew	-	-	-	-	10	5
25	Dewater Pond 1	Year 6	3	0.7	40	Pump	GODWIN CD75	xylem.com	Diesel	17	24	7
26	Dewater Pond 1	Year 6	3	0.9	1	Long-reach excavator	CAT 352 LRE	cat.com	Diesel	424	10	5
27	Dewater Pond 1	Year 6	3	1.0	1	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	10	5
28	Dewater Pond 1	Year 6	3	0.9	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
29	Dewater Pond 1	Year 6	3	0.9	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
30	Dewater Pond 1	Year 6	3	1.0	-	No Equipment - Crew	-	-	-	-	10	5
	Dewater Pond 1	Year 6	0.50	0.5	1	Pile Drivers	GIKEN SILENT PILER F401-1400	giken.com	Diesel	355	10	5
40	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	1	Bulldozer	CAT D10T2	cat.com	Diesel	722	10	5
41	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	1	Long-reach excavator	CAT 352 LRE	cat.com	Diesel	424	10	5
42	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
43	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
44	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
45	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	20	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
46	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	1	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
47	Pond 1 Fill Borrow Hill Excavation	Year 6	2	0.9	1	Pump for water trucks	GODWIN CD150M	xylem.com	Diesel	74	10	5
48	Pond 1 Fill Borrow Hill Excavation	Year 6	2	1.0	-	No Equipment - Crew	-	-	-	-	10	5
	Pond 1 Fill Borrow Hill Excavation		2	0.9	0	Conveyors	FINLAY TC-100	terex.com	Diesel	110	10	5
	Pond 1 Fill Borrow Hill Excavation		2	0.9	0	Soil shakers and sifters	FINLAY 893+	terex.com	Diesel	202	10	5
62	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	2	Bulldozer	CAT D10T2	cat.com	Diesel	722	10	5
63	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	1	Long-reach excavator	CAT 352 LRE	cat.com	Diesel	424	10	5
64	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	2	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
65	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5

Ogier Ponds Restoration Conservation Measure Estimate of On-Site Equipment (02/03/2022)

#	Construction Activity	Construction Phase	Approx. Duration (months)	Utilization Factor	Equipment Quantity	Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)³	Operating Hours/Day	Days/ Week
66	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
67	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	20	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
68	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	1	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
69	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	0.9	1	Pump for water trucks	GODWIN CD150M	xylem.com	Diesel	74	10	5
70	Excavate and Sort Creek Materials from Holiday Bench Excavation	Year 7	4	1.0	-	No Equipment - Crew	-	-	-	-	10	5
91	Spillway	Year 7	2	0.7	1	Concrete pump truck	Liebherr 42 M5 XXT	liebherr.com	Diesel	500	10	5
92	Spillway	Year 7	2	0.7	1	Compressor	Doosan HP450	doosanportablepower.com	Diesel	173	10	5
93	Spillway	Year 7	2	0.7	1	Bobcat	S590 Skid-Steer Loader	bobcat.com	Diesel	68	10	5
94	Spillway	Year 7	2	0.7	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
95	Spillway	Year 7	2	0.7	2	Manlift	JLG 600AJ	jlg.com	Diesel	67	10	5
96	Spillway	Year 7	2	0.7	0	Crane 150t	GROVE GRT9165	manitowoc.com	Diesel	300	10	5
97	Spillway	Year 7	2	1.0	2	Pump	GODWIN CD75	xylem.com	Diesel	17	10	5
98	Spillway	Year 7	2	0.7	2	Welder	Big Blue® 800 Series	millerwelds.com	Diesel	66	10	5
99	Spillway	Year 7	2	0.7	4	Concrete vibrator	1.5 Inch x 18 Foot Flexible	californiatoolsandequipment.com	Gasoline	6.5	10	5
100	Spillway	Year 7	2	1.0	1	Generator (80 kW)	Generac SD100	generac.com	Diesel	152	10	5
101	Spillway	Year 7	2	1.0	2	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
102	Spillway	Year 7	2	1.0	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
103	Spillway	Year 7	2	1.0	2	Light truck - Carpenters	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
104	Spillway	Year 7	2	1.0	-	No Equipment - Crew	-	-	-	-	10	5

B. CADNAA INPUTS AND RESULTS

Table A- 19. Ogier Ponds CadnaA On-Site Construction Noise Point Sources, DNL Calculation

Name	ID	Result. PWL (dBA)	Lw / Li Type	Value	Freq. (Hz)	Direct.	Height (ft)		Coordinates X (ft)	Y (ft)	Z (ft)
Medium Bulldozer	!0401!	115.5	Lw	MDoz		(none)	5	r	2020319.5	13502447.18	325.34
Medium Excavator	!0401!	115.5	Lw	MedExc		(none)	5	r	2019545.1	13503159.08	321.45
Motor Grader	!0401!	115.5	Lw	MGrad		(none)	5	r	2018659.57	13503947.37	319.41
Track Drill Rig	!0401!	126.5	Lw	TDrRig		(none)	5	r	2021962.07	13502346.48	333.08
Pump For Water Trucks	!0401!	108.4	Lw	PWTruc		(none)	5	r	2021132.1	13502329.11	330.2
Loader	!0401!	111.5	Lw	LD		(none)	5	r	2020202.45	13501314.67	323.21
Long Reach Excavator	!0403!	115.5	Lw	LRExc		(none)	5	r	2022943.46	13501801.59	333.08
Generator	!0403!	99.5	Lw	Gen		(none)	5	r	2022435.96	13501893.47	333.08
Loader	!0403!	111.5	Lw	LD		(none)	4.99	r	2020208.17	13501302.2	323.22
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021650.96	13502092.93	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021606.33	13502150.48	332.9
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021681.5	13502112.9	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021636.86	13502170.45	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021709.69	13502126.99	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021670.93	13502183.96	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021746.1	13502145.78	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021701.46	13502203.34	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021776.63	13502165.75	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021732	13502223.3	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021804.82	13502179.85	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021766.06	13502236.81	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021834.19	13502196.29	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021789.55	13502253.84	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021864.72	13502216.26	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021820.09	13502273.81	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021892.91	13502230.35	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021854.15	13502287.32	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021922.28	13502240.92	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021877.64	13502298.47	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021981	13502274.98	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021942.24	13502331.95	333.08

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022016.24	13502294.95	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021971.61	13502352.5	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022046.78	13502314.92	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022002.14	13502372.47	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022074.97	13502329.01	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022036.21	13502385.98	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022111.38	13502345.46	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022066.74	13502403.01	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022141.91	13502365.42	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022097.28	13502422.98	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022170.1	13502379.52	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022131.34	13502436.48	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022206.51	13502397.14	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022161.88	13502454.69	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022237.05	13502417.1	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022192.42	13502474.65	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022265.24	13502431.2	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2022226.48	13502488.16	333.08
80 kW generator	!0403!	99.5	Lw	Gen		(none)	6	r	2021934.5	13502289.5	334.08
Pile Driver	!0403!	100	Lw	silent_piler		(none)	6	r	2021986.71	13501991.17	334.08
Bulldozer	!0405!	115.5	Lw	Doz		(none)	5	r	2022431.58	13502190.97	333.08
Long Reach Excavator	!0405!	115.5	Lw	LRExc		(none)	5	r	2022252.21	13501985.34	333.08
Loader	!0405!	111.5	Lw	LD		(none)	5	r	2020246.78	13501334.72	323.51
Pump For Water Truck	!0405!	108.4	Lw	PWTruc		(none)	5	r	2022819.21	13501642.14	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022205.61	13502189.85	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022125.7	13502133.61	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022059.11	13502092.92	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022026.55	13502001.91	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2021871.33	13501985.3	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2021946.81	13501957.93	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022337.05	13502237.39	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022502.06	13502149.76	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2020207.62	13501304.61	323.23
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022681.05	13502014.59	333.08

Name	ID	Result. PWL	Lw / Li	Value	Freq.	Direct.	Height		Coordinates		
			Type						X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022744.9	13501971.71	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022810.16	13501874.75	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022853.04	13501740.51	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022734.65	13501667.8	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022572.44	13501647.29	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022471.76	13501721.87	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022339.38	13501742.38	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022200.48	13501822.55	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2022047.6	13501864.5	333.08
Articulated Dump Truck	!0405!	115.5	Lw	ATD		(none)	5	r	2021923.61	13501903.65	333.08
100HP Conveyer	!0405!	82.5	Lw	Conveyer		(none)	6	r	2022078.08	13502198.14	334.08
Soil Shaker and Sifter	!0405!	113.8	Lw	VH		(none)	6	r	2022134.01	13502250.35	334.08
Loader	!0407!	111.5	Lw	LD		(none)	5	r	2020208.41	13501319.34	323.25
pump	!0407!	112.5	Lw	PMP		(none)	5	r	2021295.07	13502354.85	331.23
pump	!0407!	112.5	Lw	PMP		(none)	5	r	2021189.37	13502431.2	330.68
Generator	!0407!	99.5	Lw	Gen		(none)	5	r	2022435.96	13501893.47	333.08
concrete pump truck	!0407!	112.5	Lw	CPmpTru		(none)	5	r	2021226.4	13502287.15	330.73
compressor	!0407!	110.5	Lw	Comp		(none)	5	r	2021191.16	13502585.48	330.88
Manlift	!0407!	112.5	Lw	MLift		(none)	5	r	2021022.03	13502406.95	329.62
Manlift	!0407!	112.5	Lw	MLift		(none)	5	r	2021407.28	13502352.93	331.92
Concrete Vibrator	!0407!	103.5	Lw	ConVib		(none)	5	r	2020982.09	13502298.9	329.24
Concrete Vibrator	!0407!	103.5	Lw	ConVib		(none)	5	r	2021278.08	13502519.71	331.33
Concrete Vibrator	!0407!	103.5	Lw	ConVib		(none)	5	r	2021496.54	13502374.07	332.5
Concrete Vibrator	!0407!	103.5	Lw	ConVib		(none)	5	r	2021289.82	13502146.21	330.94
Medium Bulldozer	!0401!	115.5	Lw	MDoz		(none)	5	r	2020319.5	13502447.18	325.34
Medium Excavator	!0401!	115.5	Lw	MedExc		(none)	5	r	2019545.1	13503159.08	321.45
Motor Grader	!0401!	115.5	Lw	MGrad		(none)	5	r	2018659.57	13503947.37	319.41
Track Drill Rig	!0401!	126.5	Lw	TDrRig		(none)	5	r	2021962.07	13502346.48	333.08
Pump For Water Trucks	!0401!	108.4	Lw	PWTruc		(none)	5	r	2021132.1	13502329.11	330.2
Loader	!0401!	111.5	Lw	LD		(none)	5	r	2020202.45	13501314.67	323.21
Long Reach Excavator	!0403!	115.5	Lw	LRExc		(none)	5	r	2022943.46	13501801.59	333.08
Generator	!0403!	99.5	Lw	Gen		(none)	5	r	2022435.96	13501893.47	333.08
Loader	!0403!	111.5	Lw	LD		(none)	4.99	r	2020208.17	13501302.2	323.22
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021650.96	13502092.93	333.08

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021606.33	13502150.48	332.9
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021681.5	13502112.9	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021636.86	13502170.45	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021709.69	13502126.99	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021670.93	13502183.96	333.08
pump	!0403!	112.5	Lw	PMP		(none)	5	r	2021746.1	13502145.78	333.08

Table A- 20. Ogier Ponds CadnaA On-Site Construction Noise Line Sources, DNL Calculation

Name	ID	Result. PWL	Result. PWL'	Lw / Li		Freq.	Direct.	Moving Pt. Src	
				Type	Value			Number	Speed
		(dBA)	(dBA)			(Hz)			(mph)
Light Truck Forman	!0401!	102.9	70.4	PWL-Pt	LT	500	(none)	2	10
Light Truck Crew	!0401!	102.9	70.4	PWL-Pt	LT	500	(none)	2	10
Articulated Dump Truck	!0401!	108.9	76.4	PWL-Pt	ATD	500	(none)	2	10
Water Truck	!0401!	108.9	76.4	PWL-Pt	WTru	500	(none)	2	10
Light Truck Forman	!0403!	99.9	67.4	PWL-Pt	LT	500	(none)	1	10
Light Truck Forman	!0405!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0405!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Articulated Dump Truck	!0405!	112.9	80.4	PWL-Pt	ATD	500	(none)	5	10
Water Truck	!0405!	112.9	80.4	PWL-Pt	WTru	500	(none)	5	10
Light Truck Forman	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Forman	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2

Table A- 21. Ogier Ponds CadnaA On-Site Construction Noise Results, DNL Calculation

Receiver		Height		Coordinates			V1	V2	V3	V4
Name	ID			X	Y	Z	Day	Day	Day	Day
		(ft)		(ft)	(ft)	(ft)	dB(A)	dB(A)	dB(A)	dB(A)
R14 - 9940 Monterey Hwy	!05!	5	r	2020088	13501968.89	323.32	53.1	47.7	49	43.7
R15 - 559 Monterey Hwy	!05!	5	r	2017727.34	13503959.68	314.31	62.5	51.6	59.2	56.1

R16 - 10000 Monterey Hwy	!05!	5	r	2018386.47	13503434.75	315.39	68.3	55.7	63.2	60.6
R17 - Parkway Lakes RV Park	!05!	5	r	2019423.42	13502811.84	320.27	66.8	59.2	65.8	64.4
R18 - 210 Ogier Ave trailer	!05!	5	r	2021751	13501446.97	332.92	67.4	62.2	66	67.2
R19 - Marra Brother Distributing	!05!	5	r	2020556.13	13502009.43	326.25	65.9	67.3	65.9	69.6
R20 - Santa Clara County	!05!	5	r	2021128.38	13501879.25	329.62	65.8	67.6	70.5	64

Table A- 22. Ogier Ponds CadnaA On-Site Construction Noise Point Sources, FTA Calculation

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Medium Bulldozer	!0401!	119.5	Lw	MDoz		(none)	5	r	2020319.5	13502447.18	325.34
Medium Excavator	!0401!	119.5	Lw	MedExc		(none)	5	r	2019545.1	13503159.08	321.45
Motor Grader	!0401!	119.5	Lw	MGrad		(none)	5	r	2018659.57	13503947.37	319.41
Track Drill Rig	!0401!	129.5	Lw	TDrRig		(none)	5	r	2021962.07	13502346.48	333.08
Pump For Water Trucks	!0401!	115.5	Lw	PWTruc		(none)	5	r	2021132.1	13502329.11	330.2
Loader	!0401!	114.5	Lw	LD		(none)	5	r	2020202.46	13501314.67	323.2
Long Reach Excavator	!0403!	119.5	Lw	LRExc		(none)	5	r	2022943.46	13501801.59	333.08
Generator	!0403!	102.5	Lw	Gen		(none)	5	r	2022435.96	13501893.47	333.08
Loader	!0403!	114.5	Lw	LD		(none)	5	r	2020208.17	13501302.2	323.22
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021650.96	13502092.93	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021606.33	13502150.48	332.9
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021681.5	13502112.9	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021636.86	13502170.45	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021709.69	13502126.99	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021670.93	13502183.96	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021746.1	13502145.78	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021701.46	13502203.34	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021776.63	13502165.75	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021732	13502223.3	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021804.82	13502179.85	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021766.06	13502236.81	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021834.19	13502196.29	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021789.55	13502253.84	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021864.72	13502216.26	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021820.09	13502273.81	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021892.91	13502230.35	333.08

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021854.15	13502287.32	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021922.28	13502240.92	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021877.64	13502298.47	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021981	13502274.98	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021942.24	13502331.95	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022016.24	13502294.95	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2021971.61	13502352.5	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022046.78	13502314.92	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022002.14	13502372.47	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022074.97	13502329.01	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022036.21	13502385.98	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022111.38	13502345.46	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022066.74	13502403.01	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022141.91	13502365.42	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022097.28	13502422.98	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022170.1	13502379.52	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022131.34	13502436.48	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022206.51	13502397.14	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022161.88	13502454.69	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022237.05	13502417.1	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022192.42	13502474.65	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022265.24	13502431.2	333.08
pump	!0403!	115.5	Lw	PMP		(none)	5	r	2022226.48	13502488.16	333.08
Pile Driver	!0403!	100	Lw	silent_piler		(none)	6	r	2021986.71	13501991.17	334.09
Bulldozer	!0405!	119.5	Lw	Doz		(none)	5	r	2022431.58	13502190.97	333.08
Long Reach Excavator	!0405!	119.5	Lw	LRExc		(none)	5	r	2022252.21	13501985.34	333.08
Loader	!0405!	114.5	Lw	LD		(none)	5	r	2020246.78	13501334.71	323.5
Pump For Water Truck	!0405!	115.5	Lw	PWTruc		(none)	5	r	2022819.21	13501642.14	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022205.61	13502189.85	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022125.7	13502133.61	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022059.11	13502092.92	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022026.55	13502001.91	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2021871.33	13501985.3	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2021946.81	13501957.93	333.08

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022337.05	13502237.39	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022502.06	13502149.76	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2020207.61	13501304.63	323.22
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022681.05	13502014.59	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022744.9	13501971.71	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022810.16	13501874.75	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022853.04	13501740.51	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022734.65	13501667.8	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022572.44	13501647.29	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022471.76	13501721.87	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022339.38	13501742.38	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022200.48	13501822.55	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2022047.6	13501864.5	333.08
Articulated Dump Truck	!0405!	118.5	Lw	ATD		(none)	5	r	2021923.61	13501903.65	333.08
100HP Conveyer	!0405!	82.5	Lw	Conveyer		(none)	6	r	2022078.08	13502198.13	334.09
Soil Shaker and Sifter	!0405!	113.8	Lw	VH		(none)	6	r	2022134.02	13502250.36	334.09
Loader	!0407!	114.5	Lw	LD		(none)	5	r	2020208.4	13501319.32	323.24
pump	!0407!	115.5	Lw	PMP		(none)	5	r	2021295.07	13502354.85	331.23
pump	!0407!	115.5	Lw	PMP		(none)	5	r	2021189.37	13502431.2	330.68
Generator	!0407!	102.5	Lw	Gen		(none)	5	r	2022435.96	13501893.47	333.08
concrete pump truck	!0407!	119.5	Lw	CPmpTru		(none)	5	r	2021226.4	13502287.15	330.73
compressor	!0407!	114.5	Lw	Comp		(none)	5	r	2021191.16	13502585.48	330.88
Manlift	!0407!	119.5	Lw	MLift		(none)	5	r	2021022.03	13502406.95	329.62
Manlift	!0407!	119.5	Lw	MLift		(none)	5	r	2021407.28	13502352.93	331.92
Concrete Vibrator	!0407!	110.5	Lw	ConVib		(none)	5	r	2020982.09	13502298.9	329.24
Concrete Vibrator	!0407!	110.5	Lw	ConVib		(none)	5	r	2021278.08	13502519.71	331.33
Concrete Vibrator	!0407!	110.5	Lw	ConVib		(none)	5	r	2021496.54	13502374.07	332.5
Concrete Vibrator	!0407!	110.5	Lw	ConVib		(none)	5	r	2021289.82	13502146.21	330.94

Table A- 23. Ogier Ponds CadnaA On-Site Construction Noise Line Sources, FTA Calculation

Name	ID	Result. PWL	Result. PWL'	Lw / Li		Freq.	Direct.	Moving Pt. Src	
				Type	Value			Number	Speed
		(dBA)	(dBA)			(Hz)			(mph)
Light Truck Forman	!0401!	102.9	70.4	PWL-Pt	LT	500	(none)	2	10
Light Truck Crew	!0401!	102.9	70.4	PWL-Pt	LT	500	(none)	2	10
Articulated Dump Truck	!0401!	111.9	79.4	PWL-Pt	ATD	500	(none)	2	10
Water Truck	!0401!	112.9	80.4	PWL-Pt	WTru	500	(none)	2	10
Light Truck Forman	!0403!	99.9	67.4	PWL-Pt	LT	500	(none)	1	10
Light Truck Forman	!0405!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0405!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Articulated Dump Truck	!0405!	115.9	83.4	PWL-Pt	ATD	500	(none)	5	10
Water Truck	!0405!	116.9	84.4	PWL-Pt	WTru	500	(none)	5	10
Light Truck Forman	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Forman	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2
Light Truck Crew	!0407!	102	69.5	PWL-Pt	LT	500	(none)	1	6.2

Table A- 24. Ogier Ponds CadnaA On-Site Construction Noise Results, FTA Calculation

Receiver		Height		Coordinates			V2	V4	V6	V8
Name	ID			X	Y	Z	Day	Day	Day	Day
		(ft)		(ft)	(ft)	(ft)	dB(A)	dB(A)	dB(A)	dB(A)
R14 - 9940 Monterey Hwy	!05!R14	5	r	2020088	13501968.89	323.32	56.9	50.7	52.2	48.4
R15 - 559 Monterey Hwy	!05!R15	5	r	2017727.34	13503959.68	314.31	66.3	54.6	62.5	60.6
R16 - 10000 Monterey Hwy	!05!R16	5	r	2018386.47	13503434.75	315.39	72.3	58.6	66.5	65.3
R17 - Parkway Lakes RV Park	!05!R17	5	r	2019423.42	13502811.84	320.27	70.6	62.2	68.9	69.4
R18 - 210 Ogier Ave trailer	!05!R18	5	r	2021751	13501446.97	332.92	71.4	65.2	69.2	72.7
R19 - Marra Brother Distributing	!05!R19	5	r	2020556.13	13502009.43	326.25	70.2	70.3	69	75.4
R20 - Santa Clara County	!05!R20	5	r	2021128.38	13501879.25	329.62	69.2	70.6	73.5	69.7

Table A- 25. Ogier Ponds CadnaA On-Site Construction Noise Line Sources at BHBA, DNL Calculation

Name	ID	Result. PWL	Result. PWL'	Lw / Li		Freq.	Direct.	Moving Pt. Src	
				Type	Value			Number	Speed
		(dBA)	(dBA)			(Hz)			(mph)

Articulated Dump Trucks	!0109!	121.9	92.3	PWL-Pt	ADT	500	(none)	90	10

Table A- 26. Ogier Ponds CadnaA On-Site Construction Noise Results near BHBA, DNL Calculation

Name	ID	Level Lr	Height		Coordinates		
					X	Y	Z
		(dBA)	(ft)		(ft)	(ft)	(ft)
18720_Buena_Vista_Ct	!02!R01	49.2	9.84	r	2036199.31	13497204.95	405.64
Boys_Ranch	!02!R02	50.5	9.84	r	2036734.82	13497862.83	415.47
18780_Alicante_Circula	!02!R03	51.4	9.84	r	2036918.8	13497344.65	412.32
2015_Alicante_Pl	!02!R04	53.4	9.84	r	2037463.98	13497357.38	414.47
18675_Corte_Paterna	!02!R05	55	9.84	r	2037852.89	13497314.37	417.55
18625_Corte_Bautista	!02!R06	57.5	9.84	r	2038345.21	13497255.15	424.43
2225_Via_Santa_Elena	!02!R07	59.7	9.84	r	2038757.87	13496747.04	447.09
18290_Cochrane_Rd	!02!R08	61.4	9.84	r	2039941.42	13496201.61	573.71
18051_Barnard_Rd	!02!R09	53.6	9.84	r	2040681.07	13496192.93	708.58
17888_Holiday_Dr	!02!R10	34.3	9.84	r	2043416.6	13496287.04	747.95
3291_Butterfly_Ln	!02!R11	23	9.84	r	2048115.49	13493743.96	659.62
17106_Shady_Ln_Dr	!02!R12	18.9	9.84	r	2049896.39	13492799.21	659.59
3800_E_Dunne_Ave	!02!R13	31.8	9.84	r	2049085.37	13496052.59	849.74

Table A- 27. Ogier Ponds CadnaA On-Site Construction Noise Line Sources at BHBA, FTA Calculation

Name	ID	Result. PWL	Result. PWL'	Lw / Li		Freq.	Direct.	Moving Pt. Src	
				Type	Value			Number	Speed
		(dBA)	(dBA)			(Hz)			(mph)
Articulated Dump Trucks	!0109!	126.2	96.3	PWL-Pt	ADT	500	(none)	90	10

Table A- 28. Ogier Ponds CadnaA On-Site Construction Noise Results near BHBA, FTA Calculation

Name	ID	Level Lr	Height		Coordinates		
					X	Y	Z
		(dBA)	(ft)		(ft)	(ft)	(ft)
18720_Buena_Vista_Ct	!02!R01	51	9.84	r	2036199.31	13497204.95	405.64
Boys_Ranch	!02!R02	52.4	9.84	r	2036734.82	13497862.83	415.47
18780_Alicante_Circula	!02!R03	53.2	9.84	r	2036918.8	13497344.65	412.32

2015_Alicante_Pl	!02!R04	55.1	9.84	r	2037463.98	13497357.38	414.47
18675_Corte_Paterna	!02!R05	56.8	9.84	r	2037852.89	13497314.37	417.55
18625_Corte_Bautista	!02!R06	59.2	9.84	r	2038345.21	13497255.15	424.43
2225_Via_Santa_Elena	!02!R07	60.9	9.84	r	2038757.87	13496747.04	447.09
18290_Cochrane_Rd	!02!R08	62	9.84	r	2039941.42	13496201.61	573.71
18051_Barnard_Rd	!02!R09	55.8	9.84	r	2040681.07	13496192.93	708.58
17888_Holiday_Dr	!02!R10	38.3	9.84	r	2043416.6	13496287.04	747.95
3291_Butterfly_Ln	!02!R11	26.8	9.84	r	2048115.49	13493743.96	659.62
17106_Shady_Ln_Dr	!02!R12	22.9	9.84	r	2049896.39	13492799.21	659.59
3800_E_Dunne_Ave	!02!R13	34.1	9.84	r	2049085.37	13496052.59	849.74

PERCOLATION DAM

A. EQUIPMENT LIST AND SOUND LEVELS

Table A- 29. Percolation Dam Equipment List

Phase 2 Coyote Percolation Dam Conservation Measure Estimate of On-Site Equipment (02/03/2022)

#	Construction Activity	Construction Phase	Approx. Duration (months)	Utilization Factor	Equipment Quantity	Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)³	Operating Hours/Day	Days/ Week
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	1	Medium Bulldozer	CAT D8T	cat.com	Diesel	354	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	1	Medium excavator	CAT 330	cat.com	Diesel	273	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	1	Motor grader	CAT 16	cat.com	Diesel	290	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	1.0	1	Small backhoe	Cat 310	cat.com	Diesel	70	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	2	Track drill rig	PowerROC T35 (2½"–4½")	epiroc.com	Diesel	201	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	2	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	2	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	0.9	2	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	1.0	1	Pump for water trucks	GODWIN CD150M	xylem.com	Diesel	74	10	5
	Construction of the Haul Roads and Preparation of Stockpile Areas	Year 1	0.5	1.0	-	No Equipment - Crew	-	-	-	-	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Bulldozer	CAT D10T2	cat.com	Diesel	722	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Long-reach excavator	CAT 352 LRE	cat.com	Diesel	424	10	5
	Roughened Ramp	Year 2	5.0	1.0	1	Small backhoe	Cat 310	cat.com	Diesel	70	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Loader	CAT 966M XE	cat.com	Diesel	298	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Bobcat	S590 Skid-Steer Loader	bobcat.com	Diesel	68	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Light truck - Forman	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Light truck - Crew	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
	Roughened Ramp	Year 2	5.0	0.9	2	Articulated dump truck	CAT 745	cat.com	Diesel	496	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Water truck	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
	Roughened Ramp	Year 2	5.0	0.9	1	Pump for water trucks	GODWIN CD150M	xylem.com	Diesel	74	10	5
	Roughened Ramp	Year 2	5.0	1.0	-	No Equipment - Crew	-	-	-	-	10	5

B. CADNAA INPUTS AND RESULTS

Table A- 30. Percolation Dam CadnaA On-Site Construction Noise Point Sources

Name	ID	Result. PWL (dBA)	Lw / Li Type	Value	Freq. (Hz)	Direct.	Height (ft)		Coordinates X (ft)	Coordinates Y (ft)	Coordinates Z (ft)
Medium Bulldozer	!04000000!	115.8	Lw	MDozDNL	500	(none)	5	r	2001158.93	13522883.97	237.6
Medium Excavator	!04000000!	115.8	Lw	MExcDNL	500	(none)	5	r	2003388.93	13521400.18	247.78
Loader	!04000000!	110.8	Lw	LoadDNL	500	(none)	5	r	2002041.2	13522215.98	239.45
Motor Grader	!04000000!	115.8	Lw	MGradDNL	500	(none)	5	r	2003121.59	13521573.81	244.17
Small Backhoe	!04000000!	112.8	Lw	SBackhoeDNL	500	(none)	5	r	2001616.76	13522521.91	238.08
Track Drill Rig	!04000000!	122.8	Lw	TDrillRigDNL	500	(none)	5	r	2002429.81	13522083.69	241.12
Track Drill Rig	!04000000!	122.8	Lw	TDrillRigDNL	500	(none)	5	r	2001354.93	13522731.37	237.55
Pump for Water Truck	!04000000!	99.8	Lw	PumpWatTruDNL	500	(none)	5	r	2002355.31	13521991.09	241.03
Medium Bulldozer	!04000001!	119.8	Lw	MDozFTA	500	(none)	5	r	2001158.93	13522883.97	237.6
Medium Excavator	!04000001!	119.8	Lw	MExcFTA	500	(none)	5	r	2003388.93	13521400.18	247.78
Loader	!04000001!	114.8	Lw	LoadFTA	500	(none)	5	r	2002041.2	13522215.98	239.45
Motor Grader	!04000001!	119.8	Lw	MGradFTA	500	(none)	5	r	2003121.59	13521573.81	244.17
Small Backhoe	!04000001!	116.8	Lw	SBackhoeFTA	500	(none)	5	r	2001616.76	13522521.91	238.08
Track Drill Rig	!04000001!	129.8	Lw	TDrillRigFTA	500	(none)	5	r	2002429.81	13522083.69	241.12
Track Drill Rig	!04000001!	129.8	Lw	TDrillRigFTA	500	(none)	5	r	2001354.93	13522731.37	237.55
Pump for Water Truck	!04000001!	102.8	Lw	PumpWatTruFTA	500	(none)	5	r	2002355.31	13521991.09	241.03
Bulldozer	!04010000!	115.8	Lw	BDozDNL	500	(none)	5	r	2001007	13522553.59	235.19
Long Range Excavator	!04010000!	115.8	Lw	LReaExcDNL	500	(none)	5	r	2000510.9	13522674.86	233.57
Small Backhoe	!04010000!	112.8	Lw	SBackhoeDNL	500	(none)	5	r	2000764.46	13522592.18	234.66
Loader	!04010000!	110.8	Lw	LoadDNL	500	(none)	5	r	2000637.68	13522729.98	233.56
Bob Cat	!04010000!	110.8	Lw	BobCatDNL	500	(none)	5	r	2000863.68	13522658.33	234.66
Pump for Water Truck	!04010000!	99.8	Lw	PumpWatTruDNL	500	(none)	5	r	2001055	13522511.82	235.33
Bulldozer	!04010001!	119.8	Lw	BDozFTA	500	(none)	5	r	2001007	13522553.59	235.19
Long Range Excavator	!04010001!	119.8	Lw	LReaExcFTA	500	(none)	5	r	2000510.9	13522674.86	233.57
Small Backhoe	!04010001!	116.8	Lw	SBackhoeFTA	500	(none)	5	r	2000764.46	13522592.18	234.66
Loader	!04010001!	114.8	Lw	LoadFTA	500	(none)	5	r	2000637.68	13522729.98	233.56
Bob Cat	!04010001!	114.8	Lw	BobCatFTA	500	(none)	5	r	2000863.68	13522658.33	234.66
Pump for Water Truck	!04010001!	102.8	Lw	PumpWatTruFTA	500	(none)	5	r	2001055	13522511.82	235.33

Table A- 31. Percolation Dam CadnaA On-Site Construction Noise Line Sources

Name	ID	Result. PWL	Result. PWL'	Lw / Li		Freq.	Direct.	Moving Pt. Src	
				Type	Value			Number	Speed
		(dBA)	(dBA)			(Hz)			(mph)
Light Truck Forman	!04000000!	92.7	62.8	PWL-Pt	LTruForDNL	500	(none)	2	6.2
Light Truck Crew	!04000000!	89.7	59.8	PWL-Pt	LTruCrDNL	500	(none)	1	6.2
Articulated Dump Truck	!04000000!	107.7	77.8	PWL-Pt	ADTDNL	500	(none)	2	6.2
Water Truck	!04000000!	107.7	77.8	PWL-Pt	WTruDNL	500	(none)	2	6.2
Light Truck Forman	!04000001!	102.7	72.8	PWL-Pt	LTruForFTA	500	(none)	2	6.2
Light Truck Crew	!04000001!	99.7	69.8	PWL-Pt	LTruCrFTA	500	(none)	1	6.2
Articulated Dump Truck	!04000001!	111.7	81.8	PWL-Pt	ADTFTA	500	(none)	2	6.2
Water Truck	!04000001!	111.7	81.8	PWL-Pt	WTruFTA	500	(none)	2	6.2
Light Truck Forman	!04010000!	89.7	59.8	PWL-Pt	LTruForDNL	500	(none)	1	6.2
Light Truck Crew	!04010000!	89.7	59.8	PWL-Pt	LTruCrDNL	500	(none)	1	6.2
Articulated Dump Truck	!04010000!	107.7	77.8	PWL-Pt	ADTDNL	500	(none)	2	6.2
Water Truck	!04010000!	104.7	74.8	PWL-Pt	WTruDNL	500	(none)	1	6.2
Light Truck Forman	!04010001!	99.7	69.8	PWL-Pt	LTruForFTA	500	(none)	1	6.2
Light Truck Crew	!04010001!	99.7	69.8	PWL-Pt	LTruCrFTA	500	(none)	1	6.2
Articulated Dump Truck	!04010001!	111.7	81.8	PWL-Pt	ADTFTA	500	(none)	2	6.2
Water Truck	!04010001!	108.7	78.8	PWL-Pt	WTruFTA	500	(none)	1	6.2

Table A- 32. Percolation Dam CadnaA On-Site Construction Noise Results

Receiver		Height		Coordinates			V1	V2	V3	V4
Name	ID			X	Y	Z	Day	Day	Day	Day
		(ft)		(ft)	(ft)	(ft)	dB(A)	dB(A)	dB(A)	dB(A)
R1 - 7295 Forsum Rd	!05!	5	r	2000488.77	13522329.98	234.66	63.2	69.7	65.4	69.4
R2 - 7373 Forsum rd	!05!	5	r	2001279.32	13521475.67	237.89	62.6	69.1	56.3	60.3
R3 - 7026 Basking Ridge Ave	!05!	5	r	2001625.51	13523281.5	245.42	66.7	73.2	58.4	62.5
R4 - 7226 Basking Ridge Ave	!05!	5	r	2002613.01	13522622.9	268.79	65.3	71.9	54.3	58.4
R5 - 7358 Basking Ridge Ave	!05!	5	r	2003339.59	13522126.2	287.15	60.8	66.7	48.2	52.3

SEDIMENT AUGMENTATION
A. EQUIPMENT LIST AND SOUND LEVELS

Table A- 33. Sediment Augmentation Equipment List

Gravel Augmentation and Large Woody Debris Conservation Measure Estimate of On-Site Equipment (02/03/2022)[1]

#	Utilization Factor	Equipment Quantity	Equipment Type	CalEEMod Equipment Type	Assumed Equipment Description	Source/Notes	Fuel Type	Power Rating (HP)[3]	Operating Hours/Day	Days/ Week
	0.9	2	Medium Bulldozer	Rubber Tired Dozers	CAT D8T	cat.com	Diesel	354	10	5
	0.9	2	Medium excavator	Excavators	CAT 330	cat.com	Diesel	273	10	5
	0.9	1	Motor grader	Graders	CAT 16	cat.com	Diesel	290	10	5
	0.9	3	Light truck - Forman	--	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
	0.9	1	Light truck - Crew	--	Ford F150 XLT 3.3L V6	ford.com	Gasoline	290	10	5
	0.9	2	Articulated dump truck	Off-Highway Trucks	CAT 745	cat.com	Diesel	496	10	5
	0.9	2	Water truck	Off-Highway Trucks	4000 gal Water truck	rbauction.com, 2020 KENWORTH T370 T/A	Diesel	330	10	5
	1.0	1	Pump for water trucks	Pumps	GODWIN CD150M	xylem.com	Diesel	74	10	5
	0.9	1	Loader	Rubber Tired Loaders	CAT 966M XE	cat.com	Diesel	298	10	5
	1.0	-	No Equipment - Crew	--	-	-	-	-	10	5

1. Equipment list updated from 02/03/2022 based on subsequent Project changes.

B. CADNAA INPUTS AND RESULTS

Table A- 34. Gravel Augmentation CadnaA On-Site Construction Noise Point Sources

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Medium Bulldozer	!04000100!	115.8	Lw	MDozDNL	500	(none)	5	r	2030320.86	13498479.11	352.77
Medium Bulldozer	!04000100!	115.8	Lw	MDozDNL	500	(none)	5	r	2028660.12	13498896.86	344.99
Medium Excavator	!04000100!	115.8	Lw	MExcDNL	500	(none)	5	r	2029549.53	13498544.25	350.45
Medium Excavator	!04000100!	115.8	Lw	MExcDNL	500	(none)	5	r	2027226.26	13499123.77	339.65
Motor Grader	!04000100!	115.8	Lw	MGradDNL	500	(none)	5	r	2028362.32	13498876.47	346.21
Pumps for Water Truck	!04000100!	99.8	Lw	PumpWatTruDNL	500	(none)	5	r	2027779.84	13498895.93	339.77
Loader	!04000100!	110.8	Lw	LoadDNL	500	(none)	5	r	2028920.59	13498747.33	346.21
Medium Bulldozer	!04000101!	119.8	Lw	MDozFTA	500	(none)	5	r	2030320.86	13498479.11	352.77
Medium Bulldozer	!04000101!	119.8	Lw	MDozFTA	500	(none)	5	r	2028660.12	13498896.86	344.99
Medium Excavator	!04000101!	119.8	Lw	MExcFTA	500	(none)	5	r	2029549.53	13498544.25	350.45
Medium Excavator	!04000101!	119.8	Lw	MExcFTA	500	(none)	5	r	2027226.26	13499123.77	339.65
Motor Grader	!04000101!	119.8	Lw	MGradFTA	500	(none)	5	r	2028362.32	13498876.47	346.21
Pumps for Water Truck	!04000101!	102.8	Lw	PumpWatTruFTA	500	(none)	5	r	2027779.84	13498895.93	339.77
Loader	!04000101!	114.8	Lw	LoadFTA	500	(none)	5	r	2028920.59	13498747.33	346.21
Medium Bulldozer	!04000000!	115.8	Lw	MDozDNL	500	(none)	5	r	2033835.27	13498665.57	379.02
Medium Bulldozer	!04000000!	115.8	Lw	MDozDNL	500	(none)	5	r	2033057.7	13498871.51	379.02
Medium Excavator	!04000000!	115.8	Lw	MExcDNL	500	(none)	5	r	2033303.69	13498927.85	379.02
Medium Excavator	!04000000!	115.8	Lw	MExcDNL	500	(none)	5	r	2032422.07	13497893.93	372.45
Motor Grader	!04000000!	115.8	Lw	MGradDNL	500	(none)	5	r	2032676.76	13498379.39	379.02
Pumps for Water Truck	!04000000!	99.8	Lw	PumpWatTruDNL	500	(none)	5	r	2032507.88	13498042.4	372.45
Loader	!04000000!	110.8	Lw	LoadDNL	500	(none)	5	r	2032858.38	13498697.8	379.02
Medium Bulldozer	!04000000!	115.8	Lw	MDozDNL	500	(none)	5	r	2037769.83	13497888.45	416.04
Medium Bulldozer	!04000000!	115.8	Lw	MDozDNL	500	(none)	5	r	2036658.36	13497517.42	401.18
Medium Excavator	!04000000!	115.8	Lw	MExcDNL	500	(none)	5	r	2036750.07	13497651.43	398.7
Motor Grader	!04000000!	115.8	Lw	MGradDNL	500	(none)	5	r	2037161.52	13497987.93	398.7
Loader	!04000000!	110.8	Lw	LoadDNL	500	(none)	5	r	2037482.02	13497984.1	404.76
Medium Bulldozer	!04000001!	119.8	Lw	MDozFTA	500	(none)	5	r	2033835.27	13498665.57	379.02
Medium Bulldozer	!04000001!	119.8	Lw	MDozFTA	500	(none)	5	r	2033057.7	13498871.51	379.02
Medium Excavator	!04000001!	119.8	Lw	MExcFTA	500	(none)	5	r	2033303.69	13498927.85	379.02

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Medium Excavator	!04000001!	119.8	Lw	MExcFTA	500	(none)	5	r	2032422.07	13497893.93	372.45
Motor Grader	!04000001!	119.8	Lw	MGradFTA	500	(none)	5	r	2032676.76	13498379.39	379.02
Pumps for Water Truck	!04000001!	102.8	Lw	PumpWatTruFTA	500	(none)	5	r	2032507.88	13498042.4	372.45
Loader	!04000001!	114.8	Lw	LoadFTA	500	(none)	5	r	2032858.38	13498697.8	379.02
Medium Bulldozer	!04000001!	115.8	Lw	MDozDNL	500	(none)	5	r	2037769.83	13497888.45	416.04
Medium Bulldozer	!04000001!	115.8	Lw	MDozDNL	500	(none)	5	r	2036658.36	13497517.42	401.18
Medium Excavator	!04000001!	115.8	Lw	MExcDNL	500	(none)	5	r	2036750.07	13497651.43	398.7
Motor Grader	!04000001!	115.8	Lw	MGradDNL	500	(none)	5	r	2037161.52	13497987.93	398.7
Loader	!04000001!	110.8	Lw	LoadDNL	500	(none)	5	r	2037482.02	13497984.1	404.76
Medium Bulldozer	!04000200!	115.8	Lw	MDozDNL	500	(none)	5	r	2018648.78	13504227.83	325.35
Medium Bulldozer	!04000200!	115.8	Lw	MDozDNL	500	(none)	5	r	2020609.42	13502978.45	315.84
Medium Excavator	!04000200!	115.8	Lw	MExcDNL	500	(none)	5	r	2018331.46	13504736.22	320.36
Medium Excavator	!04000200!	115.8	Lw	MExcDNL	500	(none)	5	r	2018159.42	13505489.52	312.7
Motor Grader	!04000200!	115.8	Lw	MGradDNL	500	(none)	5	r	2017707.47	13506120.57	316.52
Pumps for Water Truck	!04000200!	99.8	Lw	PumpWatTruDNL	500	(none)	5	r	2019881.22	13503392.34	313.4
Loader	!04000200!	110.8	Lw	LoadDNL	500	(none)	5	r	2019292.43	13503897.14	319.96

Table A- 35. Gravel Augmentation CadnaA On-Site Construction Noise Results

Receiver		Height		Coordinates			V1	V2	V3	V4	V5	V6
Name	ID			X	Y	Z	Day	Day	Day	Day	Day	Day
		(ft)		(ft)	(ft)	(ft)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R03 - 18780 Alicante Circula	!05!	5	r	2036925.57	13497314.71	407.89	63.9	63.9	-80.2	-80.2	-80.2	-80.2
R02 - Boys Ranch	!05!	5	r	2036728.69	13497848.48	409.34	70	70	12.4	16.4	-80.2	-80.2
R02 - 18720 Buena Ventura Ct	!05!	5	r	2036203.68	13497174.71	401.06	58	58.3	14.1	18.1	-80.2	-80.2
R26 - 19129 Eagle View Dr	!05!	5	r	2033672.62	13498039.43	383.52	58.1	62	37.8	41.8	-80.2	-80.2
R27 - 19145 Eagle View Dr	!05!	5	r	2033317.09	13497507.52	386.39	55.7	59.5	39.4	43.4	-80.2	-80.2
R28 - 19250 Donna Ct	!05!	5	r	2031765.46	13497090.55	379.02	54.6	58.5	43.2	47.2	-80.2	-80.2
R29 - 910 Burnett Ave	!05!	5	r	2030428.76	13496983.59	372.45	48.4	52.3	46.6	50.6	-80.2	-80.2
R30 - 10806 Kirby Ave	!05!	5	r	2026050.56	13498308.53	353.58	30.6	34.6	47.8	51.8	-80.2	-80.2
R18 - RV Home at 230 Ogier Ave	!05!	5	r	2020550.76	13502011.62	319.94	-80.2	-80.2	-80.2	-80.2	55.1	59.1
R17 - Parkway Lakes RV Park	!05!	5	r	2020043.33	13501982	319.96	-80.2	-80.2	-80.2	-80.2	52.6	56.6
R16 - 10000 Monterey Hwy	!05!	5	r	2019423.69	13502806.88	314.43	-80.2	-80.2	-80.2	-80.2	54.9	58.9

APPENDIX 4 – ANDERSON DAM VIBRATION ANALYSIS

Table A- 36. On-Site Construction Equipment Vibration, Structural Damage – Excavation Area

		Vibration Per Equipment (PPV, in/sec)																										
Sensitive Receptor	Approx. Distance to Receptor (ft)	Medium excavator	Loader	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Vibratory plate	Tamper	Large excavator	Manlift	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Bobcat	Road-header	Scooptrams	Jackhammer	Padfoot roller	Tamping foot roller	Small backhoe	Jacklegs	Vibratory smooth drum roller	Significance Threshold (PPV, in/sec)	Significant Impact?
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.076	0.076	0.008	0.035	0.076	0.035	0.035	0.089	0.003	0.089	0.089	0.076	0.003	0.19	0.089	0.035	0.21	0.089	0.003	0.035	0.21	--	--
18625 Corte Bautista	480	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.001	0.001	0.000	0.002	0.001	0.000	0.002	0.001	0.000	0.000	0.002	0.12	No

Table A- 37. On-Site Construction Equipment Vibration, Indoor Impact – Excavation Area

		Vibration Per Equipment (VdB)																										
Sensitive Receptor	Approx. Distance to Receptor (ft)	Medium excavator	Loader	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Vibratory plate	Tamper	Large excavator	Manlift	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Bobcat	Road-header	Scooptrams	Jackhammer	Padfoot roller	Tamping foot roller	Small backhoe	Jacklegs	Vibratory smooth drum roller	Significance Threshold (VdB)	Significant Impact?
FTA Reference Vibration	25	58	87	87	87	86	86	66	79	86	79	79	87	58	87	87	86	58	94	87	79	94	87	58	79	94	--	--
18625 Corte Bautista	480	19	48	48	48	47	47	28	40	47	40	40	48	19	48	48	47	19	55	48	40	56	48	19	40	56	72	No

Table A- 38. On-Site Construction Equipment Vibration, Structural Damage – Staging Area 1

		Vibration Per Equipment (PPV, in/sec)																														
Sensitive Receptor	Approx. Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Large excavator	Manlift	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Bobcat	Road-header	Scooptrams	Jackhammer	Padfoot roller	Tamping foot roller	Excavator-mounted hoe-ram	Mini excavator	Small backhoe	Loader	Highway dump truck	Vibratory smooth drum roller	Asphalt paving machine	Asphalt compactor	Significance Threshold (PPV, in/sec)	Significant Impact?
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.089	0.076	0.076	0.008	0.035	0.076	0.089	0.003	0.089	0.089	0.076	0.003	0.19	0.089	0.035	0.21	0.089	0.089	0.003	0.003	0.089	0.076	0.21	0.08	0.21	--	--
2015 Alicante Pl	180	0.000	0.005	0.005	0.005	0.005	0.004	0.004	0.000	0.002	0.004	0.005	0.000	0.005	0.005	0.004	0.000	0.010	0.005	0.002	0.011	0.005	0.005	0.000	0.000	0.005	0.004	0.011	0.004	0.011	0.12	No
18720 Buena Ventura Ct	270	0.000	0.003	0.003	0.003	0.003	0.002	0.002	0.000	0.001	0.002	0.003	0.000	0.003	0.003	0.002	0.000	0.005	0.003	0.001	0.006	0.003	0.003	0.000	0.000	0.003	0.002	0.006	0.002	0.006	0.12	No
Boys Ranch	120	0.000	0.008	0.008	0.008	0.008	0.007	0.007	0.001	0.003	0.007	0.008	0.000	0.008	0.008	0.007	0.000	0.018	0.008	0.003	0.020	0.008	0.008	0.000	0.000	0.008	0.007	0.020	0.008	0.020	0.12	No

Table A- 39. On-Site Construction Equipment Vibration, Indoor Impact – Staging Area 1

		Vibration Per Equipment (VdB)																														
Sensitive Receptor	Approx. Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Large excavator	Manlift	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Bobcat	Road-header	Scooptrams	Jackhammer	Padfoot roller	Tamping foot roller	Excavator-mounted hoe-ram	Mini excavator	Small backhoe	Loader	Highway dump truck	Vibratory smooth drum roller	Asphalt paving machine	Asphalt compactor	Significance Threshold (VdB)	Significant Impact?
FTA Reference Vibration	25	58	87	87	87	87	86	86	66	79	86	87	58	87	87	86	58	94	87	79	94	87	87	58	58	87	86	94	86	94	--	--
2015 Alicante Pl	180	32	61	61	61	61	60	60	40	53	60	61	32	61	61	60	32	68	61	53	69	61	61	32	32	61	60	69	60	69	72	No
18720 Buena Ventura Ct	270	26	56	56	56	56	55	55	35	48	55	56	26	56	56	55	26	63	56	48	63	56	56	26	26	56	55	63	55	63	72	No
Boys Ranch	120	37	67	67	67	67	65	65	46	58	65	67	37	67	67	65	37	73	67	58	74	67	67	37	37	67	65	74	66	74	72	Yes

Table A- 40. On-Site Construction Equipment Vibration, Structural Damage – Staging Area 2

		Vibration Per Equipment (PPV, in/sec)															
Sensitive Receptor	Approx. Distance to Receptor (ft)	Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Manlift	Bobcat	Small backhoe	Jacklegs	Significance Threshold (PPV, in/sec)	Significant Impact?
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.089	0.076	0.076	0.008	0.035	0.076	0.003	0.003	0.003	0.035	--	--
MH Vallee Vineyards (18285 Cochrane Rd)	180	0.000	0.005	0.005	0.005	0.005	0.004	0.004	0.000	0.002	0.004	0.000	0.000	0.000	0.002	0.12	No

Table A- 41. On-Site Construction Equipment Vibration, Indoor Impact – Staging Area 2

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (VdB) Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Manlift	Bobcat	Small backhoe	Jacklegs	Significance Threshold (VdB)	Significant Impact?
FTA Reference Vibration	25	58	87	87	87	87	86	86	66	79	86	58	58	58	79	--	--
MH Vallee Vineyards (18285 Cochrane Rd)	180	32	61	61	61	61	60	60	40	53	60	32	32	32	53	75	No

Table A- 42. On-Site Construction Equipment Vibration, Structural Damage – Staging Area 4

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (PPV, in/sec) Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Vibratory plate	Tamper	Large excavator	Manlift	Bobcat	Road-header	Scooptrams	Vibratory smooth drum roller	Significance Threshold (PPV, in/sec)	Significant Impact?
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.089	0.076	0.076	0.008	0.035	0.076	0.035	0.035	0.089	0.003	0.003	0.19	0.089	0.21	--	--
R6	340	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.000	0.001	0.002	0.001	0.001	0.002	0.000	0.000	0.004	0.002	0.004	0.2	No
R32	110	0.000	0.010	0.010	0.010	0.010	0.008	0.008	0.001	0.004	0.008	0.004	0.004	0.010	0.000	0.000	0.021	0.010	0.023	0.2	No

Table A- 43. On-Site Construction Equipment Vibration, Indoor Impact – Staging Area 4

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (VdB) Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Crane 150t	Concrete vibrator	Concrete pump truck	Vibratory plate	Tamper	Large excavator	Manlift	Bobcat	Road-header	Scooptrams	Vibratory smooth drum roller	Significance Threshold (VdB)	Significant Impact?
FTA Reference Vibration	25	58	87	87	87	87	86	86	66	79	86	79	79	87	58	58	94	87	94	--	--
R6	340	23	53	53	53	53	52	52	32	45	52	45	45	53	23	23	60	53	60	72	No
R32	110	38	68	68	68	68	66	66	47	60	66	60	60	68	38	38	74	68	75	72	Yes

Table A- 44. On-Site Construction Equipment Vibration, Structural Damage – Stockpile Area E

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (PPV, in/sec) Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Large excavator	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Padfoot roller	Tamping foot roller	Small backhoe	Vibratory smooth drum roller	Significance Threshold (PPV, in/sec)	Significant Impact?
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.089	0.076	0.076	0.089	0.089	0.089	0.076	0.21	0.089	0.003	0.21	--	--
2015 Alicante Pl	290	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.000	0.005	0.12	No
Boys Ranch	250	0.000	0.003	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.007	0.003	0.000	0.007	0.12	No

Table A- 45. On-Site Construction Equipment Vibration, Indoor Impact – Stockpile Area E

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (VdB) Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Large excavator	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Padfoot roller	Tamping foot roller	Small backhoe	Vibratory smooth drum roller	Significance Threshold (VdB)	Significant Impact?
FTA Reference Vibration	25	58	87	87	87	87	86	86	87	87	87	86	94	87	58	94	--	--
2015 Alicante Pl	290	26	55	55	55	55	54	54	55	55	55	54	62	55	26	62	72	No
Boys Ranch	250	28	57	57	57	57	56	56	57	57	57	56	64	57	28	64	72	No

Table A- 46. On-Site Construction Equipment Vibration, Structural Damage – Stockpile Area K North

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (PPV, in/sec)															Significance Threshold (PPV, in/sec)	Significant Impact?
		Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Large excavator	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Padfoot roller	Tamping foot roller	Small backhoe	Vibratory smooth drum roller		
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.089	0.076	0.076	0.089	0.089	0.089	0.076	0.21	0.089	0.003	0.21	--	--
3291 Butterfly Ln	320	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.000	0.005	0.12	No

Table A- 47. On-Site Construction Equipment Vibration, Indoor Impact – Stockpile Area K North

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (VdB)															Significance Threshold (VdB)	Significant Impact?
		Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Large excavator	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Padfoot roller	Tamping foot roller	Small backhoe	Vibratory smooth drum roller		
FTA Reference Vibration	25	58	87	87	87	87	86	86	87	87	87	86	94	87	58	94	--	--
3291 Butterfly Ln	320	24	54	54	54	54	52	52	54	54	54	52	61	54	24	61	72	No

Table A- 48. On-Site Construction Equipment Vibration, Structural Damage – Stockpile Area K South

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (PPV, in/sec)															Significance Threshold (PPV, in/sec)	Significant Impact?
		Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Large excavator	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Padfoot roller	Tamping foot roller	Small backhoe	Vibratory smooth drum roller		
FTA Reference Vibration	25	0.003	0.089	0.089	0.089	0.089	0.076	0.076	0.089	0.089	0.089	0.076	0.21	0.089	0.003	0.21	--	--
17106 Shady Ln Dr	310	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.000	0.005	0.12	No

Table A- 49. On-Site Construction Equipment Vibration, Indoor Impact – Stockpile Area K South

Sensitive Receptor	Approx. Distance to Receptor (ft)	Vibration Per Equipment (VdB)															Significance Threshold (VdB)	Significant Impact?
		Medium excavator	Loader	Medium Bulldozer	Motor grader	Track drill rig	Articulated dump truck	Water truck	Large excavator	Bulldozer	Bulldozer w/discs	Large rigid-body dump truck	Padfoot roller	Tamping foot roller	Small backhoe	Vibratory smooth drum roller		
FTA Reference Vibration	25	58	87	87	87	87	86	86	87	87	87	86	94	87	58	94	--	--
17106 Shady Ln Dr	310	25	54	54	54	54	53	53	54	54	54	53	62	54	25	62	72	No

APPENDIX 5 – BLASTING ANALYSIS

Table A- 50. Vibration Energy below 3 Hz

Calculation Sheet

Maximum Charge Weight per Delay

Project Name:	**Anderson Dam Seismic Retrofit Project (ADSRP)**	**Date:**	3/10/2023
Project Number:	**1690016353**		
Receptor ID:	**18051 Barnard Rd**		

Data Input

	Unit System	U.S.
Ground Vibration	**Industry**	Construction
	Confidence Level	Upper Bound
Air-Overpressure	**Blasting Type**	Construction (average)
	Statistical Type	Best Fit

Distance from Blasting	**R**	**240**	ft.
Peak Particle Velocity	**PPV**	**0.50**	in./sec.
Air-Overpressure	**P**		psi
Peak Overpressure Level	**SPL**	**133**	dB

Calculation Results

Ground Vibration $PPV = A \times (SD_2)^{-B}$

Square Root Scaled Distance	**SD_2**	**47.6**	ft./lb. ½
Charge-Weight per delay	**W**	**25.37**	lb.
	A	**242**	
	B	**-1.60**	

Air-Overpressure $P = A \times (SD_3)^{-B}$

Cube Root Scaled Distance	**SD_3**	**52.0**	ft./lb. ⅓
Charge-Weight per delay	**W**	**98.32**	lb.
	A	**1**	
	B	**-1.10**	
Calculated Air-Overpressure from SPL	**P**	**0.01**	psi
Maximum Charge-Weight per delay	**W**	**25.4**	lb.

References

Blaster's Handbook of International Society of Explosive Engineers (ISEE) - 18th Edition

Table A- 51. Vibration Energy 3 Hz and above

Calculation Sheet

Maximum Charge Weight per Delay

Project Name:	**Anderson Dam Seismic Retrofit Project (ADSRP)**	**Date:**	3/10/2023
Project Number:	**1690016353**		
Receptor ID:	**18051 Barnard Rd**		

Data Input

	Unit System	U.S.
Ground Vibration	**Industry**	Construction
	Confidence Level	Upper Bound
Air-Overpressure	**Blasting Type**	Construction (average)
	Statistical Type	Best Fit

Distance from Blasting	**R**	**240**	ft.
Peak Particle Velocity	**PPV**	**0.1884**	in./sec.
Air-Overpressure	**P**		psi
Peak Overpressure Level	**SPL**	**133**	dB

Calculation Results

Ground Vibration $PPV = A \times (SD_2)^{-B}$

Square Root Scaled Distance	SD_2	**87.7**	ft./lb. $^{1/2}$
Charge-Weight per delay	**W**	**7.49**	lb.
	A	**242**	
	B	**-1.60**	

Air-Overpressure $P = A \times (SD_3)^{-B}$

Cube Root Scaled Distance	SD_3	**52.0**	ft./lb. $^{1/3}$
Charge-Weight per delay	**W**	**98.32**	lb.
	A	**1**	
	B	**-1.10**	
Calculated Air-Overpressure from SPL	**P**	**0.01**	psi
Maximum Charge-Weight per delay	**W**	**7.5**	lb.

References

Blaster's Handbook of International Society of Explosive Engineers (ISEE) - 18th Edition

Table A- 52. Air Overpressure

Calculation Sheet

Maximum Charge Weight per Delay

Project Name:	**Anderson Dam Seismic Retrofit Project (ADSRP)**	**Date:**	3/10/2023
Project Number:	**1690016353**		
Receptor ID:	**18051 Barnard Rd**		

Data Input

	Unit System	U.S.
Ground Vibration	**Industry**	Construction
	Confidence Level	Upper Bound
Air-Overpressure	**Blasting Type**	Construction (average)
	Statistical Type	Best Fit

Distance from Blasting	**R**	**240**	ft.
Peak Particle Velocity	**PPV**		in./sec.
Air-Overpressure	**P**		psi
Peak Overpressure Level	**SPL**	**133**	dB

Calculation Results

Ground Vibration $PPV = A \times (SD_2)^{-B}$

Square Root Scaled Distance	SD_2	**-**	ft./lb. ½
Charge-Weight per delay	**W**	**-**	lb.
	A	**242**	
	B	**-1.60**	

Air-Overpressure $P = A \times (SD_3)^{-B}$

Cube Root Scaled Distance	SD_3	**52.0**	ft./lb. ⅓
Charge-Weight per delay	**W**	**98.32**	lb.
	A	**1**	
	B	**-1.10**	
Calculated Air-Overpressure from SPL	**P**	**0.01**	psi
Maximum Charge-Weight per delay	**W**	**98.3**	lb.

References

Blaster's Handbook of International Society of Explosive Engineers (ISEE) - 18th Edition

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix N

Recreation Appendix

Appendix N

Recreation Data

Appendix N.1

Weekly Activity Report Summaries

County of Santa Clara

Parks and Recreation Department

WEEKLY ACTIVITY REPORT SUMMARY 1999-2013 BY PARK

	All Camps Occupied	# Camps Available	Camp Attendance	% of Camp Occupancy	RV Sites Occupied	RV Attendance	# RV Sites Available	% RV Sites Occupied	Yurts Occupied	# Yurts Available	% Yurt Occupancy	Ttl Yurt Attendance	Total Youth Camp Attend	Group Camp Attendance	# Power Boats	Power Boat Attendance	PWC	PWC Attendance	# Non-power Boats	Non-Pwr Boat Attend	Special Permit Boats	Special Permit Boat Attend	# Interp Center Programs	Interp Center Attendance	Field School Group Attend	Picnic	Fish / Hunt (Alviso)	Hike/ Runners	Equestrian Use	Bikes	Hang Gliders	Disc Golf / RC Crafts / Archery / Fly Casting Pond	200 Yard Range	Multi Use Range	Trap / Skeet	Rifle / Pistol Range	Riders	Spectators	Special Events Attend (FOL)	Dog Park	Total Estimated Attendance
Adams-Chitactac																										2,569	11,210														13,779
Almaden Quicksilver																										3,587	1,628	157,050	1,174	26,170											189,609
Alviso															1,466	5,131			382	573						13,011	2,733	18,917		9,748											50,113
Anderson Lake															5,458	19,103	1,035	1,553	250	375						19,333	5,498	9,726	1,738	4,971											62,297
Calero															3,705	12,968	1,276	1,914	710	1,065						12,748	6,584	7,661	2,313												45,253
Chesbro Reservoir																										2,450	18,800	6,000													27,250
Coyote Creek - North																											997	32,091		15,584									4,230		52,902
Coyote Creek - South																											1,530	27,963		19,967		8,258									57,718
Coyote Lake -Bear	4,203	19,761	25,218	21%	1,725	4,313	6,811	25%							2,715	9,503	675	1,013	547	821						7,493	8,071	20,783	2,405	3,725											83,343
Ed Levin																										32,743	13,238	25,037	17,512	19,968	8,812									24,649	141,959
Field Sports Park																																	1,112	2,441	8,439	23,758					35,750
Grant	2,113	8,708	12,678	24%																						4,191	3,665	6,405	593	10,076											37,608
Hellyer County Park																										88,257	2,530	46,470		19,567		25,960							8,649	5,563	196,996
Lexington																			1,219	1,829	582	4,656				4,241	6,690	126,687	634	122,502											267,239
Los Gatos Creek Park																										14,980	18,918	209,425		111,573		959								45,514	401,369
Motorcycle																																					25,507	5,736			31,243
Mt Madonna	5,762	18,876	34,572	31%	3,780	9,450	10,556	36%	528	1,820	29%	3,696	10,600	10,860												24,202		53,040	8,260												154,680
Penitencia Creek																										2,424	38	6,668		2,761											11,891
Sanborn	2,280	5,098	13,680	45%	1,330	3,325	3,766	35%																		29,611	725	63,727	20	698											111,786
Santa Teresa																										5,084		22,187	1,109	6,846		5,174							339		40,739
Stevens Creek																			851	1,277						32,615	3,182	48,364	1,387	8,843											95,668
Upper Stevens Creek																												6,205	320	9,443											15,968
Uvas Canyon	1,562	5,900	9,372	26%									3,950													9,800	25,720	21,460													70,302
Vasona																					2,059	4,118				114,485	6,036	268,272		96,720									128,016		617,647
Interp Site - AQ																							211	12,311	3,078																15,389
Interp Site - Chitactac																							93	245	3,284																3,529
Inerp Site - Joice Bernal																							72	2,716	2,595																5,311
Total	15,920	58,343	95,520	**29%**	6,835	17,088	21,133	**32%**	**528**	**1,820**	**29%**	3,696	14,550	10,860	13,344	46,704	2,986	4,479	3,959	5,939	2,641	8,774	376	15,272	8,957	423,824	137,793	1,184,138	37,465	489,162	8,812	40,351	1,112	2,441	8,439	23,758	25,507	5,736	141,234	75,726	2,837,336
				Average				Average			Average																														

County of Santa Clara
Parks and Recreation Department
WEEKLY ACTIVITY REPORT SUMMARY 1999-2015 BY PARK

	All Camps Occupied	# Camps Available	Camp Attendance	% of Camp Occupancy	RV Sites Occupied	RV Attendance	# RV Sites Available	% RV Sites Occupied	Yurts Occupied	# Yurts Available	% Yurt Occupancy	Ttl Yurt Attendance	Total Youth Camp Attend	Group Camp Attendance	# Power Boats	Power Boat Attendance	PWC	PWC Attendance	# Non-power Boats	Non-Pwr Boat Attend	Special Permit Boats	Special Permit Boat Attend	# Interp Center Programs	Interp Center Attendance	Field School Group Attend	Picnic	Fish / Hunt (Alviso)	Hike/ Runners	Equestrian Use	Bikes	Hang Gliders	Disc Golf / RC Crafts / Archery / Fly Casting Pond	200 Yard Range	Multi Use Range	Trap / Skeet	Rifle / Pistol Range	Riders	Spectators	Special Events Attend (FOL)	Dog Park	Total Estimated Attendance
Adams-Chitactac																										3,427		13,880													17,307
Almaden Quicksilver																										1,920	2,603	208,000	68	17,564											230,155
Alviso															9,972	34,902			10,640	15,960						15,158	20,230	37,450		27,173											150,873
Anderson Lake															3,969	13,892	391	587	201	302						22,099	4,846	11,569		7,653											60,947
Calero															2,291	8,019	79	119	332	498						9,851	4,655	7,990	3,410												34,541
Chesbro Reservoir																										3,341	17,965	13,674													34,980
Coyote Creek - North																												32,610		17,426											50,036
Coyote Creek - South																											1,608	62,517	2,718	66,468		15,555									148,866
Coyote Lake -Bear	4,945	13,613	29,670	36%	2,521	6,303	4,566	55%							3,253	11,386	671	1,007	857	1,286						5,412	8,597	5,882	2,584	2,089											74,214
Ed Levin																										22,675	1,158	15,341	5,020	6,657	5,654									21,490	77,995
Field Sports Park																																	1,476	1,882	8,160	25,227					36,745
Grant	2,999	7,252	17,994	41%																						2,813	1,387	5,811	307	13,034											41,346
Hellyer County Park																										84,161	1,782	48,004		24,771		24,943							14,718	16,287	214,666
Lexington																					4,041	32,328				9,120	7,974	143,535		138,794											331,751
Los Gatos Creek Park																										21,997	5,080	237,278		184,095		1,326								37,900	487,676
Martial Cottle Park																							75	2,636		9,128		113,953	465	32,068									5741		163,991
Motorcycle																																					18,293	2,859			21,152
Mt Madonna	12,208	35,282	73,248	35%	5,207	13,018	10,556	49%	825	1,820	45%	5,775	12,135	16,843												36,401		77,509	7,730												242,659
Penitencia Creek																										18,041	19	58,638		47,616											124,314
Sanborn	2,926	5,098	10,241	57%	2,117	5,293	2,979	71%																		9,513	412	35,334	2	708											61,501
Santa Teresa																										6,772		29,340	1,594	14,925		6,736									59,367
Stevens Creek																			941	1,412						8,132	1,012	10,834	453	11,088											32,931
Upper Stevens Creek																												8,328	196	6,995											15,519
Uvas Canyon	2,882	9,100	17,292	32%									6,015													19,282	30,767	40,688													114,044
Vasona																					3,369	6,738				129,712	5,975	303,951		109,583									89,796		645,755
Interp Site - AQ																							161	11,431	1,846																13,277
Interp Site - Chitactac																							55	3,974	1,364																5,338
Inerp Site - Joice Bernal																							123	150	3,976																4,126
Total	25,960	70,345	148,445	**35%**	9,845	24,613	18,101	**42%**	**825**	**1,820**	**37%**	5,775	18,150	16,843	19,485	68,198	1,141	1,712	12,971	19,457	7,410	39,066	414	18,191	7,186	438,955	116,070	1,522,116	24,547	728,707	5,654	48,560	1,476	1,882	8,160	25,227	18,293	2,859	110,255	75,677	3,496,070

County of Santa Clara

Parks and Recreation Department

WEEKLY ACTIVITY REPORT SUMMARY COMPARISON

Ending Calendar Year 2014

	Camps Occupied	#Camps Available	Camp Attendance	% Camp Occupancy	RV Camps Occupied	# RV Camps Available	RV Camp Attendance	% RV Occupancy	Yurts Occupied	# Yurts Available	Yurt Attendance	% Yurt Occupancy	Youth Camp Attendance	Group Camp Attendance	# Power Boats	Power Boat Attendance	#PWC	PWC Attend	# Non-Power Boats	Non-Power Boat Attendance
WAR Summary '99	22,827	59,925													31,184			5,133	35,420	
WAR Summary '00	22,894	69,333													23,262			7,298	29,011	
WAR Summary '01	18,717	67,779													31,440			8,422	34,171	
WAR Summary '02	18,111	78,707	52,352										5,196	5,165	27,215	92,497		4,876	23,999	76,694
WAR Summary '03	17,184	92,129	60,143	17.6%									7,842	4,040	16,630	58,204		5,123	5,851	20,893
WAR Summary ' 04	16,890	91,011	59,115	17.6%									7,168	5,677	20,168	70,588		19,470	5,823	20,381
WAR Summary ' 05	17,526	91,391	61,341	17.6%									6,166	5,329	27,509	96,282		26,973	19,711	68,989
WAR Summary '06	17,952	92,884	62,832	17.20%									4,505	4,337	20,307	71,075		32,743	11,717	41,010
WAR Summary ' 07	16,314	94,050	57,098	17%									4,690	2,328	20,915	69,702	4,886	17,102	15,046	52,659
WAR Summary '08	20,452	84,492	71,583	23%									7,780	3,627	19,933	69,766	4,639	16,237	4,600	16,100
WAR Summary '09	21,137	86,261	73,981	%									15,279	8,160	15,362	53,767	3,621	12,674	4,619	16,167
WAR Summary '10	20,808	85,497	72,828	24%									9,700	9,020	17,932	62,762	4,167	14,585	5,160	18,060
WAR Summary '11	20,645	73,106	72,397	26%	2,120	11,004	7,420	19%	819	1,820	2,867	45%	12,995	10,360	20,101	70,354	3,418	11,963	13,592	47,572
WAR Summary '12	18,753	65,962	65,006	28%	2,445	10,627	8,558	23%	616	1,820	2,156	34%	6,565	5,625	16,249	56,872	4,074	14,259	5,895	20,633
WAR Summary'13	15,920	58,343	95,520	29%	6,835	21,133	17,088	32%	528	1,820	3,696	29%	14,550	10,860	13,344	46,704	2,986	4,479	3,959	5,939
WAR summary '14	19,171	58,178	115,026	35%	7,987	18,733	19,968	42%	668	1,820	4,008	37%	18,950	13,725	15,252	53,382	1,674	2,511	3,579	5,369

	Special Permit Boat	Special Boat Attend	Interp Program Attendance	School Group Attendance	Picnic	Fish	Hike/ Runners	Equestrian Use	Bikes	Hang Gliders	Disc Golf, RC, Arch, Cast	Field Sports Park	MCP Riders	MCP Spectators	Special Event Attend	Dog Park	Total Attendance
WAR Summary '99					657,584	150,105	1,386,625	35,699	772,141	3,618		1,032	12,687				3,524,168
WAR Summary '00					592,385	144,037	1,154,084	23,847	871,447	5,281		7,409	17,674				2,967,962
WAR Summary '01					665,397	151,437	1,227,172	23,675	852,659	5,001		1,221	18,862				3,105,953
WAR Summary '02					538,774	125,026	1,099,514	25,956	762,820	8,722		N/R	23,156				2,968,780
WAR Summary '03				9,300	418,253	107,570	903,490	22,059	715,569	6,762	5,957	23,869	33,092	10,842			2,498,692
WAR Summary ' 04				5,057	503,155	126,378	629,864	21,629	284,535	6,654	9,899	27,482	40,061	7,548		12,608	1,857,269
WAR Summary ' 05				4,170	575,999	131,207	556,098	24,573	352,540	6,206	10,214	25,140	32,850	5,513		14,256	2,003,846
WAR Summary '06				2,740	481,301	126,917	532,611	15,699	292,359	4,151	10,452	22,916	44806	16,261		39,134	1,791,991
WAR Summary ' 07			18,591	660	903,158	92,470	694,508	27,105	325,204	6,926	9,799	21,455	36,596	9,372	104,824	42,628	2,496,875
WAR Summary '08			18,091	0	619,132	153,147	700,639	24,506	335,322	4,621	12,336	22,323	37,079	7,069	84,304	26,897	2,230,559
WAR Summary '09			5,537	7,133	557,047	147,980	903,833	23,583	285,338	4,824	17,635	22,649	6,654	35,993	85,610	43,751	2,327,595
WAR Summary '10			3,686	4,594	606,871	150,831	654,522	57,932	241,147	4,439	27,758	25,704	30,432	7,924	0	46,830	2,049,625
WAR Summary '11	16,250	67,413	15,171	7,864	402,327	146,099	1,009,888	36,712	330,579	5,506	41,409	31,890	27,840	6,764	116,149	122,292	2,603,830
WAR Summary '12	2,982	14,181	16,197	7,877	365,447	142,153	1,011,680	37,821	378,589	5,588	37,713	36,869	22,691	4,313	119,313	102,204	2,482,310
WAR Summary'13	2,641	8,774	15,272	8,957	423,824	137,793	1,184,138	37,465	489,162	8,812	40,351	35,750	25,507	5,736	141,234	75,726	2,837,337
WAR summary '14	8,234	43,408	15,323	8,799	585,556	94,442	1,449,576	33,422	620,282	8,071	38,596	35,197	17,776	1,697	92,359	80,924	3,358,367

Note: Prior to 2011 RV Camp was included In Camp Attendance. Starting in 2010 Disc Golf Included RC Fields, Archery and Casting Ponds.
Yurts were added at Mt. Madonna in 2011

ATTENDANCE ESTIMATE CHANGES IN 2013

The estimate calculations were changed for 2013 based on revised industry standards and observed usage.

Vehicles are now multiplied by 2.5 people per car. Prior to 2013 vehicles were 3.5 people per car.

Power Vessels are mutliplied by 3.5 people per vessel entry. This is the same as prior years.

Non-power Vessels and PWC are multiplied by 1.5 people per vessel. Prior to 2013 these vessels were 3.5 per vessel.

Standard Campsites are multiplied by 6 people per campsite. Previously we used 3.5 per campsite.

Walk-in Campsites are multiplied at 3.5 people per site. This is the same as prior years.

Yurts are multiplied by 6-7 people per campsite.

RVs are multiplied 2.5 per site. Previously they were 3.5 persons per RV

Interp Program Participation = 35 people per program. Previous years we used 30 per persons per program.

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Appendix X.2

Boating Use

County of Santa Clara

Parks and Recreation Department

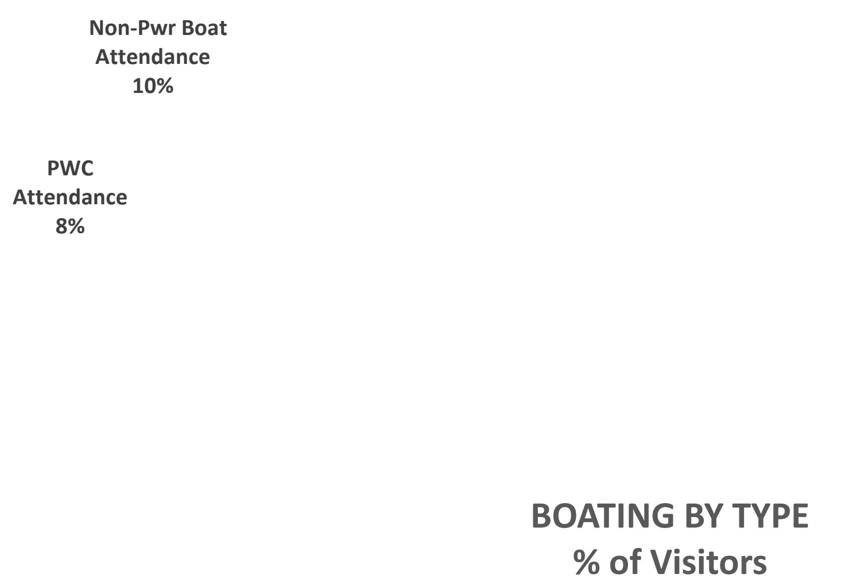
Boating Activity 2013

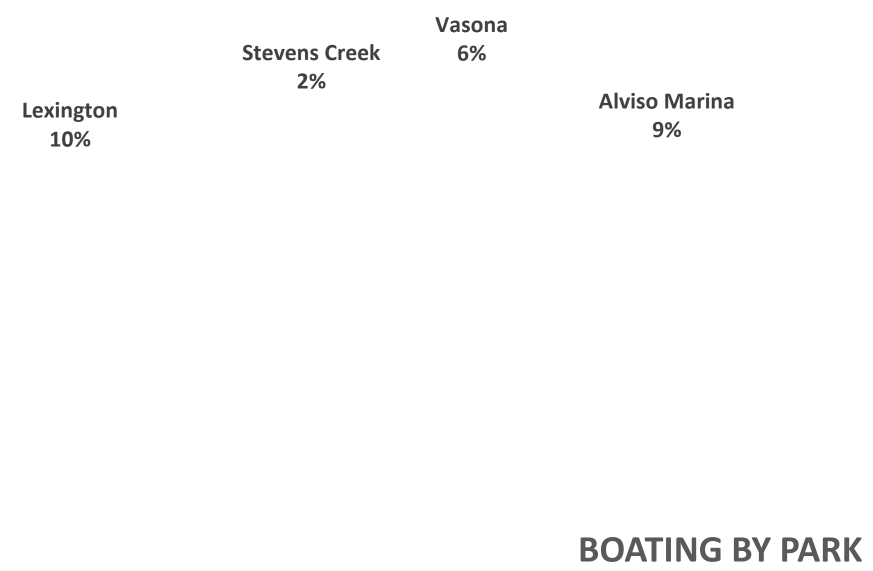
Park Name	# Power Boats	Power Boat Attendance	# PWC	PWC Attendance	# Non-power Boats	Non-Pwr Boat Attendance	Special Permit Boats	Special Permit Boat Attendance	Total Attendance by Park
Alviso Marina	1,466	5,131			382	573			5,704
Anderson Lake	5,458	19,103	1,035	1,553	250	375			21,031
Calero	3,705	12,968	1,276	1,914	710	1,065			15,947
Coyote Lake	2,715	9,503	675	1,013	547	821			11,336
Lexington		0		0	1,219	1,829	582	4,656	6,485
Stevens Creek		0		0	851	1,277			1,277
Vasona		0		0		0	2,059	4,118	4,118
	13,344	46,704	2,986	4,479	3,959	5,939	2,641	8,774	

Park Name	Total Attendance by Park	Total Launches By Park
Alviso Marina	5,704	1,848
Anderson Lake	21,031	6,743
Calero	15,947	5,691
Coyote Lake	11,336	3,937
Lexington	6,485	1,801
Stevens Creek	1,277	851
Vasona	4,118	2,059
	Ttl Launches	**22,930**

Total Boating Attendance **65,896**

% of Total Park Attenda **2.32%**





Special Note: Activity Numbers are retireved from QID, and compared to WAR reports,and reconciled to capture special permit boating not captured in QID.

Vasona Park number represents velocity of resident rental boats being used mutiple times by different visitors in one day * 2 persons per boat

Remote Control Boats were removed from QID data, and added to RC Boats for LG Creek.

Lexington Special Permit Boats = launches times 8 people per skull

S Drive:Common/Weekly Activity Reports/ WAR SUMMARY 2013

County of Santa Clara

Parks and Recreation Department

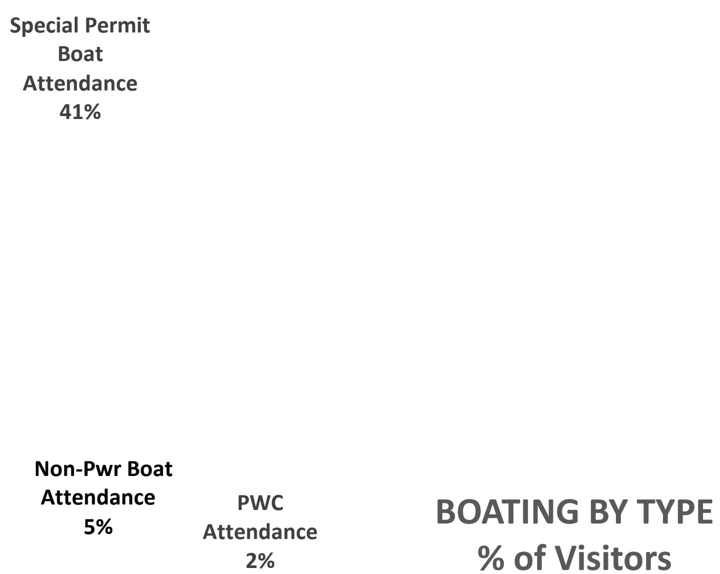
Boating Activity 2014

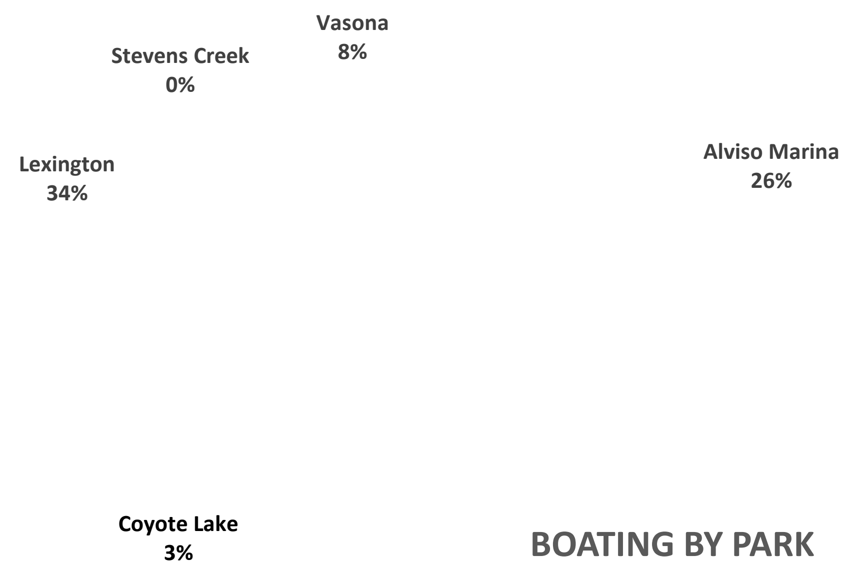
Park Name	# Power Boats	Power Boat Attendance	# PWC	PWC Attendance	# Non-power Boats	Non-Pwr Boat Attendance	Special Permit Boats	Special Permit Boat Attendance	Total Attendance by Park
Alviso Marina	6,800	23,800			2,342	3,513			27,313
Anderson Lake	5,054	17,689	639	959	277	416			19,063
Calero	2,709	9,482	884	1,326	798	1,197			12,005
Coyote Lake	689	2,412	151	227	162	243			2,881
Lexington							4,490	35,920	35,920
Stevens Creek									0
Vasona	100	350					3,744	7,488	7,838
	15,352	53,732	1,674	2,511	3,579	5,369	8,234	43,408	

Park Name	Total Attendance by Park	Total Launches By Park
Alviso Marina	27,313	9,142
Anderson Lake	19,063	5,970
Calero	12,005	4,391
Coyote Lake	2,881	1,002
Lexington	35,920	4,490
Stevens Creek		
Vasona	7,838	3,844
	Ttl Launches	**28,839**

Total Boating Attendance **105,020**

% of Total Park Attendance **3.13%**





Special Notes: Activity Numbers are retireved from QID, and compared to WAR reports,and reconciled to capture special permit boating not captured in QID.

Vasona Park number represents velocity of resident rental boats being used mutiple times by different visitors in one day * 2 persons per boat.

Remote Control Boats were removed from QID data, and added to RC Boats for LG Creek.

Lexington Special Permit Boats = launches times 8 people per skull.

Stevens Creek and Lexington were closed to public launch due to low water levels.

County of Santa Clara

Parks and Recreation Department

Boating Activity 2015

Park Name	# Power Boats	Power Boat Attendance	# PWC	PWC Attendance	# Non-power Boats	Non-Pwr Boat Attendance	Special Permit Boats	Special Permit Boat Attendance	Total Attendance by Park
Alviso Marina	9,972	34,902			10,640	15,960			50,862
Anderson Lake	4,693	16,426	543	815	283	425			17,665
Calero	193	676	8	12	54	81			769
Coyote Lake	3,287	11,505	479	719	931	1,397			13,620
Lexington					99	149	4,041	32,328	32,477
Stevens Creek					1,035	1,553			1,553
Vasona		0					3,369	6,738	6,738
	18,145	63,508	1,030	1,545	13,042	19,563	7,410	39,066	

Park Name	Total Attendance by Park	Total Launches By Park
Alviso Marina	50,862	20,612
Anderson Lake	17,665	5,519
Calero	769	255
Coyote Lake	13,620	4,697
Lexington	32,477	4,140
Stevens Creek	1,553	1,035
Vasona	6,738	3,369
	Ttl Launches	**39,627**

Total Boating Attendance **123,682**

% of Total Park Attendance **3.54%**

BOATING BY TYPE % of Visitors

Special Permit Boat Attendance 32%

Non-Pwr Boat Attendance 16%

PWC Attendance 2%

BOATING BY PARK

Vasona 6%

Stevens Creek 1%

Lexington 26%

Alviso Marina 41%

Coyote Lake 11%

Calero 1%

Special Notes: Activity Numbers are retireved from QID, and compared to WAR reports,and reconciled to capture special permit boating not captured in QID.

Vasona Park number represents velocity of resident rental boats being used mutiple times by different visitors in one day * 2 persons per boat.

Remote Control Boats were removed from QID data, and added to RC Boats for LG Creek.

Lexington Special Permit Boats = launches times 8 people per skull.

Several reservoirs were closed part year due to low water.

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Appendix X.1

Day Use

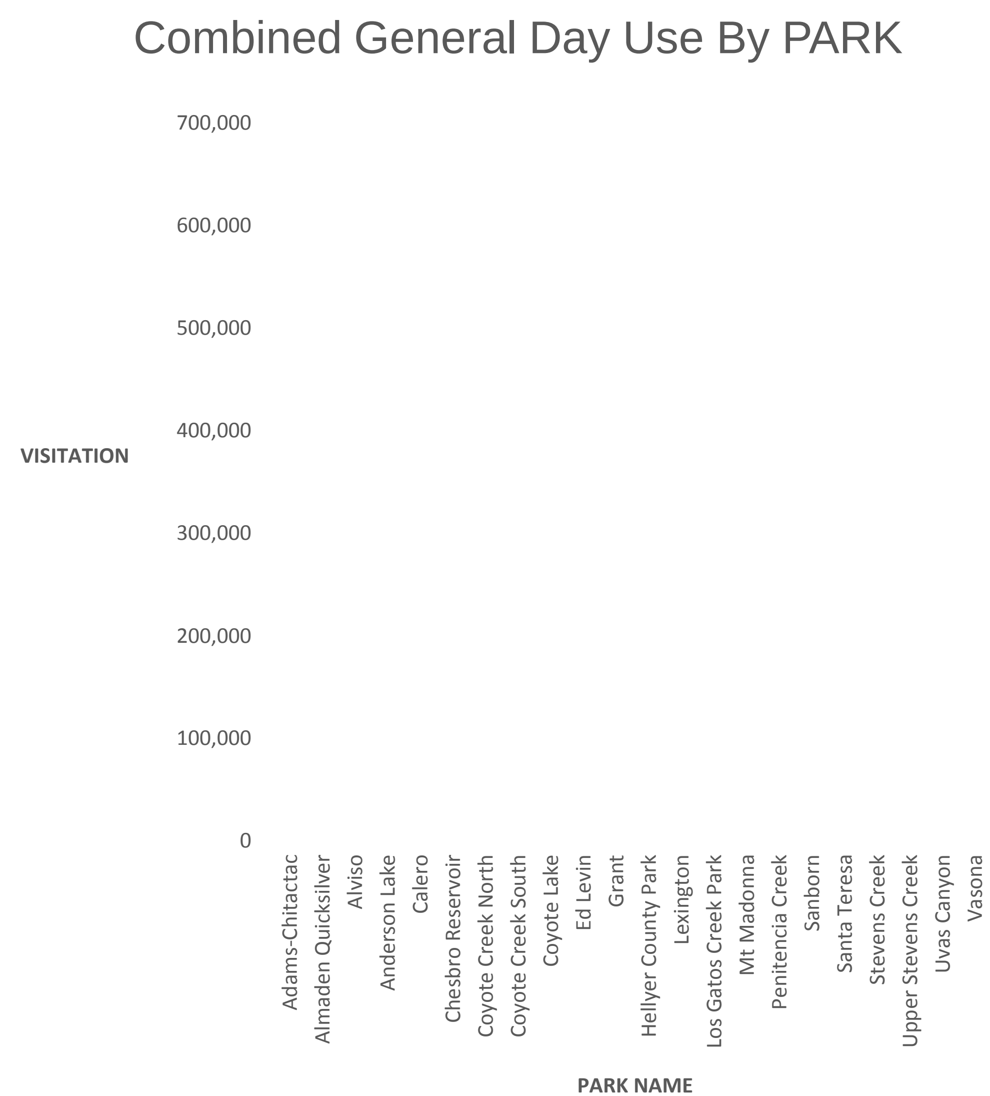
County of Santa Clara

Parks and Recreation Department

GENERAL DAY USE ACTIVITY 2013

Park	Picnic	Fish / Hunt (Alviso)	Hike/ Runners	Equestrian Use	Bikes	Field School Group Attendance	Gliders / D Golf / RC Archery / Fly Cast	Special Event Attendance (FOL)	Dog Parks	Total By Park	% Day Use by Park
Adams-Chitactac	2569		11210							13,779	0.54%
Almaden Quicksilver	3587	1628	157050	1174	26170					189,609	7.47%
Alviso	13011	2733	18917	1131	9748					45,540	1.79%
Anderson Lake	19333	5498	9726	1738	4971					41,266	1.62%
Calero	12748	6584	7661	2313						29,306	1.15%
Chesbro Reservoir	2450	18800	6000							27,250	1.07%
Coyote Creek North		997	32091		15584			4230		52,902	2.08%
Coyote Creek South		1530	27963		19967		8258			57,718	2.27%
Coyote Lake	7493	8071	20783	2405	3725					42,477	1.67%
Ed Levin	32743	13238	25037	17512	19968		8812		24649	141,959	5.59%
Grant	4191	3665	6405	593	10076					24,930	0.98%
Hellyer County Park	88257	2530	46470		19567		25960	8649	5563	196,996	7.76%
Lexington	4241	6690	126687	634	122502					260,754	10.27%
Los Gatos Creek Park	14980	18918	209425		111573		959		45514	401,369	15.80%
Mt Madonna	24202		53040	8260						85,502	3.37%
Penitencia Creek	2424	38	6668		2761					11,891	0.47%
Sanborn	29611	725	63727	20	698					94,781	3.73%
Santa Teresa	5084		22187	1109	6846		5174	339		40,739	1.60%
Stevens Creek	32615	3182	48364	1387	8843					94,391	3.72%
Upper Stevens Creek			6205	320	9443					15,968	0.63%
Uvas Canyon	9800	25720	21460							56,980	2.24%
Vasona	114485	6036	268272		96720			128016		613,529	24.16%
Total by Activity	423,824	126,583	1,195,348	38,596	489,162	0	49,163	141,234	75,726	**2,539,636**	
% of Day Use by Activity	16.69%	4.98%	47.07%	1.52%	19.26%	0.00%	1.94%	5.56%	2.98%		

General Day Use Activity Accounts for 89% of All Park Visitation



(Chart and Graph excludes MCP, FSP, and Interp Centers due to specialized nature of activities. See separate sheets.)

S Drive:Common/Weekly Activity Reports/ WAR SUMMARY 2013

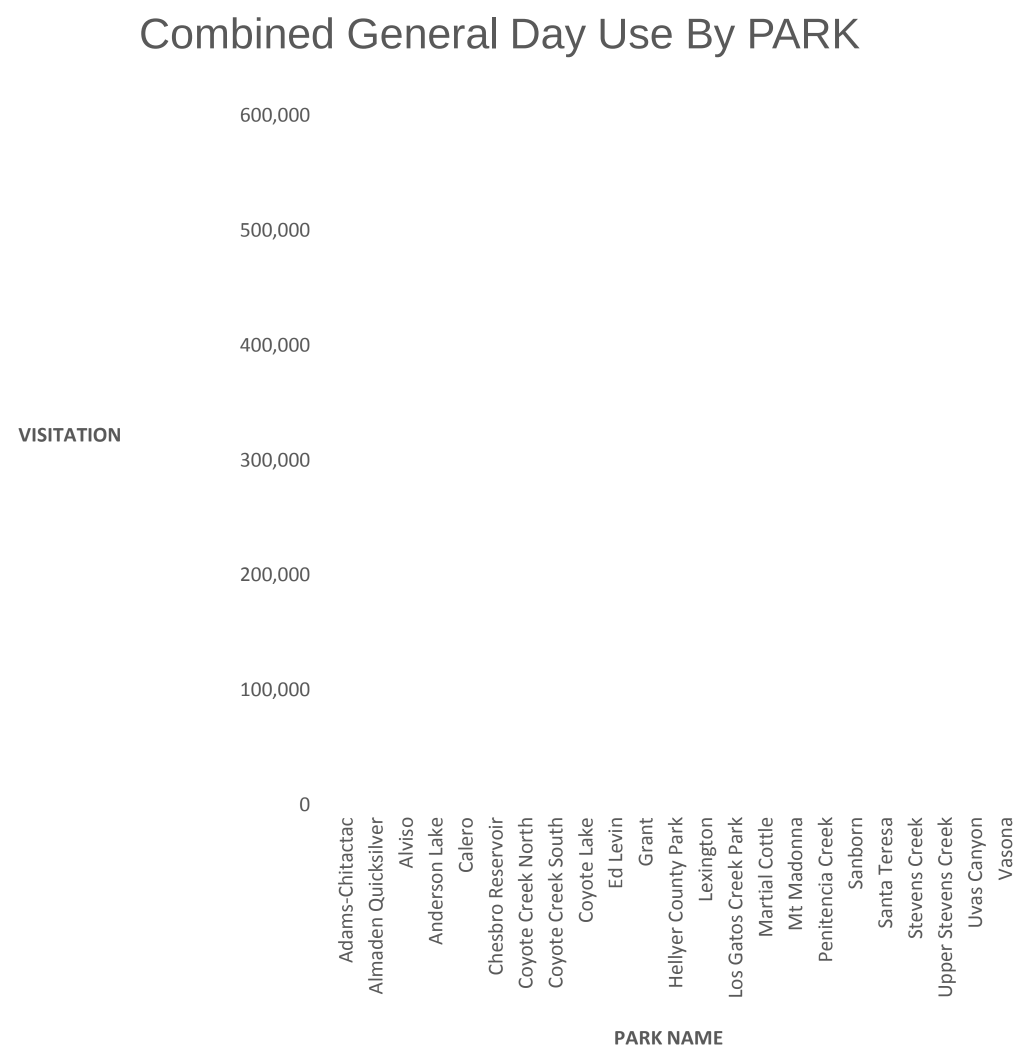
County of Santa Clara

Parks and Recreation Department

GENERAL DAY USE ACTIVITY 2014

Park	Picnic	Fish / Hunt (Alviso)	Hike/ Runners	Equestrian Use	Bikes	Gliders / D Golf / RC Archery / Fly Cast	Special Event Attendance (FOL)	Dog Parks	Total By Park	% Day Use by Park
Adams-Chitactac	3,225		10,440						13,665	0.47%
Almaden Quicksilver	1,727	533	219,100	672	20,632				242,664	8.29%
Alviso	16,857	4,470	33,654		19,814				74,795	2.56%
Anderson Lake	15,697	3,456	10,178	2,815	7,666				39,812	1.36%
Calero	24,352	7,853	14,809	2,842					49,856	1.70%
Chesbro Reservoir	2,286	15,657	9,190						27,133	0.93%
Coyote Creek North			41,721		19,261		1,623		62,605	2.14%
Coyote Creek South		416	28,205		29,222	9,028			66,871	2.29%
Coyote Lake	5,655	6,122	7,396	1,195	1,527				21,895	0.75%
Ed Levin	30,271	10,192	26,966	15,445	19,087	8,071		26,141	136,173	4.65%
Grant	3,515	2,649	5,910	279	12,211				24,564	0.84%
Hellyer County Park	199,284	1,601	33,004		24,771	21,609	13,523	4,718	298,510	10.20%
Lexington	8,855	8,860	139,355		134,752				291,822	9.97%
Los Gatos Creek Park	23,880	8,415	230,367		122,730	3,955		50,065	439,412	15.02%
Martial Cottle			95,784		25,623				121,407	4.15%
Mt Madonna	32,297		66,430	6,922					105,649	3.61%
Penitencia Creek	18,434	85	52,783		43,326				114,628	3.92%
Sanborn	39,923	416	57,561		572				98,472	3.37%
Santa Teresa	11,360		26,310	2,510	13,718	4,004	288		58,190	1.99%
Stevens Creek	8,655	958	11,782	482	11,954				33,831	1.16%
Upper Stevens Creek			7,827	260	7,024				15,111	0.52%
Uvas Canyon	13,349	16,120	25,705						55,174	1.89%
Vasona	125,934	6,639	295,099		106,392				534,064	18.25%
Total by Activity	585,556	94,442	1,449,576	33,422	620,282	46,667	15,434	80,924	**2,926,303**	
% of Day Use by Activity	20.01%	3.23%	49.54%	1.14%	21.20%	1.59%	0.53%	2.77%		

General Day Use Activity Accounts for 87% of All Park Visitation



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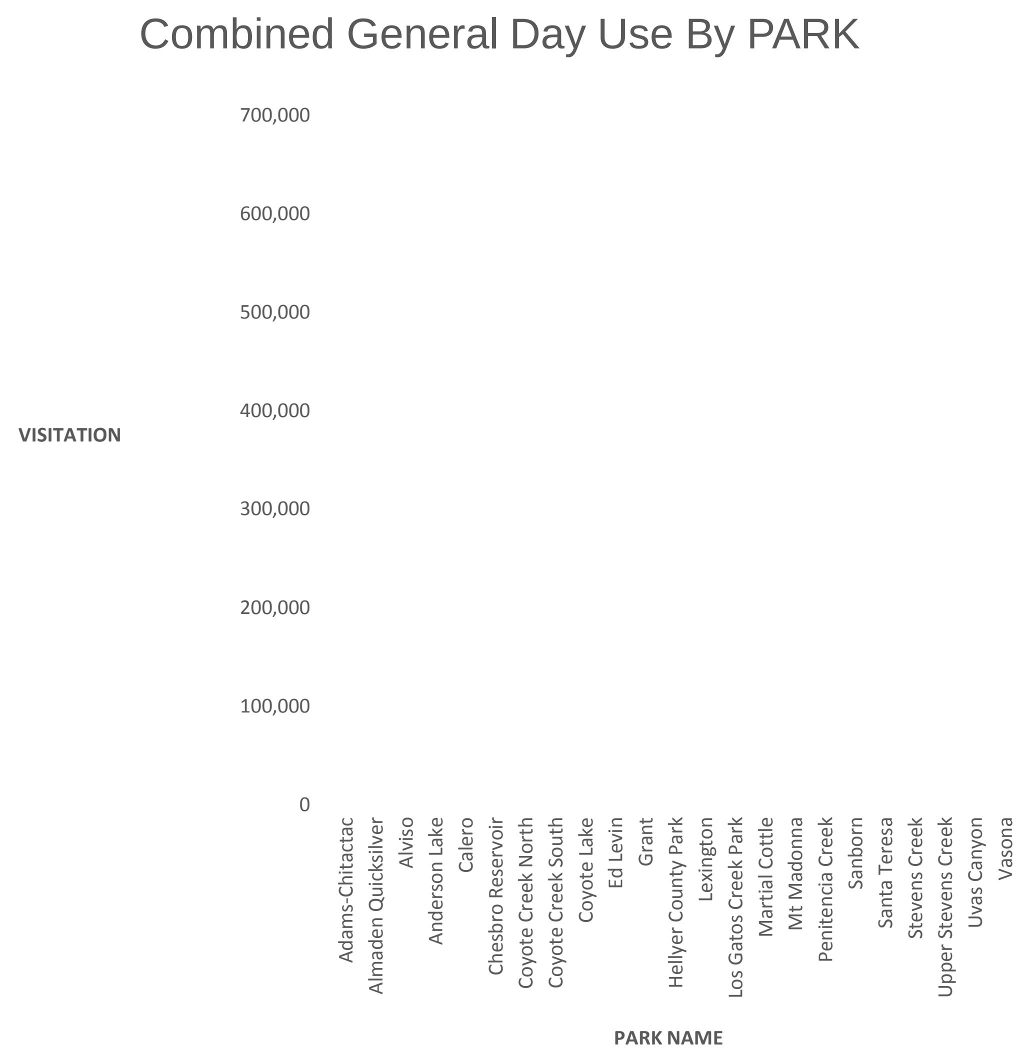
County of Santa Clara

Parks and Recreation Department

GENERAL DAY USE ACTIVITY 2015

Park	Picnic	Fish / Hunt (Alviso)	Hike/ Runners	Equestrian Use	Bikes	Gliders / D Golf / RC Archery / Fly Cast	Special Event Attendance (FOL)	Dog Parks	Total By Park	% Day Use by Park
Adams-Chitactac	3,427		13,880						17,307	0.56%
Almaden Quicksilver	1,920	2,603	208,000	68	17,564				230,155	7.50%
Alviso	15,158	20,230	37,450		27,173				100,011	3.26%
Anderson Lake	22,099	4,846	11,569		7,653				46,167	1.51%
Calero	9,851	4,655	7,990	3,410					25,906	0.84%
Chesbro Reservoir	3,341	17,965	13,674						34,980	1.14%
Coyote Creek North			32,610		17,426				50,036	1.63%
Coyote Creek South		1,608	62,517	2,718	66,468	15,555			148,866	4.85%
Coyote Lake	5,412	8,597	5,882	2,584	2,089				24,564	0.80%
Ed Levin	22,675	1,158	15,341	5,020	6,657	5,654		21,490	77,995	2.54%
Grant	2,813	1,387	5,811	307	13,034				23,352	0.76%
Hellyer County Park	84,161	1,782	48,004		24,771	24,943	14,718	16,287	214,666	7.00%
Lexington	9,120	7,974	143,535		138,794				299,423	9.76%
Los Gatos Creek Park	21,997	5,080	237,278		184,095	1,326		37,900	487,676	15.90%
Martial Cottle	9,128		113,953	465	32,068		5,741		161,355	5.26%
Mt Madonna	36,401		77,509	7,730					121,640	3.97%
Penitencia Creek	18,041	19	58,638		47,616				124,314	4.05%
Sanborn	9,513	412	35,334	2	708				45,969	1.50%
Santa Teresa	6,772		29,340	1,594	14,925	6,736			59,367	1.94%
Stevens Creek	8,132	1,012	10,834	453	11,088				31,519	1.03%
Upper Stevens Creek			8,328	196	6,995				15,519	0.51%
Uvas Canyon	19,282	30,767	40,688						90,737	2.96%
Vasona	125,934	5,975	303,951		109,583		89,796		635,239	20.71%
Total by Activity	435,177	116,070	1,522,116	24,547	728,707	54,214	110,255	75,677	**3,066,763**	
% of Day Use by Activity	14.19%	3.78%	49.63%	0.80%	23.76%	1.77%	3.60%	2.47%		

General Day Use Activity Accounts for 87% of All Park Visitation



(Chart and Graph excludes MCP, FSP, and Interp Centers due to specialized nature of activities. See separate sheets.)

S Drive:Common/Weekly Activity Reports/ WAR SUMMARY 2015

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Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix O

Transportation Technical Memorandum

This technical appendix was prepared as a technical report by Valley Water's EIR consultant team. Valley Water has independently reviewed its contents, and partially relied on the appendix contents in preparing the EIR section on Transportation. Project changes occurred after public circulation of the Draft EIR which changed construction trips, which may have affected the level of service (LOS) analysis in this report. However, the LOS analysis was not used to determine significance of transportation impacts in the EIR. Rather, the EIR analysis relied on vehicle miles traveled, which was not affected by changes to the project description. In the event of any inconsistencies between the EIR text and this appendix, the EIR text was prepared by Valley Water later and takes precedence.

Anderson Dam Seismic Retrofit Project (ADSRP)

Draft Transportation Analysis

March 20, 2023

Hexagon Transportation Consultants, Inc.
Hexagon Office: 8070 Santa Teresa Boulevard, Suite 230
Gilroy, CA 95020
Hexagon Job Number: 20RD05
Phone: 408.846.7410
Client Name: Horizon Water and Environment

Table of Contents

Appendices

List of Tables

List of Figures

Executive Summary

This report presents the results of the transportation analysis (TA) conducted for the proposed Anderson Dam Seismic Retrofit Project (ADSRP) in Morgan Hill, California. The project would temporarily generate truck and employee auto trips during project construction period along roadways that provide access to Anderson Dam and the planned San Pedro Staging Area. The purpose of this analysis is to:

(1) Quantify the number of truck and auto trips that may be generated by the project,
(2) Estimate the vehicle miles traveled (VMT) that will be generated by employees of the project
(3) Quantify the number of truck and auto trips that may be added to nearby roadways,
(4) Determine whether the increase in truck and auto traffic would result in any traffic operations issues,
(5) Propose measures to reduce the impact of the project (if necessary).

This evaluation focuses only on off-site trips, or trips that would utilize surrounding streets to access the construction site. Construction projects of this type would typically generate a significant number of truck trips associated with off-site hauling of material. However, the construction plan will allow for storage of material on-site. Thus, there will be a significant number of trucks that will travel within the project site throughout the day which are not the subject of this evaluation.

In addition to the dam retrofit, the project also will include four additional project areas in which project conversation measures and temporary emergency egress routes would be provided in the case of an emergency requiring evacuation from the reservoir area. Each of the additional project areas are described below:

(1) Ogier Ponds Restoration Project - The Ogier Ponds are located approximately 4 miles downstream of Anderson Dam between US 101 and Monterey Road. The Ogier Ponds Restoration includes the reconstruction of the Coyote Creek channel to separate the creek from the Ogier Ponds.
(2) Phase 2 Coyote Percolation Dam - The Coyote Creek Percolation Dam is located approximately 10 miles downstream of Anderson Dam and will include the construction of a roughened ramp fishway to allow for improved fish passage over the deflated bladder dam over a range of flow conditions.
(3) Shingle Valley Haul Road - The north haul road (Shingle Valley Road) will provide access from Highway 101 to Metcalf Road to Shingle Valley Road (Private) to Stockpile Area L.
(4) Holiday Estates Haul Road – The south haul road (Holiday Estates) will provide access from Highway 101 to Dunne Avenue to Holiday Drive to Staging Area 6 (Boat Marina).

(5) The sediment augmentation program would consist of removing and stockpiling approximately 55,000 cubic yards of sediment from the exposed reservoir between the Dunne Avenue Bridge and the Holiday Estates boat launch. Sediment materials would then be placed in Coyote Creek at multiple locations between the Anderson Dam and Ogier Ponds.

Each of the conservation measure and haul road project components will consist of much smaller project areas and shorter construction time periods than those of the ADSRP. Each of the conservation measure sites also are separate of the ADSRP site and its construction schedule. Therefore, the effects of the conservation measure components and haul roads are evaluated individually at only a qualitative level. The focus of the transportation analysis is the ADSRP project and its construction activities.

Transportation Analysis Scope

The TA consists of a California Environmental Quality Act (CEQA) required vehicle miles traveled (VMT) analysis and a supplemental traffic operations analysis.

CEQA VMT Analysis

The evaluation of the project's effects on VMT was completed using the Santa Clara Countywide Vehicle Miles Traveled Evaluation Tool (VMT Evaluation Tool). The City of Morgan Hill, at the time of this report, has not yet adopted analysis procedures, standards, or guidelines consistent with SB 743. In the absence of an adopted policy with impact thresholds, this assessment relies on guidelines published by the Governor's Office of Planning and Research (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018 in analyzing the project's effects on VMT. However, since OPR does not provide specific recommended impact thresholds for industrial uses, the existing regional VMT per industrial worker is used as the impact threshold for the construction employees of the project. The VMT Evaluation Tool indicates that the regional average VMT per industrial worker is currently 15.33.

Based on the VMT Evaluation Tool the VMT per worker (25.47) in the project area is currently greater than the regional average. The VMT generated by the project would be 24.69 per worker, which is less than the current project area VMT per worker. Per CEQA guidelines, project's that decrease VMT in the project areas when compared to current conditions should be presumed to have a less than significant transportation impact. In addition, the estimated daily trips upon which the VMT for the project is based represents a temporary worst-case scenario (one-year period) during its construction. Once the dam reconstruction is complete, there will be minimal VMT generated by the project site. Therefore, the project would result in a less than significant impact on the transportation system.

Traffic Operations Analysis

The traffic operations analysis supplements the CEQA required VMT analysis. However, the determination of project impacts per CEQA requirements is based solely on the VMT analysis.

The effects of the project on traffic operations on the surrounding roadway system were evaluated following the standards and methodologies set forth by the City of Morgan Hill in its *Guidelines for Preparation of Transportation Impact Reports*, February 2010, the 2035 MH General Plan, and the Santa Clara Valley Transportation Authority (VTA). The VTA administers the County Congestion Management Program (CMP). The traffic operations analysis includes the evaluation of the standard weekday AM and PM commute peak-hour operations at selected intersections for the purpose of identifying operational issues at intersections in the general vicinity of the project site. At the request of Valley Water, the weekday AM and PM peak-hour analysis was supplemented with an analysis of weekday (Monday AM and Friday PM) and weekend peak conditions since peak direction traffic conditions can be abnormally worse on Monday mornings and Friday evenings along US 101.

Project Trip Generation

Based on the information provided by Valley Water, it is estimated that the project would generate a total of 756 daily vehicle trips with 48 trips occurring during the AM peak hour (33 inbound and 15 outbound) and 271 occurring during the PM peak hour (67 inbound and 204 outbound). Note that the project trip generation is based on the Year 6 (Stage 3b) estimated daily maximum employee, truck, and shuttle trips, which is the peak construction conditions during the 7-year construction period. As such, this analysis represents a worst-case scenario in regard to project generated construction traffic and is much greater than expected during the majority of the 7-year construction period.

Intersection Operation Analysis

The results of the level of service and peak hour warrant analysis indicate that, when measured against the City of Morgan Hill level of service standards, all of the study intersections currently operate and are projected to operate at acceptable levels of service during each of the peak hours analyzed under existing and existing plus project conditions and would not have peak hour volumes that meet signal warrant thresholds. Thus, intersection operation analysis shows that the project would not have a significant adverse effect on traffic conditions at the study intersections.

Freeway Segment Analysis

The results show that the mixed-flow lanes for each study segment would operate at an unacceptable LOS F during at least one peak hour, and that the southbound HOV lane from Coyote Creek Golf Drive and Cochrane round would operate an unacceptable LOS F during the PM peak hour.

Improvement of freeway segment operations would require freeway widening to construct additional through lanes, thereby increasing freeway capacity. VTA's Valley Transportation Plan (VTP) 2040 identifies freeway express lane projects along US 101 between Cochrane Road and Whipple Avenue. The planned improvements consist of the conversion of the existing HOV lane to an express lane and the construction of a second express lane in each direction on US 101. These improvements would increase the capacity of the freeway and help to address the deficiency in freeway operations. However, it is not feasible for an individual project to bear responsibility for implementing such extensive transportation system improvements due to constraints in the acquisition and cost of right-of-way. In addition, the estimated peak hour trips upon which the freeway analysis is based represents a temporary worst-case scenario (one-year period) during its construction. The peak hour trips generated by the project would be much less during the remainder of the 7-year construction period since fewer employees and construction activities are anticipated on a daily basis. Furthermore, there would be minimal peak hour trips generated by the project site upon completion of the ADSRP construction.

Other Transportation Issues

Analyses of other transportation issues associated with the project site, including roadway segment analysis, freeway off-ramp queuing analysis, and a review of the project's effects on pedestrian, bicycle, and transit facilities also was completed. Unlike the level of service traffic operations methodology, which is adopted by local and regional agencies, the analyses in this chapter are based on professional judgment in accordance with the standards and methods employed by the traffic engineering community.

Roadway Segment Evaluation

The following conclusions can be drawn from the evaluation of the study roadway segments:

- Traffic volumes at each study roadway segment are and would continue to be within the volume range characteristic for LOS D or better operations based on volume thresholds identified in the 2035 MH General Plan.
- Increases in traffic volumes on roadways other than Cochrane Road will be less than 10%.Cochrane Road would serve as the primary route for construction truck traffic. Therefore, increases in the composition of truck traffic along the study roadways, outside of Cochrane Road, will be minimal.
- Speeds along eight of the ten study roadway segments currently exceed the posted speed limit by more than 5 mph in at least one direction.

Freeway Off-Ramp Queuing Analysis

The results of the analysis show that the 95th percentile queue lengths at each of the US 101 off-ramps to Dunne Avenue, Cochrane Road, and Tennant Avenue are projected to be accommodated entirely on the ramps and would not extend back and disrupt the freeway mainline.

Effects on Pedestrian, Bicycle, and Transit Facilities

The project is not expected to have an adverse effect on the existing pedestrian, bicycle, and transit facilities.

Conservation Measures and Temporary Access Roads

A qualitative evaluation of the effects on traffic operations due to the construction activities associated with the conservation measures at Ogier Ponds and the Coyote Percolation Dam was completed. Additionally, construction activities associated with the construction of temporary access roads via Shingle Valley Road (north haul road) and via Holiday Estates (south haul road) also were evaluated.

Each of the conservation measure and haul road project components will consist of much smaller project areas and shorter construction time periods than those of the ADSRP. Each of the conservation measure sites also are separate of the ADSRP site and its construction schedule. Therefore, the effects of the conservation measure components and haul roads are evaluated individually at only a qualitative level.

- The Ogier Ponds and Coyote Creek Percolation Dam conservation measures would generate no daily or peak hour trips upon completion of their construction. Therefore, the construction traffic generated during the completion of the conservation measures can be considered a temporary condition that does not warrant physical improvement of the roadways in the project areas.
- Upon completion of the ADSRP project, the temporary haul roads will be eliminated. Therefore, the construction traffic generated during the completion of the haul roads can be considered a temporary condition that does not warrant physical improvement of the roadways in the project area.
- The traffic that will be added to the roadways system due to the sediment augmentation program would be an ongoing process for an extended length of time beyond the completion of the ADSRP construction. However, the evaluation of the construction activities and schedule indicate that the number of trips added to the roadway system would be minimal and would not warrant physical improvement of the roadways in the project area.

1. Introduction

This report presents the results of the transportation analysis (TA) conducted for the proposed Anderson Dam Seismic Retrofit Project (ADSRP) in Morgan Hill, California. The project would temporarily generate truck and employee auto trips during project construction period along roadways that provide access to Anderson Dam and the planned San Pedro Staging Area. The purpose of this analysis is to:

(1) Quantify the number of truck and auto trips that may be generated by the project,
(2) Estimate the vehicle miles traveled (VMT) that will be generated by employees of the project
(3) Quantify the number of truck and auto trips that may be added to nearby roadways,
(4) Determine whether the increase in truck and auto traffic would result in any traffic operations issues,
(5) Propose measures to reduce the impact of the project (if necessary).

This evaluation focuses only on off-site trips, or trips that would utilize surrounding streets to access the construction site. Construction projects of this type would typically generate a significant number of truck trips associated with off-site hauling of material. However, the construction plan will allow for storage of material on-site. Thus, there will be a significant number of trucks that will travel within the project site throughout the day which are not the subject of this evaluation.

Project Description

Anderson Dam is located near the intersection of Cochrane Road and Coyote Road. The proposed seismic retrofit of Anderson Dam would involve retrofitting and upgrading Anderson Dam and associated facilities to meet Federal Energy Regulatory Commission (FERC) and California Department of Water Resources Division of Safety of Dams (DSOD) requirements.

Project construction is planned over a seven-year duration. The following describes the generalized construction activities by calendar year:

- Year 1: Site mobilization; preparation of staging areas, access roads, in-reservoir stockpile areas, and borrow sites.
- Year 2: Full dewatering of the reservoir; cofferdam construction; sediment check dams and reservoir bypass pipe; conversion of existing Stage 1 diversion system into Stage 2 diversion

system; dam excavation to interim dam with crest of elevation 565 feet (Stage 1a Dam Excavation); and tunneling for high-level outlet works.
- Year 3: Dam excavation to interim dam with crest of elevation 556 feet (Stage 1b Dam Excavation); construction of high-level outlet works; and demolition of the existing spillway.
- Year 4: Dam excavation to a remnant core (Stage 2a Dam Excavation) and dam fill to interim dam with crest elevation 556 feet (Stage 2b Fill); and construction of the spillway.
- Year 5: Dam fill to interim dam with crest elevation 565 feet (Stage 3a Dam Fill); construction of the spillway; and construction of the low-level outlet structure.
- Year 6: Dam fill to new dam crest elevation 657 feet (Stage 3b Dam Fill); completion of low-level outlet works, including sloping intake structure and outlet structure; and completion of the spillway including the unlined chute, and refilling of reservoir.
- Year 7: Permanent roadways and site restoration; and repaving Cochrane Road.

The ADSRP project would include several construction staging areas located on-site. However, one staging site will be located at 2100 San Pedro Avenue approximately 2.6 miles south of the ADSRP site. The San Pedro Avenue staging area would be used for construction employee parking. Employee shuttles will be provided between the ADSRP site and the staging area. Therefore, the effects of vehicular traffic associated with the San Pedro Staging area is included as part of the ADSRP evaluation.

In addition to the dam retrofit, the project also will include four additional project areas in which project conversation measures and temporary emergency egress routes would be provided in the case of an emergency requiring evacuation from the reservoir area. Each of the additional project areas are described below:

(1) Ogier Ponds Restoration Project - The Ogier Ponds are located approximately 4 miles downstream of Anderson Dam between US 101 and Monterey Road. The Ogier Ponds Restoration includes the reconstruction of the Coyote Creek channel to separate the creek from the Ogier Ponds.
(2) Phase 2 Coyote Percolation Dam - The Coyote Creek Percolation Dam is located approximately 10 miles downstream of Anderson Dam and will include the construction of a roughened ramp fishway to allow for improved fish passage over the deflated bladder dam over a range of flow conditions.
(3) Shingle Valley Haul Road - The north haul road (Shingle Valley Road) will provide access from Highway 101 to Metcalf Road to Shingle Valley Road (Private) to Stockpile Area L
(4) Holiday Estates Haul Road – The south haul road (Holiday Estates) will provide access from Highway 101 to Dunne Avenue to Holiday Drive to Staging Area 6 (Boat Marina).
(5) The sediment augmentation program would consist of removing and stockpiling approximately 55,000 cubic yards of sediment from the exposed reservoir between the Dunne Avenue Bridge and the Holiday Estates boat launch. Sediment materials would then be placed in Coyote Creek at multiple locations between the Anderson Dam and Ogier Ponds

Each of the conservation measures and haul road project components will consist of much smaller project areas and shorter construction time periods than those of the ADSRP. Each of the conservation measure sites also are separate of the ADSRP site and its construction schedule. Therefore, the effects of the conservation measure components and haul roads are evaluated individually at only a qualitative level. The focus of the transportation analysis is the ADSRP project and its construction activities.

The project sites and the surrounding study area are shown on Figure 1 and Figure 2.

LEGEND

= Site Location

Morgan Hill

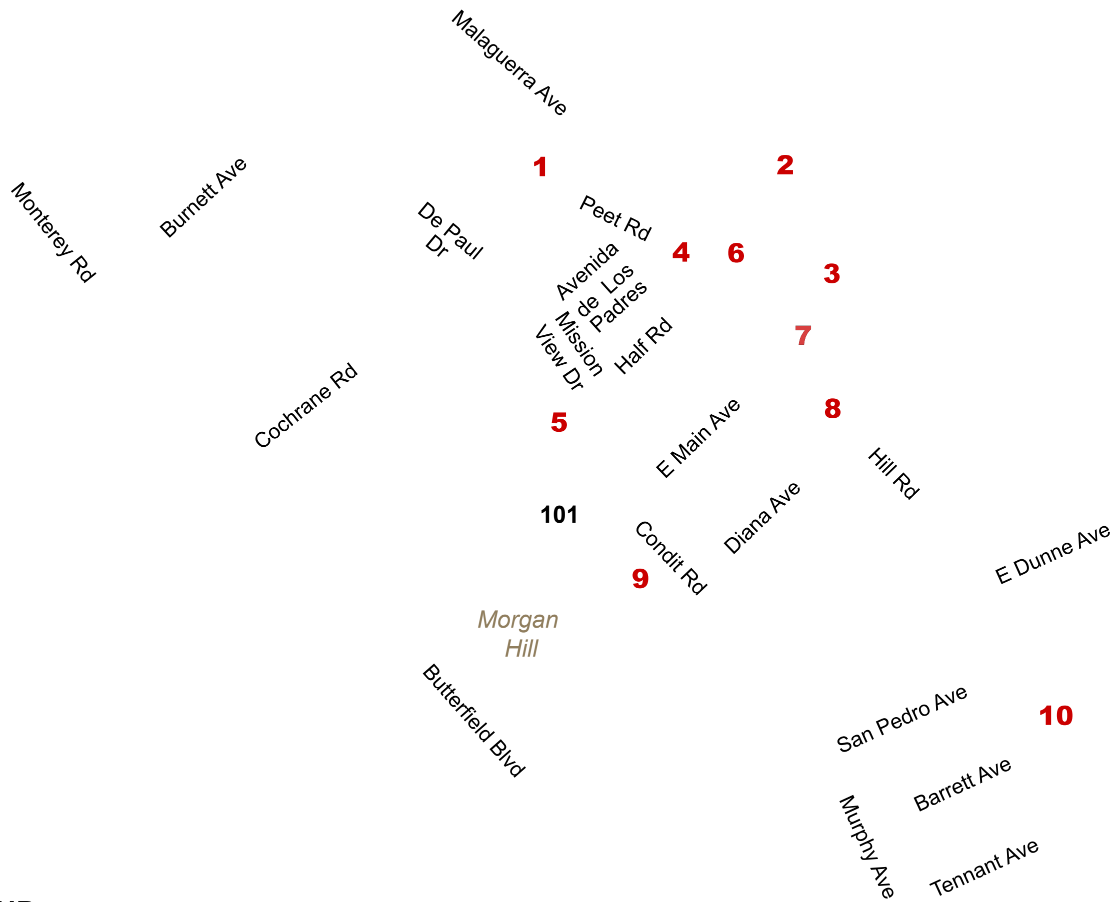
101

Peet Rd

Cochrane Rd

Half Rd

Figure 1
Project Site



LEGEND

= Site Location

= Study Intersection

X = Study Street Segment

= San Pedro Employee Staging Area

Figure 2
Project Site and Study Area

Scope of Study

The TA consists of a California Environmental Quality Act (CEQA) vehicle miles traveled (VMT) analysis and a supplemental traffic operations analysis.

CEQA Transportation Analysis Scope

Historically, traffic impact analysis has focused on the identification of traffic impacts and potential roadway improvements based on delay to relieve traffic congestion that may result due to proposed/planned growth. However, with the adoption of Senate Bill (SB) 743 legislation, public agencies are required (effective July 2020) to base transportation impacts on vehicle miles traveled (VMT) rather than level of service that typically uses delay as its metric. The change in measurement is intended to better evaluate the effects on the state's goals for climate change and multi-modal transportation. Therefore, to adhere to the state's legislation, transportation impacts for projects are based on the VMT metric.

The CEQA VMT impact analysis was completed using the Santa Clara Countywide Vehicle Miles Traveled Evaluation Tool (VMT Evaluation Tool). The City of Morgan Hill, within which the majority of the project area is located, is currently developing the framework for new transportation policies based on VMT as the primary measure of transportation impacts. The new policies will replace the City's current transportation policies that are based on levels of service per the 2035 MH General Plan. However, the City has not formally adopted its own city specific VMT policies.

Traffic Operations Analysis Scope

All study intersections and roadway segments are located with the City of Morgan Hill and County of Santa Clara. However, the County reverts to local jurisdictional requirements and standards for roadway facility operations. Therefore, the traffic operations is based on City of Morgan Hill LOS standards for all study intersections and roadway segments. The traffic operations analysis supplements the CEQA required VMT analysis. However, the determination of project impacts per CEQA requirements is based solely on the VMT analysis.

The effects of the project on traffic operations on the surrounding roadway system were evaluated following the standards and methodologies set forth by the City of Morgan Hill in its *Guidelines for Preparation of Transportation Impact Reports*, February 2010, the 2035 MH General Plan, and the Santa Clara Valley Transportation Authority (VTA). The VTA administers the County Congestion Management Program (CMP). The traffic operations analysis includes the evaluation of the standard weekday AM and PM commute peak-hour operations at selected intersections for the purpose of identifying operational issues at intersections in the general vicinity of the project site. At the request of Valley Water, the weekday AM and PM peak-hour analysis was supplemented with an analysis of weekday (Monday AM and Friday PM) and weekend peak conditions since peak direction traffic conditions can be abnormally worse on Monday mornings and Friday evenings along US 101. The traffic operations analysis also includes freeway segment analysis, roadway segment analysis, and a freeway ramp analysis, which are described further in Chapter 4.

Report Organization

The remainder of this report is divided into four chapters. Chapter 2 describes the existing conditions in terms of the existing roadway network, existing bicycle and pedestrian facilities, and transit services. Chapter 3 presents the CEQA VMT analysis. Chapter 4 presents the traffic operations analysis and the project's effects on the transportation system. Chapter 5 provides a qualitative evaluation of the conservation measures and proposed temporary haul road. Chapter 6 presents the conclusions of the transportation analysis.

2. Existing Transportation System

This chapter describes the existing transportation systems within the ADSRP project area. It describes the transportation facilities in the vicinity of the site, including the roadway network, pedestrian and bicycle facilities, and transit services.

Existing Roadway Network

Regional access to the project site is provided via US 101. Local access to the site and the San Pedro Avenue staging area is provided by Cochrane Road, Main Avenue, Hill Road, Dunne Avenue, and Tennant Avenue.

US 101 is a north-south freeway extending northward to San Francisco and southward through Gilroy. US 101 is an eight-lane freeway (three mixed-flow lanes and one high-occupancy vehicle (HOV) lane in each direction) north of Cochrane Road. South of Cochrane Road, US 101 narrows to a six-lane freeway with no HOV lanes. Access to and from the project site and the San Pedro Avenue staging area is provided via its interchanges at Cochrane Road, Dunne Avenue, and Tennant Avenue.

Cochrane Road is predominantly an east-west arterial that extends from Main Avenue in the east to Monterey Road. Cochrane Road is generally a four-lane divided roadway west of Mission View Drive and a two-lane undivided roadway east of Mission View Drive. Cochrane Road includes bike lanes on both sides of the street and has a posted speed of 40 miles per hour (mph) in the project vicinity. Cochrane Road provides direct access to the project site.

Main Avenue is designated as an arterial per the 2035 MH General Plan and is a two-lane east-west roadway that extends from Cochrane Road in the east to John Telfer Drive in the west. Main Avenue includes on-street parking and bike lanes along some portions of the roadway. Main Avenue has a posted speed of 40 mph in the project vicinity and provides access to the project site via Cochrane Road and provides access to the San Pedro Avenue staging area via Hill Road.

Hill Road is designated as an arterial in the project vicinity and is a two-lane north-south undivided road that extends from Main Avenue in the north to Maple Avenue in the south. Hill Road has a posted speed of 40 mph with bike lanes between Dunne Avenue and Diana Avenue. Sidewalks are only provided adjacent to the existing residential developments along Hill Road near Dunne Avenue. Hill Road provides direct access to the San Pedro Avenue staging area.

Dunne Avenue is designated as an arterial per the 2035 MH General Plan and transverses the City extending from the east part of town to the west with a posted speed limit of 35 to 40 mph. Bike lanes are provided along both sides of Dunne Avenue between Peak Avenue and Gallop Drive (east of US 101). Dunne Avenue provides access to the San Pedro Avenue staging area via Hill Road.

Tennant Avenue is designated as an arterial west of Hill Road and as a collector east of Hill Road per the 2035 MH General Plan and is a two-lane east-west roadway with a posted speed limit of 45 mph. There are and no bike lanes or sidewalks provided on either side of the street in the project vicinity. Tennant Avenue provides access to the San Pedro Avenue staging area via Hill Road.

Existing Pedestrian and Bicycle Facilities

Pedestrian facilities in the study areas consist primarily of sidewalks, pedestrian push buttons, marked crosswalks, and signal heads at signalized intersections. In the project vicinity, there are existing sidewalks along the south side of Cochrane Road and along portions of the north side of Cochrane Road.

As defined by the Valley Transportation Authority (VTA), bicycle facilities include Class I bikeways (off-street bike paths, which are shared with pedestrians and exclude general motor vehicle traffic), Class II bikeways (striped bike lanes on street), and rated streets. The latter refers to streets frequently used by bicyclists, sharing the roadway with motor vehicles, and includes city-designated Class III bike routes. Rated streets include extreme caution (heavy traffic volumes with high traffic speeds), alert (moderate traffic volumes and speeds), and moderate (low traffic volumes and moderate to low traffic speeds). Class III bikeways only have signs to help guide bicyclists on recommended routes to certain locations.

In the project vicinity, bike lanes are currently provided along the extent of Cochrane Road and Mission View Drive north of Cochrane Road. An unpaved bike path, the Madrone Channel Trail, runs along the east side of US 101, between Tennant Avenue and Cochrane Road.

The remaining bicycle facilities in the area are located beyond the immediate project vicinity. Bike lanes are currently provided along the following roadways:

- Main Avenue, between Live Oak High School and Peak Avenue;
- Dunne Avenue west of Gallop Drive;
- Hill Road between Dunne Avenue and Diana Avenue;
- Murphy Avenue between Dunne Avenue and Kelly Park Circle;
- Butterfield Boulevard, along its entire length;
- Sutter Boulevard, between Cochrane Road and Butterfield Boulevard;
- Central Avenue, between Butterfield Boulevard and its termination point west of US 101;
- Monterey Road, nearly its entire length within City of Morgan Hill limits, with the exception of the segment that runs through downtown between Dunne Avenue and Main Avenue;
- Tennant Avenue, between Condit Road and Olympic Drive
- Depot Street, along its entire length;
- Peak Avenue, between Dunne Avenue and Wright Avenue;
- Hale Avenue, between Main Avenue and north of the City of Morgan Hill.

Other bicycle facilities in the City include the following:

- A bike route on Monterey Road, between Dunne Avenue and Main Avenue;

- A paved bike path on the east side of Butterfield Boulevard, between San Pedro Avenue and Central Avenue.
- Along the west bank of Little Llagas Creek, extending from Watsonville Road north to Spring Avenue.

The existing bicycle facilities in the study area are presented graphically on Figure 3.

Existing Transit Service

Existing transit service to the study area is provided by VTA and Caltrain. The transit services are described below and shown on Figure 4.

VTA Bus Services

The study area is served directly by one local bus (Local Bus Route 87). In addition, Express Route 168 operates along Cochrane Road west of US 101.

Local Bus Route 87 operates on Cochrane Road, Mission View Drive, and Half Road in the study area. It runs from Burnett Avenue to the Civic Center (Main and Dewitt) in Morgan Hill with approximately 60-minute headways in the AM and PM commute periods. Route 87 operates between 6:45 AM and 6:00 PM. The nearest Route 87 bus stops to the project site are located near the De Paul Drive/Cochrane Road, Mission View/Cochrane Road, and Elm Street/Half Road intersections.

Rapid Route 568 operates on Butterfield Boulevard and Cochrane Road on its route between the Gilroy Transit Center and the San Jose Diridon Transit Center. Route 568 operates between 5:15 AM and 8:15 PM operates northbound with approximately 30- to 45-minute headways during the AM commute period and southbound with approximately 45-minute headways during the PM commute period. The nearest Route 568 bus stops to the project site are located near the intersection of Cochrane Circle/Cochrane Road.

Caltrain

Commuter rail service between San Francisco and Gilroy is provided by Caltrain. The Morgan Hill Caltrain Station is located along Depot Street, with main access and parking off of Butterfield Boulevard, approximately 3.5 miles from the project site. At the Morgan Hill Station, Caltrain provides three northbound trains during the AM commute period and three southbound trains during the PM commute period.

Malaguerra Ave
101
Monterey Rd
Burnett Ave
De Paul Dr
Peet Rd
Avenida de Los Padres
Mission View Dr
Half Rd
Cochrane Rd
E Main Ave
Hill Rd
Diana Ave
Condit Rd
E Dunne Ave
Morgan Hill
Butterfield Blvd
San Pedro Ave
Barrett Ave
Murphy Ave
Tennant Ave

LEGEND

= Site Location

= Existing Class I Bike Paths

= Existing Class II Bike Lanes

= Existing Class III Bike Routes

Figure 3
Existing Bicycle Facilities

Malaguerra Ave
101
Monterey Rd
Burnett Ave
De Paul Dr
Peet Rd
Avenida de Los Padres
Half Rd
Mission View Dr
Cochrane Rd
E Main Ave
Hill Rd
Diana Ave
Condit Rd
E Dunne Ave
Morgan Hill
Morgan Hill Caltrain Station
Butterfield Blvd
San Pedro Ave
Barrett Ave
Murphy Ave
Tennant Ave

LEGEND

= Site Location

= Local Bus Route

= Frequent Bus Route

= Rapid Bus Route

Figure 4
Existing Transit Services

3. CEQA VMT Evaluation

This chapter provides an evaluation of the project's effect on vehicle miles traveled (VMT). Pursuant to Senate Bill (SB) 743, the California Environmental Quality Act (CEQA) 2019 Update Guidelines Section 15064.3, subdivision (b) states that VMT will be the metric in analyzing transportation impacts for CEQA purposes.

VMT Evaluation Methodology

VMT is the total miles of travel by personal motorized vehicles a project is expected to generate in a day. VMT measures the full distance of personal motorized vehicle trips with one end within the project area. Typically, projects that are farther from other, complementary land uses (such as a business park far from housing) and in areas without transit or active transportation infrastructure (bike lanes, sidewalks, etc.) generate more driving than development near complementary land uses with more robust transportation options.

The evaluation of the project's effects on VMT was completed using the Santa Clara Countywide Vehicle Miles Traveled Evaluation Tool (VMT Evaluation Tool). The VMT Evaluation Tool identifies the existing average VMT per capita and VMT per worker for areas throughout the County based on the assessor's parcel number (APN) of a project. Based on the project location, type of development, project description, and proposed trip reduction measures, the evaluation tool calculates the project VMT.

VMT Policies and Impact Criteria

A project's VMT is compared to established thresholds of significance based on the project location and type of development. When assessing a residential project, the project's VMT is typically divided by the number of residents expected to occupy the project to determine the VMT per capita. When assessing an office or industrial project, the project's VMT is divided by the number of employees to determine the VMT per employee/job. Retail uses are assessed based on their effects on total VMT.

The City of Morgan Hill, at the time of this report, has not yet adopted analysis procedures, standards, or guidelines consistent with SB 743. In the absence of an adopted policy with impact thresholds, this assessment relies on guidelines published by the Governor's Office of Planning and Research (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018 in analyzing the project's effects on VMT.

Employment Use Impact Thresholds

As stated in the technical advisory, OPR recommends an impact threshold of 15% below the existing regional VMT per worker for office uses. OPR does not provide recommended impact thresholds for industrial uses. Office space and jobs are more commonly available in urban areas in close proximity to supporting residential uses unlike industrial land uses which are typically more isolated from residential areas. While office employees may have the option to choose a convenient job location in close proximity to their place of residence, industrial employees may have limited options, resulting in longer trips and consequently greater VMT.

For this reason, jurisdictions that have adopted their own VMT guidelines and impact thresholds have tended to define impact thresholds for industrial land uses that are less stringent than the typical 15% below existing VMT per worker that is applied to office uses. In most jurisdictions, the existing VMT per industrial job is used as the impact threshold. Therefore, the existing regional VMT per industrial worker is used as the impact threshold for the construction employees of the project. The VMT Evaluation Tool indicates that the regional average VMT per industrial worker is currently 15.33.

Vehicle Types

The OPR guidelines state that VMT refers to the amount and distance of automobile (cars and light trucks) travel attributable to a project. The objective of the SB 743 legislation is to reduce VMT for commuting to and from work or using retail services within the neighborhood by encouraging alternative modes of travel such as walking, bicycling, transit, or carpooling. VMT analysis is not intended to evaluate temporary construction related traffic nor how goods and products are shipped and moved in the marketplace. Even though one particular project may generate a significant amount of truck trips, the number of truck trips and resulting in truck-generated VMT for an individual project is incidental when compared to the total VMT generated by residential, commercial, and office uses. Therefore the VMT evaluation for the project excludes construction truck trips that will be generated by the project.

VMT Evaluation

The VMT Evaluation Tool is typically used to calculate the project VMT based on the project location, type of development, project description, and proposed trip reduction measures. However, the VMT Evaluation Tool is limited to the evaluation of the general land use categories of residential, office, and industrial. Therefore, the use of the VMT Evaluation Tool for uses that are not reflective of one of the general land uses, such as the proposed dam reconstruction and its related construction traffic, requires the conversion of the project to an equivalent number of residential units, office space, or industrial space. Therefore, the estimated trips for the projects peak (Year 6 Stage B) construction activities was converted to an equivalent amount of industrial space by comparing estimates of daily trips for the project to trip generation estimates for industrial uses based on trip rates published in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 11th Edition* (2021). The estimated 446 daily trips for the construction employees of the project are based on anticipated construction schedules and activities that were provided by Valley Water. Note that the estimated daily trips for the project are discussed in greater detail in Chapter 4 of this report. Based on construction activity information provided by Valley Water, the estimated 446 daily trips would be equivalent to that daily trips expected to be generated by 92,000 square feet of industrial space (see Table 1). The amount of equivalent industrial space was used to evaluate the project VMT using the VMT Evaluation Tool.

Based on the VMT Evaluation Tool the VMT per worker (25.47) in the project area is currently greater than the regional average. The VMT generated by the project would be 24.69 per worker, which is less than the current project area VMT per worker. Per CEQA guidelines, project's that decrease VMT in the

Table 1
Equivalent Industrial Space

Project Trips (employeess)[1]	-[1]		n/a		-[1]	446
General Light Industrial	110	**Equivalent Industrial Space[2] =**	**92,000**	**s.f.**	4.87	446

Notes:
s.f. = square feet

[1] Trip generation for the project is based on the Year 6 (Stage 3b) estimated daily maximum of employee trips. See trip generation table for details.

[2] The Santa Clara Countywide Vehicle Miles Traveled Evaluation Tool (VMT Evaluation Tool) does not directly provide for the evaluation of VMT for a construction project. Therefore, the construction related employee trips were converted to equivalent industrial space using the ITE daily trip generation rates and evaluated as industrial land use in the VMT Evaluation Tool.

project areas when compared to current conditions should be presumed to have a less than significant transportation impact. In addition, the estimated daily trips upon which the VMT for the project is based represents a temporary worst-case scenario (one-year period) during its construction. Once the dam reconstruction is complete, there will be minimal VMT generated by the project site. Therefore, the project would result in a less than significant impact on the transportation system. The VMT Evaluation Tool output sheet is shown on Figure 5.

Figure 5
VMT Analysis

4. Traffic Operations Analysis

This chapter describes the traffic operations analysis. The traffic operations analysis provides supplemental analysis for the purposed of identifying potential improvements of the transportation system that may be implemented to minimize adverse effects of project construction traffic. However, the identified roadway operations and improvements are not required or considered project impacts per CEQA guidelines.

The chapter presents the method by which project traffic is estimated, intersection operations analysis for existing and existing plus project conditions, the identification of any adverse effects on study intersections caused by project generated trips, and recommended improvements to alleviate any identified operational issues. In addition, the chapter includes a freeway segment capacity evaluation, roadway segment capacity evaluation, freeway off-ramp capacity evaluation, and review of the project's effects on pedestrian, bicycle, and transit facilities.

Project Trip Estimates

The project would temporarily generate truck and auto trips associated with workers and activities during its construction along roadways that provide access to the Anderson Dam and the San Pedro Avenue staging area. Generally, the number of workers on-site would vary during the project's 7-year construction period based on the phase of construction. Table 2 provides a summary of planned construction during the 7-year construction period. Detailed construction activity information included estimates of the number of trucks is provided in Appendix A. Based on the construction phasing plan, peak construction activities will occur during Year 6 with up to an approximate maximum of 235 daily workers, 30 daily employee shuttle trips, and a maximum of 125 support truck trips per day. Year 6 (Stage B) construction traffic would consist of the following:

- A day shift from 6 AM to 5 PM and an evening shift from 6 PM to 5 AM.
- Support truck trips will include construction materials, supplies, equipment, etc.
- A maximum of 40 employees will park on-site and the remaining employees will park at the San Pedro Avenue staging area (see Figure 2 in Chapter 1).
- Employees will be shuttled to/from the San Pedro Avenue staging area to the project site.

The magnitude of traffic produced by developments and the locations where that traffic would appear are typically estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In determining project trip generation, the magnitude of traffic entering and exiting the site is estimated for the AM and PM peak hours. As part of the project trip distribution, the directions to and

Table 2
ADSRP Construction Phase Workers

Site Mobilization	Year 1	40/55
Stage 1a Dam Excavation	Year 2	120/195
Stage 1b Dam Excavation	Year 3	140/230
Stage 2a Excavation and Fill	Year 4	130/190
Stage 2b Excavation and Fill	Year 4	170/205
Stage 3a Dam Fill	Year 5	150/235
Stage 3b Dam Fill	**Year 6**	**135/235**
Site Restoration	Year 7	55/85

Notes:
Source: AECOM 2022 (Anderson Dam Siesmic Retrofit Project Description (Table 2-2))
[1] Year 6 (Stage 3b) is identified as the peak construction period based on the maximum antcipated employees and other contruction actvities (trucks).

from which the project trips would travel are estimated. In the project trip assignment, the project trips are assigned to specific streets and intersections. These procedures are described below.

Trip Generation

The magnitude of traffic produced by developments is typically estimated by applying the size of the project to the applicable trip generation rates contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. However, since the project would consist of truck and auto trips associated with workers and activities during construction for which trip rates are not provided in the ITE *Trip Generation Manual*, trip generation estimates for the project were estimated by Hexagon utilizing project information for the proposed construction operations as provided by Valley Water.

Based on information provided by Valley Water, the project would generate a maximum of 380 employee trips during the day shift, 90 employee trips during the evening shift, and 250 truck trips per day. In addition, a maximum of 60 shuttle trips between the project site and the San Pedro Avenue staging area will occur. Based on the information provided by Valley Water, the hourly site-generated trips are summarized in Table 3 and the AM and PM peak hour trips are summarized in Table 4. It is estimated that the project would generate a total of 756 daily vehicle trips with 48 trips occurring during the AM peak hour (33 inbound and 15 outbound) and 271 occurring during the PM peak hour (67 inbound and 204 outbound).

Note that the project trip generation is based on the Year 6 (Stage 3b) estimated daily maximum employee, truck, and shuttle trips, which is the peak construction conditions during the 7-year construction period. As such, this analysis represents a worst-case scenario in regard to project generated construction traffic and is much greater than expected during the majority of the 7-year construction period.

Table 3
Estimate of Daily Project Construction Generated Trips

5:00 AM	Arrival	23	103	11		126	0	126	11	11	22	137	11	148
to 6:00 AM	Departure			11										
6:00 AM	Arrival	6	30	3		36	43	79	3	3	6	39	46	85
to 7:00 AM	Departure	8	35	3										
7:00 AM	**Arrival**	**3**	**15**	**2**	**13**	**18**	**0**	**18**	**15**	**15**	**30**	**33**	**15**	**48**
to 8:00 AM	**Departure**			**2**	**13**									
8:00 AM	Arrival				11	0	0	0	11	11	22	11	11	22
to 9:00 AM	Departure				11									
9:00 AM	Arrival				11	0	0	0	11	11	22	11	11	22
to 10:00 AM	Departure				11									
10:00 AM	Arrival				11	0	0	0	11	11	22	11	11	22
to 11:00 AM	Departure				11									
11:00 AM	Arrival				11	0	0	0	11	11	22	11	11	22
to 12:00 PM	Departure				11									
12:00 PM	Arrival				11	0	0	0	11	11	22	11	11	22
to 1:00 PM	Departure				11									
1:00 PM	Arrival				11	0	0	0	11	11	22	11	11	22
to 2:00 PM	Departure				11									
2:00 PM	Arrival				11	0	0	0	11	11	22	11	11	22
to 3:00 PM	Departure				11									
3:00 PM	Arrival				11	0	0	0	11	11	22	11	11	22
to 4:00 PM	Departure				11									
4:00 PM	Arrival				11	0	0	0	11	11	22	11	11	22
to 5:00 PM	Departure				11									
5:00 PM	**Arrival**	**8**	**35**	**11**	**13**	**43**	**180**	**223**	**24**	**24**	**48**	**67**	**204**	**271**
to 6:00 PM	**Departure**	**32**	**148**	**11**	**13**									
6:00 PM	Arrival			3		0	0	0	3	3	6	3	3	6
to 7:00 PM	Departure			3										
TOTAL DAILY TRIPS:		**80**	**366**	**60**	**250**	**223**	**223**	**446**	**155**	**155**	**310**	**378**	**378**	**756**

Notes:

[1] Number of employee trips is based on the Year 6 (Stage 3b) estimated daily maximum number of employees of 235. Analysis assumes 190 employees for the day shift (6 AM to 5 PM) and 45 employees for the evening shift (6 PM to 5 AM). Analysis assumes 10% of day shift employees arrive during the AM peak hour. Analysis assumes 17% of employees will park on-site and 83% of employees will park at the San Pedro Avenue staging area.

[2] Analysis assumed a carpool reduction of 5% for the employee trips.

[3] Analysis assumed a maximum of 30 inbound and 30 outbound daily shuttle trips (60 total trips) and an average of 15 employees will be carried on each shuttle trip.

[4] Number of truck trips is based on the Year 6 (Stage 3b) estimated daily maximum of 125 truck trips per day. Analysis assumes 10% of truck trips enter and exit during each peak hour.

Table 4
Estimated Peak Hour Trip Generation

Employees[1]							
Employees (on-site staging area)	80	3	0	3	8	32	40
Employees (San Pedro Avenue staging area)	390	16	0	16	37	158	195
Subtotal Employee Trips	470	19	0	19	45	190	235
Carpool Reduction (5%) [2]	*(24)*	*(1)*	*0*	*(1)*	*(2)*	*(10)*	*(12)*
Subtotal Employee Trips w/Carpool Reduction	*446*	*18*	*0*	*18*	*43*	*180*	*223*
Shuttle Trips[3]	60	2	2	4	11	11	22
Trucks[4] **(construction materials, supplies, equipment, etc.)**	250	13	13	26	13	13	26
Total	***756***	***33***	***15***	***48***	***67***	***204***	***271***

Notes:
[1] Number of employee trips is based on the Year 6 (Stage 3b) estimated daily maximum number of employees of 235. Analysis assumes 190 employees for the day shift (6 AM to 5 PM) and 45 employees for the evening shift (6 PM to 5 AM). Analysis assumes 10% of day shift employees arrive during the AM peak hour. Analysis assumes 17% of employees will park on-site and 83% of employees will park at the San Pedro Avenue staging area.
[2] Analysis assumed a carpool reduction of 5% for the employee trips.
[3] Analysis assumed a maximum of 30 inbound and 30 outbound daily shuttle trips (60 total trips) and an average of 15 employees will be carried on each shuttle trip.
[4] Number of truck trips is based on the Year 6 (Stage 3b) estimated daily maximum of 125 truck trips per day. Analysis assumes 10% of truck trips enter and exit during each peak hour.

Trip Distribution and Trip Assignment

The distribution of employee and truck traffic was assumed to be distributed equally to US 101 north and south of the project area. The shuttle traffic would only travel between the project site (Anderson Dam) and the San Pedro Avenue staging area. Figure 6 shows the trip distribution patterns for employees and trucks. Figure 7 shows the primary truck, employee, and shuttle routes, and Figure 8 shows the peak-hour trip assignment of project traffic at the study intersections.

50%

Malaguerra Ave

1

2

Monterey Rd

Burnett Ave

De Paul Dr

Peet Rd

4

6

3

Avenida de Los Padres

Mission View Dr

Half Rd

7

Cochrane Rd

5

8

E Main Ave

Hill Rd

101

Condit Rd

Diana Ave

9

E Dunne Ave

Morgan Hill

Butterfield Blvd

San Pedro Ave

10

Barrett Ave

Murphy Ave

Tennant Ave

50%

LEGEND

= Site Location

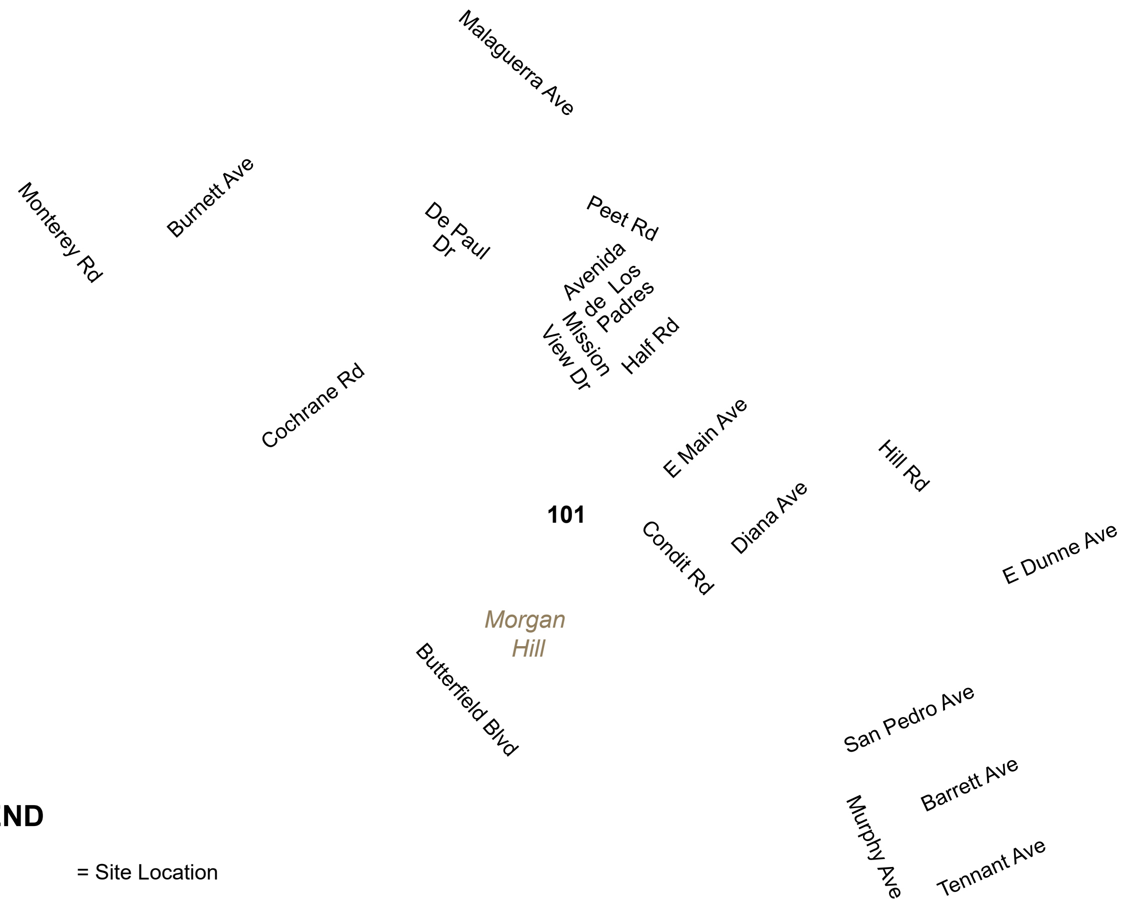
= Study Intersection

x = Study Street Segment

= San Pedro Employee Staging Area

XX% = Trip Distribution

Figure 6
Project Trip Distribution



LEGEND

= Site Location

= Primary Truck Route

= Primary Employee Route to Staging Area

= Primary Employee Route to Construction Area

= Shuttle Route

= San Pedro Employee Staging Area

Figure 7
Truck/Employee/Shuttle Routes

Intersection Operations Methodology

This section presents the methods used to evaluate the traffic operations at the study intersections. It includes descriptions of the data requirements, the analysis methodologies, the applicable transportation policies, and the criteria defining adverse effects. The intersection operations analysis is intended to quantify the operations of nearby facilities and to identify potential negative effects due to the addition of project traffic. Note that a potential adverse effect on an existing facility is not considered a CEQA impact metric.

The intersection operations analysis includes an evaluation of traffic conditions at the study intersections listed below.

Study Intersections

1. US 101 SB Ramps and Cochrane Road
2. US 101 NB Ramps and Cochrane Road
3. De Paul Drive and Cochrane Road
4. Mission View Drive and Cochrane Road
5. Peet Road and Cochrane Road
6. Malaguerra Avenue and Cochrane Road
7. Peet Road and Half Road
8. Cochrane Road and Half Road
9. Hill Road and Dunne Avenue
10. Claret Drive/ Tassajara Circle and Dunne Avenue
11. Pine Way and Dunne Avenue
12. Peppertree Drive and Dunne Avenue
13. Murphy Avenue and Dunne Avenue
14. Condit Road and Dunne Avenue
15. US 101 NB Ramps and Dunne Avenue
16. US 101 SB Ramps and Dunne Avenue
17. US 101 SB Ramps and Tennant Avenue
18. US 101 NB Ramps and Tennant Avenue
19. Hill Road and Tennant Avenue

Traffic conditions were evaluated for the conditions described below.

- **Existing Conditions:** Existing conditions represent traffic conditions on the roadway system during the periods listed below. Existing traffic conditions were based on existing count data collected from previous studies, where available, and supplemented with new counts.
  - ***Standard Weekday Peak Conditions*** - Mid-week AM and PM peak traffic volumes (Tuesday through Thursday, 7:00AM to 9:00 AM and 4:00 PM to 6:00 PM).
  - ***Monday AM Peak Conditions*** - Monday AM peak traffic volumes (7:00 AM to 9:00 AM).
  - ***Friday PM Peak Conditions*** - Friday PM peak traffic volumes (4:00 PM to 6:00 PM).
  - ***Weekend Peak Conditions*** - Weekend peak traffic volumes (Saturday 1:00 PM to 3:00 PM).
- **Existing Plus Project Conditions:** Existing plus project conditions represent each of the existing conditions with the addition of project-generated traffic during each of the applicable periods.

Data Requirements

The data required for the analysis were obtained from recently completed traffic studies, traffic counts collected in September 2021, the 2018 CMP Monitoring and Conformance Report, the project team, and field observations. The following data were collected from these sources:

- existing traffic volumes,
- lane configurations,
- freeway and roadway segment speeds,
- signal timing and phasing, and
- construction phasing and construction vehicle trip information.

Lane Configurations

The existing lane configurations at the study intersections were determined by observations in the field and are shown on Figure 9.

Traffic Volumes

Existing Traffic Volumes

The existing conditions represent existing peak hour traffic volumes on the existing roadway network. Existing traffic conditions are based on new traffic counts and existing traffic counts collected from previously traffic studies. For existing counts that are older than two years old, a 1.5% compound annual growth factor was applied to 2022. In addition, the Monday AM peak conditions, Friday PM peak conditions, and weekend peak conditions for the Dunne Avenue and Tennant Avenue intersections were factored based on the new Cochrane Avenue intersections counts collected for each peak period. The existing standard weekday peak hour traffic conditions at the study intersections are shown on Figure 10, and the Monday AM peak conditions, Friday PM peak conditions, and weekend peak conditions are shown on Figure 11. The new intersection traffic counts are provided in Appendix B.

Existing Plus Project Traffic Volumes

The project trips as represented in the project trip assignment were added to the existing traffic volumes to obtain the existing plus project traffic volumes. The analysis considered the existing plus project scenarios described below.

- ***Standard Weekday Peak Conditions*** - Standard mid-week AM and PM peak traffic volumes plus the AM and PM project trips, see Figure 12.
- ***Monday AM Peak Conditions*** - Monday AM peak traffic volumes plus the AM project trips, see Figure 13.
- ***Friday PM Peak Conditions*** - Friday PM peak traffic volumes plus the PM project trips, see Figure 13.
- ***Weekend Peak Conditions*** - Weekend peak traffic volumes plus the PM project trips, see Figure 13.

Signalized Intersection Analysis Methodology

The signalized study intersections are subject to the City of Morgan Hill level of service standards. The City of Morgan Hill level of service methodology is TRAFFIX, which is based on the *2000 Highway Capacity Manual* (HCM) method for signalized intersections. TRAFFIX evaluates signalized intersections operations based on average delay time for all vehicles at the intersection. Since TRAFFIX is also the CMP-designated intersections level of service methodology, the City of Morgan Hill methodology employs the CMP defaults values for the analysis parameters, which include adjusted saturation flow rates to reflect conditions in Santa Clara County. All intersections within the City of Morgan Hill are required to meet the City's LOS standard of LOS D, with the exception of the following:

- **LOS F** for Downtown intersections and segments including at Main/Monterey, along Monterey Road between Main and Fifth Street, and along Depot Street at First through Fifth Street.

- **LOS E** for the following intersections and freeway zones:

    - Main Avenue and Del Monte Avenue
    - Main Avenue and Depot Street
    - Dunne Avenue and Del Monte Avenue
    - Dunne Avenue and Monterey Avenue
    - Dunne Avenue and Church Street
    - Dunne Avenue and Depot Street
    - Cochrane Road and Monterey Road
    - Tennant Avenue and Monterey Road
    - Tennant Avenue and Butterfield Boulevard
    - Cochrane Road Freeway Zone: from Madrone Parkway/Cochrane Plaza to Cochrane Road/DePaul Drive
    - Dunne Avenue Freeway Zone: from Walnut Grove Drive/East Dunne Avenue to Condit Road/East Dunne Avenue
    - Tennant Avenue Freeway Zone: from Butterfield Boulevard/Tennant Avenue to Condit Road/Tennant Avenue

The correlation between average delay and level of service for signalized intersections is shown in Table 5.

Definition of Adverse Signalized Intersection Operations Effects

According to the City of Morgan Hill level of service guidelines, a development is said to create a significant adverse effect on traffic conditions at a signalized intersection if for either peak hour:

1. The level of service at the intersection degrades from an acceptable level (LOS D or LOS E as identified above) under existing conditions to an unacceptable level (LOS E or F) under project conditions, or

2. The level of service at the intersection is an unacceptable level (LOS E or F as identified above) under existing conditions and the addition of project trips causes the average critical delay to increase by four (4) or more seconds and the volume-to-capacity ratio (V/C) to increase by 0.01.

An exception to this rule applies when the addition of project traffic reduces the amount of average delay for critical movements (i.e., the change in average delay for critical movements is negative). In this case, the threshold of significance is an increase in the critical V/C value by 0.01 or more.

Table 5
Signalized Intersection Level of Service Based on Control Delay

A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	Up to 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	Greater than 80.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* (Santa Clara County and City of Morgan Hill adopted level of service methodology). *Traffic Level of Service Analysis Guidelines*, Santa Clara County Transportation Authority Congestion Management Program, June 2003.

Unsignalized Intersection Analysis Methodology

The methodology used to determine the level of service for unsignalized intersections is also TRAFFIX and the *2000 HCM* methodology for unsignalized intersection analysis. This method is applicable for both side-street stop-controlled and all-way stop-controlled intersections. For the analysis of stop-controlled intersections, the 2000 HCM methodology evaluates intersection operations on the basis of average control delay time for all vehicles on the stop-controlled approaches. For the purpose of reporting the level of service for side-street stop-controlled intersections, the delay and corresponding level of service for the stop-controlled minor street approach with the highest delay is reported. For all-way stop-controlled intersections, the reported average delay and the corresponding level of service is the average for all approaches at the intersection. The City uses a minimum acceptable level of service standard of LOS D for unsignalized intersections, in accordance with its adopted threshold of significance in the City's *Guidelines for Preparation of Transportation Impact Reports*. The correlation between average delay and level of service for unsignalized intersections is shown in Table 6.

Table 6
Unsignalized Intersection Level of Service Definitions Based on Control Delay

A	Operations with very low delays occurring with favorable progression	10.0 or less
B	Operations with low delays occurring with good progression.	10.1 to 15.0
C	Operations with average delays resulting from fair progression.	15.1 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression of high V/C ratios.	25.1 to 35.0
E	Operations with high delay values indicating poor progression and high V/C ratios. This is considered to be the limited of acceptable delay.	35.1 to 50.0
F	Operations with delays unacceptable to most drivers occurring due to oversaturation and poor progression.	greater than 50.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* (Washington, D.C., 2000).

Definition of Adverse Unsignalized Intersection Operations Effects

Unsignalized intersections within the City of Morgan Hill have a minimum operating level of LOS D. According to the City of Morgan Hill level of service guidelines, a development is said to have a significant adverse effect on traffic conditions at an unsignalized intersection if for either peak hour the addition of project traffic causes the worst approach delay to degrade to LOS E or F ***and*** the traffic volumes at the intersection are sufficiently high to satisfy the peak hour volume warrant.

Intersection Operations Analysis

The results of the intersection level of service and signal warrant analyses under existing and existing plus project conditions are summarized in Table 7. The level of service calculation sheets are included in Appendix C. The signal warrant analysis calculation sheets are included in Appendix D.

The results of the level of service analysis indicate that, when measured against the City of Morgan Hill level of service standards, all of the study intersections currently operate and are projected to operate at acceptable levels of service during each of the peak hours analyzed under existing and existing plus project conditions.

The results of signal warrant analysis indicate that the intersection of Hill Road/Tennant Avenue currently has and is projected to have volumes under existing and existing plus project conditions that would warrant signalization. However, the intersection of Hill Road/Tennant Avenue is projected to continue to operate within the applicable level of service standards. Therefore, the project would not

Table 7
Intersection LOS Summary

1	US 101 Southbound Ramps and Cochrane Road	Signal	E	AM	05/08/18	--	13.1	B	--	13.2	B	0.1	0.010
				PM	05/08/18	--	17.0	B	--	17.3	B	0.3	0.011
				MonAM	09/13/21	--	12.5	B	--	12.7	B	0.1	0.010
				FriPM	09/10/21	--	17.1	B	--	17.3	B	0.2	0.011
				SatPM	09/11/21	--	16.6	B	--	16.8	B	0.1	0.011
2	US 101 Northbound Ramps and Cochrane Road	Signal	E	AM	05/08/18	--	8.7	A	--	8.8	A	0.1	0.011
				PM	05/08/18	--	11.5	B	--	11.7	B	0.2	0.015
				MonAM	09/13/21	--	5.3	A	--	5.5	A	0.3	0.010
				FriPM	09/10/21	--	10.7	B	--	10.9	B	0.2	0.015
				SatPM	09/11/21	--	13.1	B	--	13.0	B	-0.9	0.028
3	De Paul Drive and Cochrane Road	Signal	E	AM	05/08/18	--	18.0	B	--	18.1	B	0.1	0.009
				PM	05/08/18	--	18.9	B	--	19.2	B	0.4	0.016
				MonAM	09/13/21	--	18.4	B	--	18.6	B	0.2	0.009
				FriPM	09/10/21	--	18.7	B	--	19.0	B	0.4	0.016
				SatPM	09/11/21	--	17.8	B	--	18.1	B	0.5	0.016
4	Mission View Drive and Cochrane Road	Signal	D	AM	05/08/18	--	25.5	C	--	26.4	C	1.1	0.018
				PM	05/08/18	--	16.3	B	--	16.5	B	0.0	0.000
				MonAM	09/13/21	--	30.9	C	--	31.5	C	1.6	0.027
				FriPM	09/10/21	--	15.6	B	--	15.9	B	0.0	0.000
				SatPM	09/11/21	--	15.7	B	--	15.9	B	0.1	0.021
5	Peet Road and Cochrane Road	TWSC	D	AM	09/14/21	No	13.0	B	No	13.7	B	N/A	N/A
				PM	09/14/21	No	12.0	B	No	13.0	B	N/A	N/A
				MonAM	09/13/21	No	13.6	B	No	14.4	B	N/A	N/A
				FriPM	09/10/21	No	12.0	B	No	13.0	B	N/A	N/A
				SatPM	09/11/21	No	11.7	B	No	12.6	B	N/A	N/A
6	Malaguerra Avenue and Cochrane Road	OWSC	D	AM	09/14/21	No	9.3	A	No	9.5	A	N/A	N/A
				PM	09/14/21	No	8.9	A	No	9.2	A	N/A	N/A
				MonAM	09/13/21	No	9.1	A	No	9.3	A	N/A	N/A
				FriPM	09/10/21	No	9.0	A	No	9.4	A	N/A	N/A
				SatPM	09/11/21	No	9.0	A	No	9.3	A	N/A	N/A
7	Peet Road/Half Road and Half Road	OWSC	D	AM	09/14/21	No	8.5	A	No	8.5	A	N/A	N/A
				PM	09/14/21	No	8.7	A	No	8.7	A	N/A	N/A
				MonAM	09/13/21	No	8.7	A	No	8.7	A	N/A	N/A
				FriPM	09/10/21	No	8.7	A	No	8.7	A	N/A	N/A
				SatPM	09/11/21	No	8.5	A	No	8.5	A	N/A	N/A
8	Cochrane Road and Half Road	OWSC	D	AM	09/14/21	No	8.8	A	No	8.9	A	N/A	N/A
				PM	09/14/21	No	8.7	A	No	8.9	A	N/A	N/A
				MonAM	09/13/21	No	8.4	A	No	8.4	A	N/A	N/A
				FriPM	09/10/21	No	8.7	A	No	8.9	A	N/A	N/A
				SatPM	09/11/21	No	8.8	A	No	9.0	A	N/A	N/A
9	Hill Road and Dunne Avenue	Signal	D	AM	06/04/19	--	19.4	B	--	19.4	B	0.0	0.003
				PM	06/04/19	--	18.2	B	--	19.1	B	2.0	0.094
				MonAM	01/03/22	--	19.9	B	--	19.9	B	0.1	0.003
				FriPM	01/07/22	--	19.9	B	--	21.0	C	2.4	0.094
				SatPM	01/08/22	--	19.5	B	--	20.4	C	2.0	0.094

Notes:
[1] TWSC = two-way stop-controlled intersection, TWSC = one-way stop-controlled intersection, Signal = signalized intersection
[2] The reported delay and corresponding level of service for signalized intersections represent the average delay for all approaches at the intersection. The reported delay and corresponding level of service for one- and two-way stop-controlled intersections are based on the stop-controlled approach with the highest delay.

have an adverse effect on operations at this intersection and signalization of the intersection is not required based on the City of Morgan Hill's standards.

All other unsignalized study intersections are projected to have traffic volumes during each of the peak hours analyzed under existing and existing plus project conditions that fall below the thresholds that warrant signalization.

Thus, intersection operation analysis shows that the project would not have a significant adverse effect on traffic conditions at the study intersections.

Table 7 (Continued)
Intersection LOS Summary

10	Claret Drive/Tassajara Circle and Dunne Avenue	TWSC	D	AM	06/04/19	No	17.4	C	No	17.7	C	N/A	N/A
				PM	06/04/19	No	15.4	C	No	17.1	C	N/A	N/A
				MonAM	01/03/22	No	22.3	C	No	22.7	C	N/A	N/A
				FriPM	01/07/22	No	21.9	C	No	25.1	D	N/A	N/A
				SatPM	01/08/22	No	19.8	C	No	22.5	C	N/A	N/A
11	Pine Way and Dunne Avenue	TWSC	D	AM	06/04/19	No	14.6	B	No	14.7	B	N/A	N/A
				PM	06/04/19	No	14.5	B	No	16.0	C	N/A	N/A
				MonAM	01/03/22	No	20.2	C	No	20.5	C	N/A	N/A
				FriPM	01/07/22	No	19.8	C	No	22.3	C	N/A	N/A
				SatPM	01/08/22	No	18.3	C	No	20.4	C	N/A	N/A
12	Peppertree Avenue and Dunne Avenue	Signal	D	AM	06/04/19	--	12.4	B	--	12.4	B	0.0	0.000
				PM	06/04/19	--	13.9	B	--	13.1	B	-1.4	0.036
				MonAM	01/03/22	--	13.2	B	--	13.2	B	0.0	0.000
				FriPM	01/07/22	--	13.0	B	--	12.6	B	-0.5	0.036
				SatPM	01/08/22	--	12.9	B	--	12.4	B	-0.6	0.036
13	Murphy Avenue and Dunne Avenue	Signal	D	AM	03/28/19	--	19.4	B	--	19.5	B	0.0	0.000
				PM	03/28/19	--	11.9	B	--	12.0	B	-0.1	0.009
				MonAM	01/03/22	--	19.7	B	--	19.7	B	0.0	0.000
				FriPM	01/07/22	--	18.6	B	--	19.3	B	1.1	0.037
				SatPM	01/08/22	--	17.6	B	--	18.0	B	0.7	0.037
14	Condit Road and Dunne Avenue	Signal	E	AM	03/28/19	--	31.2	C	--	31.2	C	0.0	0.000
				PM	03/28/19	--	23.3	C	--	23.4	C	-0.4	0.025
				MonAM	01/03/22	--	31.8	C	--	31.7	C	0.0	0.000
				FriPM	01/07/22	--	26.2	C	--	26.2	C	-0.1	0.025
				SatPM	01/08/22	--	25.4	C	--	25.3	C	-0.3	0.025
15	US 101 Northbound Ramps and Dunne Avenue	Signal	E	AM	05/08/18	--	5.3	A	--	5.4	A	0.0	0.000
				PM	05/08/18	--	11.9	B	--	11.6	B	-0.1	0.013
				MonAM	01/03/22	--	10.4	B	--	10.5	B	0.0	0.000
				FriPM	01/07/22	--	10.2	B	--	10.0	B	-0.1	0.013
				SatPM	01/08/22	--	10.1	B	--	9.9	A	-0.2	0.013
16	US 101 Southbound Ramps and Dunne Avenue	Signal	E	AM	05/08/18	--	21.2	C	--	21.2	C	0.0	0.000
				PM	05/08/18	--	19.1	B	--	20.1	C	1.5	0.029
				MonAM	01/03/22	--	20.3	C	--	20.3	C	0.0	0.000
				FriPM	01/07/22	--	20.5	C	--	21.2	C	1.0	0.029
				SatPM	01/08/22	--	20.1	C	--	20.9	C	0.9	0.029
17	US 101 Southbound Ramps and Tennant Avenue	Signal	E	AM	06/04/19	--	22.0	C	--	22.0	C	0.0	0.000
				PM	06/04/19	--	19.9	B	--	20.9	C	1.8	0.023
				MonAM	01/03/22	--	22.0	C	--	22.0	C	0.0	0.000
				FriPM	01/07/22	--	22.1	C	--	23.2	C	1.8	0.023
				SatPM	01/08/22	--	21.4	C	--	22.4	C	1.8	0.023
18	US 101 Northbound Ramps and Tennant Avenue	Signal	E	AM	06/04/19	--	11.6	B	--	11.6	B	0.0	0.000
				PM	06/04/19	--	11.1	B	--	11.2	B	0.0	0.000
				MonAM	01/03/22	--	11.7	B	--	11.7	B	0.0	0.000
				FriPM	01/07/22	--	11.7	B	--	11.9	B	0.8	-0.004
				SatPM	01/08/22	--	11.6	B	--	11.7	B	0.8	-0.003
19	Hill Road and Tennant Avenue	AWSC	D	AM	06/04/19	No	13.4	B	No	13.4	B	N/A	N/A
				PM	06/04/19	No	10.4	B	No	10.9	B	N/A	N/A
				MonAM	01/03/22	**Yes**	19.9	C	**Yes**	20.0	C	N/A	N/A
				FriPM	01/07/22	**Yes**	19.4	C	**Yes**	21.8	C	N/A	N/A
				SatPM	01/08/22	No	16.2	C	**Yes**	17.6	C	N/A	N/A

Notes:

[1] TWSC = two-way stop-controlled intersection, TWSC = one-way stop-controlled intersection, Signal = signalized intersection

[2] The reported delay and corresponding level of service for signalized intersections represent the average delay for all approaches at the intersection. The reported delay and corresponding level of service for one- and two-way stop-controlled intersections are based on the stop-controlled approach with the highest delay.

Freeway Segment Evaluation

The VTA's Congestion Management Program (CMP) has yet to adopt and implement guidelines and standards for the evaluation of the CMP roadway system using VMT. Therefore, the effects of the project on freeway segments in the vicinity of the project area following the current methodologies, as outlined in the VTA *Transportation Impact Analysis Guidelines*, were completed. Note that this analysis is presented for informational purposes only.

The freeway segment analysis included a study of segments listed below.

Study Freeway Segments

1. US 101 between Dunne Avenue and Tennant Avenue
2. US 101 between Cochrane Road and Dunne Avenue
3. US 101 between Coyote Creek Golf Drive and Cochrane

Freeway Segment Level of Service Methodology

As prescribed in the CMP technical guidelines, the level of service for freeway segments is estimated based on vehicle density. Density is calculated by the following formula:

$$D = V / (N*S)$$

Where:

D = density, in vehicles per mile per lane (vpmpl)
V = peak hour volume, in vehicles per hour (vph)
N = number of travel lanes
S = average travel speed, in miles per hour (mph)

The vehicle density on a segment is correlated to level of service as shown in Table 8. The CMP specifies that a capacity of 2,300 vehicles per hour per lane (vphpl) be used for mixed-flow lane segments that are three lanes or wider in one direction, and a capacity of 2,200 vphpl be used for mixed-flow lane segments that are two lanes wide in one direction. A capacity of 1,650 vphpl was used for high occupancy vehicle (HOV) lanes. The CMP defines an acceptable level of service for freeway segments as LOS E or better.

CMP Definition of Significant Freeway Segment Impacts

The CMP defines an acceptable level of service for freeway segments as LOS E or better. A project is said to create an adverse effect on traffic conditions on a freeway segment if for either peak hour:

1. The level of service on the freeway segment degrades from an acceptable LOS E or better under existing conditions to an unacceptable LOS F with the addition of project trips, or

2. The level of service on the freeway segment is already operating at an unacceptable LOS F and the number of project trips added to the segment constitutes at least one percent of capacity of the segment.

An adverse effect by CMP standards is said to be satisfactorily mitigated when measures are implemented that would restore freeway conditions to existing conditions or better.

Table 8
Freeway Segment Level of Service Definitions Based on Density

A	Average operating speeds at the free-flow speed generally prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	0-11
B	Speeds at the free-flow speed are generally maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high.	>11-18
C	Speeds at or near the free-flow speed of the freeway prevail. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more vigilance on the part of the driver.	>18-26
D	Speeds begin to decline slightly with increased flows at this level. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels.	>26-46
E	At this level, the freeway operates at or near capacity. Operations in this level are volatile, because there are virtually no usable gaps in the traffic stream, leaving little room to maneuver within the traffic stream.	>46-58
F	Vehicular flow breakdowns occurs. Large queues form behind breakdown points.	>58

Source: Transportation Research Board, *2000 Highway Capacity Manual. Traffic Level of Service Analysis Guidelines* , Santa Clara County Transportation Authority Congestion Management Program, June 2003.

Freeway Segment Analysis

The results of the CMP freeway level of service analysis under existing plus project conditions are summarized in Table 9. Traffic volumes on the study freeway segments under existing plus project conditions were estimated by adding project trips to the existing volumes obtained from the 2018 CMP Monitoring and Conformance Report.

The results show that the mixed-flow lanes for each study segment would operate at an unacceptable LOS F during at least one peak hour, and that the southbound HOV lane from Coyote Creek Golf Drive and Cochrane round would operate an unacceptable LOS F during the PM peak hour.

Improvement of freeway segment operations would require freeway widening to construct additional through lanes, thereby increasing freeway capacity. VTA's Valley Transportation Plan (VTP) 2040 identifies freeway express lane projects along US 101 between Cochrane Road and Whipple Avenue. The planned improvements consist of the conversion of the existing HOV lane to an express lane and the construction of a second express lane in each direction on US 101. These improvements would increase the capacity of the freeway and help to address the deficiency in freeway operations. However, it is not feasible for an individual project to bear responsibility for implementing such

Table 9
Freeway Segment Level of Service Summary

1a	US 101	from Tennant Avenue to East Dunne Avenue	NB	AM	9.40	3	2,300	808	**86**	**F**	--	--	--	--	--	4	0.2	--	--
			NB	PM	59.80	3	2,300	1,812	30	D	--	--	--	--	--	6	0.3	--	--
2a	US 101	from East Dunne Avenue to Cochrane Road	NB	AM	21.00	3	2,300	1,406	**67**	**F**	--	--	--	--	--	2	0.1	--	--
			NB	PM	61.60	3	2,300	1,757	29	D	--	--	--	--	--	28	1.2	--	--
3a	US 101	from Cochrane Road to Coyote Creek Golf Drive	NB	AM	22.20	3	2,300	1,452	**65**	**F**	71.41	1,650	814	11.0	B	2	0.1	1	0.1
			NB	PM	64.20	3	2,300	1,454	23	C	72.66	1,650	635	9.0	A	28	1.2	13	0.8
1b	US 101	from Coyote Creek Golf Drive to Cochrane Road	SB	AM	62.80	3	2,300	1,571	25	C	63.14	1,650	1,425	23.0	C	4	0.2	4	0.2
			SB	PM	12.60	3	2,300	1,012	**80**	**F**	21.57	1,650	1,664	**77.0**	**F**	6	0.3	10	0.6
2b	US 101	from Cochrane Road to East Dunne Avenue	SB	AM	62.00	3	2,300	1,653	27	D	--	--	--	--	--	5	0.2	--	--
			SB	PM	25.00	3	2,300	1,579	**63**	**F**	--	--	--	--	--	11	0.5	--	--
3b	US 101	from East Dunne Avenue to Tennant Avenue	SB	AM	63.00	3	2,300	1,544	25	C	--	--	--	--	--	2	0.1	--	--
			SB	PM	27.00	3	2,300	1,672	**62**	**F**	--	--	--	--	--	20	0.9	--	--

Notes:
[1]Santa Clara Valley Transportation Authority CMP Monitoring & Conformance Report, 2018.
Bold indicates substandard LOS.

extensive transportation system improvements due to constraints in the acquisition and cost of right-of-way. In addition, the estimated peak hour trips upon which the freeway analysis is based represents a temporary worst-case scenario (one-year period) during its construction. The peak hour trips generated by the project would be much less during the remainder of the 7-year construction period since fewer employees and construction activities are anticipated on a daily basis. Furthermore, there would be minimal peak hour trips generated by the project site upon completion of the ADSRP construction.

Other Transportation Issues

This section presents an analysis of other transportation issues associated with the project site, including:

- roadway segment analysis,
- freeway off-ramp queuing analysis, and
- review of the project's effects on pedestrian, bicycle, and transit facilities.

Unlike the level of service traffic operations methodology, which is adopted by local and regional agencies, the analyses in this chapter are based on professional judgment in accordance with the standards and methods employed by the traffic engineering community.

Roadway Segment Evaluation

An evaluation of the effects of project traffic along streets in the immediate vicinity of the project site was completed. The study roadway segments are listed below and shown on Figure 2 in Chapter 1.

Study Street Segments

1. Cochrane Road between Malaguerra Avenue and Peet Road
2. Cochrane Road north of Half Road
3. Cochrane Road between Half Road and Main Avenue
4. Peet Road between Avenida De Los Padres and Half Road
5. Half Road between Mission View Drive and Condit Road
6. Half Road between Cochrane Road and Peet Road
7. Main Avenue between Cochrane Road and Hill Road
8. Hill Road between Main Avenue and Diana Avenue
9. Conduit Road between Main Avenue and Diana Avenue
10. Hill Road between Barrett Avenue and San Pedro Avenue

Unlike the intersection level of service analysis methodology, which has established operations thresholds, the analyses contained in this section are based on professional judgment in accordance with the standards and methods employed by the traffic engineering community. Several studies have been made regarding the indirect impacts of traffic on roadways. The variables affecting these impacts include traffic volumes, type, or makeup, of traffic (i.e. passenger cars, trucks, motorcycles, emergency vehicles, etc.), traffic speed, perception of through traffic as a percentage of total traffic, adequacy of street alignment (i.e., horizontal and vertical curvature), accident experience, on-street parking, residential dwelling setbacks from the street, pedestrian traffic, and street pavement conditions (which would add to traffic noise as the pavement deteriorates).

Existing Surrounding Roadway Characteristics

All roadway segments evaluated consist of two-lane undivided roadways, except the segment of Cochrane Road between Malaguerra Avenue and Peet Road which includes a two-way left-turn lane. The study roadway segments provide access to residential areas and provide a connection between the residential neighborhoods and arterial roadways (Cochrane Avenue, Dunne Avenue, Hill Road, and Tennant Avenue). A brief description of each of the selected surrounding roadways is provided in Chapter 2.

The City of Morgan Hill or County of Santa Clara do not have formally adopted roadway segment operating standards. Thus, for the purposes of this analysis, LOS D was used as a guideline for the evaluation of daily segment volumes. The 2035 MH General Plan has identified LOS D for a 2-lane local street with a maximum average daily traffic (ADT) of 8,200 for both directions, for a 2-lane collector street with a maximum ADT of 11,000 for both directions, and for a 2-lane undivided arterial with a maximum ADT of 16,700 for both directions.

Existing Roadway Conditions

Speed and count (twenty-four-hour tube counts) data were collected in September 2021 along the study roadway segments. The traffic count data revealed that the study roadway segments currently carry between 40 (along Half Road) and 7,100 (along Condit Road) daily vehicles (both directions combined) near the project site.

The study roadway segments have posted speed limits ranging from 25 mph to 45 mph. The speed surveys revealed that the 85th percentile speeds along eight of the ten study roadway segments were measured to exceed the posted speed limits by at least 5 mph in at least one direction. The speeds along the remainder of the study segments were measured to be lower than the posted speed limit and/or within 5 mph of the posted speed limit.

The existing traffic volumes, 85th percentile speeds collected along each of the studied roadway segments, and the existing plus project traffic volumes are summarized in Table 10 for a typical weekday, in Table 11 for Friday, and in Table 12 for Saturday. The roadway segment traffic count data is provided in Appendix E.

Project's Effect on Study Roadway Segments

The effects of project traffic on each of the study roadway segments were evaluated based the collected traffic volumes and the estimated project traffic.

As was presented in the project trip assignment, the majority of the project trips would utilize Cochrane Avenue, Dunne Avenue, Hill Road, and Tennant Avenue to access the project site and the San Pedro Avenue staging area. The addition of project trips to the study roadway segments resulted in volume increases of no greater than 12%. An increase of less than 10% of truck composition is projected along each of the study roadways. However, the existing plus project ADT for both directions at each of the study roadway segments are projected to be below the identified volume thresholds for LOS D operations.

Findings and Recommendations of the Roadway Segment Analysis

The following conclusions can be drawn from the evaluation of the study roadway segments:

- Traffic volumes at each study roadway segment are and would continue to be within the volume range characteristic for LOS D or better operations based on volume thresholds identified in the 2035 MH General Plan.
- Increases in traffic volumes on roadways other than Cochrane Road will be less than 10%.

Table 10
Roadway Segment Analysis (Typical Weekday)

1	Cochrane Road, between Malaguerra Avenue and Peet Roac	Eastbound	09/16/21	40	47.2	**Yes**	1,492	98%	25	2%	1,517	30	125	155	1,522	91%	150	9%	1,672	10%
		Westbound	09/16/21	40	46.6	**Yes**	1,407	98%	28	2%	1,435	30	125	155	1,437	90%	153	10%	1,590	11%
		Both					2,899	98%	53	2%	2,952	60	250	310	2,959	91%	303	9%	3,262	11%
2	Cochrane Road, north of Half Road	Northbound	09/16/21	45	40.7	No	498	99%	7	1%	505	10	30	40	508	93%	37	7%	545	8%
		Southbound	09/16/21	45	40.9	No	543	98%	12	2%	555	10	30	40	553	93%	42	7%	595	7%
		Both					1,041	98%	19	2%	1,060	20	60	80	1,061	93%	79	7%	1,140	8%
3	Cochrane Road, between Half Road and Main Avenue	Northbound	09/16/21	45	45.7	No	420	98%	7	2%	427	10	30	40	430	92%	37	8%	467	9%
		Southbound	09/16/21	45	45.5	No	470	98%	12	2%	482	10	30	40	480	92%	42	8%	522	8%
		Both					890	98%	19	2%	909	20	60	80	910	92%	79	8%	989	9%
4	Peet Road, between Avenida De Los Padres and Half Road	Northbound	09/16/21	35	41.8	**Yes**	338	91%	32	9%	370	0	0	0	338	91%	32	9%	370	0%
		Southbound	09/16/21	35	45.0	**Yes**	341	92%	30	8%	371	0	0	0	341	92%	30	8%	371	0%
		Both					679	92%	62	8%	741	0	0	0	679	92%	62	8%	741	0%
5	Half Road, between Mission View Drive and Condit Road	Eastbound	09/23/21	40	45.4	**Yes**	2,282	99%	20	1%	2,302	0	0	0	2,282	99%	20	1%	2,302	0%
		Westbound	09/23/21	40	45.0	No	2,302	99%	13	1%	2,315	0	0	0	2,302	99%	13	1%	2,315	0%
		Both					4,584	99%	33	1%	4,617	0	0	0	4,584	99%	33	1%	4,617	0%
6	Half Road, between Cochrane Road and Peet Road	Eastbound	09/16/21	25*	28.5	No	19	####	0	0%	19	0	0	0	19	####	0	0%	19	0%
		Westbound	09/16/21	25*	36.2	**Yes**	17	####	0	0%	17	0	0	0	17	####	0	0%	17	0%
		Both					36	####	0	0%	36	0	0	0	36	####	0	0%	36	0%
7	Main Avenue, between Hill Road and Cochrane Road	Eastbound	09/23/21	40	44.6	No	448	98%	9	2%	457	10	30	40	458	92%	39	8%	497	9%
		Westbound	09/23/21	40	44.8	No	488	99%	6	1%	494	10	30	40	498	93%	36	7%	534	8%
		Both					936	98%	15	2%	951	20	60	80	956	93%	75	7%	1,031	8%
8	Hill Road, between Main Avenue and Diana Avenue	Northbound	09/16/21	40	47.6	**Yes**	2,404	99%	18	1%	2,422	5	30	35	2,409	98%	48	2%	2,457	1%
		Southbound	09/16/21	40	46.8	**Yes**	2,564	99%	16	1%	2,580	5	30	35	2,569	98%	46	2%	2,615	1%
		Both					4,968	99%	34	1%	5,002	10	60	70	4,978	98%	94	2%	5,072	1%
9	Condit Road, between Main Avenue and Diana Avenue	Northbound	09/16/21	40	50.9	**Yes**	3,193	99%	44	1%	3,237	5	0	5	3,198	99%	44	1%	3,242	0%
		Southbound	09/16/21	40	49.0	**Yes**	3,776	99%	39	1%	3,815	5	0	5	3,781	99%	39	1%	3,820	0%
		Both					6,969	99%	83	1%	7,052	10	0	10	6,979	99%	83	1%	7,062	0%
10	Hill Road, between Barrett Avenue and San Pedro Avenue	Northbound	09/16/21	40	48.0	**Yes**	3,391	99%	49	1%	3,440	137	30	167	3,528	98%	79	2%	3,607	5%
		Southbound	09/16/21	40	45.3	**Yes**	2,448	98%	38	2%	2,486	137	30	167	2,585	97%	68	3%	2,653	7%
		Both					5,839	99%	87	1%	5,926	274	60	334	6,113	98%	147	2%	6,260	6%

Notes:

* Assumed speed limit, based on the California Vehicle Code which states that the speed limit for residential districts is 25 miles per hour, unless otherwise posted.

[1] Includes shuttle buses

Table 11
Roadway Segment Analysis (Friday)

1	Cochrane Road, between Malaguerra Avenue and Peet Roac	Eastbound	09/17/21	40	46.3	**Yes**	1,563	98%	38	2%	1,601	30	125	155	1,593	91%	163	9%	1,756	10%
		Westbound	09/17/21	40	45.2	**Yes**	1,428	97%	41	3%	1,469	30	125	155	1,458	90%	166	10%	1,624	11%
		Both					2,991	97%	79	3%	3,070	60	250	310	3,051	90%	329	10%	3,380	10%
2	Cochrane Road, north of Half Road	Northbound	09/17/21	45	39.6	No	489	97%	14	3%	503	10	30	40	499	92%	44	8%	543	8%
		Southbound	09/17/21	45	40.9	No	536	97%	18	3%	554	10	30	40	546	92%	48	8%	594	7%
		Both					1,025	97%	32	3%	1,057	20	60	80	1,045	92%	92	8%	1,137	8%
3	Cochrane Road, between Half Road and Main Avenue	Northbound	09/17/21	45	44.1	No	448	98%	9	2%	457	10	30	40	458	92%	39	8%	497	9%
		Southbound	09/17/21	45	45.9	No	492	98%	11	2%	503	10	30	40	502	92%	41	8%	543	8%
		Both					940	98%	20	2%	960	20	60	80	960	92%	80	8%	1,040	8%
4	Peet Road, between Avenida De Los Padres and Half Road	Northbound	09/17/21	35	42.0	**Yes**	365	92%	31	8%	396	0	0	0	365	92%	31	8%	396	0%
		Southbound	09/17/21	35	45.6	**Yes**	396	93%	30	7%	426	0	0	0	396	93%	30	7%	426	0%
		Both					761	93%	61	7%	822	0	0	0	761	93%	61	7%	822	0%
5	Half Road, between Mission View Drive and Condit Road	Eastbound	09/24/21	40	45.5	**Yes**	2,182	99%	14	1%	2,196	0	0	0	2,182	99%	14	1%	2,196	0%
		Westbound	09/24/21	40	44.9	No	2,417	####	12	0%	2,429	0	0	0	2,417	####	12	0%	2,429	0%
		Both					4,599	99%	26	1%	4,625	0	0	0	4,599	99%	26	1%	4,625	0%
6	Half Road, between Cochrane Road and Peet Road	Eastbound	09/17/21	25*	31.7	**Yes**	23	92%	2	8%	25	0	0	0	23	92%	2	8%	25	0%
		Westbound	09/17/21	25*	36.7	**Yes**	22	96%	1	4%	23	0	0	0	22	96%	1	4%	23	0%
		Both					45	94%	3	6%	48	0	0	0	45	94%	3	6%	48	0%
7	Main Avenue, between Hill Road and Cochrane Road	Eastbound	09/24/21	40	43.7	No	471	99%	5	1%	476	10	30	40	481	93%	35	7%	516	8%
		Westbound	09/24/21	40	44.4	No	554	99%	8	1%	562	10	30	40	564	94%	38	6%	602	7%
		Both					1,025	99%	13	1%	1,038	20	60	80	1,045	93%	73	7%	1,118	8%
8	Hill Road, between Main Avenue and Diana Avenue	Northbound	09/17/21	40	47.1	**Yes**	2,174	99%	18	1%	2,192	5	30	35	2,179	98%	48	2%	2,227	2%
		Southbound	09/17/21	40	47.0	**Yes**	2,821	99%	22	1%	2,843	5	30	35	2,826	98%	52	2%	2,878	1%
		Both					4,995	99%	40	1%	5,035	10	60	70	5,005	98%	100	2%	5,105	1%
9	Condit Road, between Main Avenue and Diana Avenue	Northbound	09/17/21	40	50.8	**Yes**	3,052	99%	21	1%	3,073	5	0	5	3,057	99%	21	1%	3,078	0%
		Southbound	09/17/21	40	48.8	**Yes**	3,955	99%	36	1%	3,991	5	0	5	3,960	99%	36	1%	3,996	0%
		Both					7,007	99%	57	1%	7,064	10	0	10	7,017	99%	57	1%	7,074	0%
10	Hill Road, between Barrett Avenue and San Pedro Avenue	Northbound	09/17/21	40	49.0	**Yes**	3,030	99%	36	1%	3,066	137	30	167	3,167	98%	66	2%	3,233	5%
		Southbound	09/17/21	40	47.0	**Yes**	2,728	98%	55	2%	2,783	137	30	167	2,865	97%	85	3%	2,950	6%
		Both					5,758	98%	91	2%	5,849	274	60	334	6,032	98%	151	2%	6,183	6%

Notes:
* Assumed speed limit, based on the California Vehicle Code which states that the speed limit for residential districts is 25 miles per hour, unless otherwise posted.
[1] Includes shuttle buses

Table 12
Roadway Segment Analysis (Saturday)

1	Cochrane Road, between Malaguerra Avenue and Peet Roac	Eastbound	09/18/21	40	46.9	**Yes**	1,376	99%	11	1%	1,387	30	125	155	1,406	91%	136	9%	1,542	11%
		Westbound	09/18/21	40	44.9	No	1,262	99%	8	1%	1,270	30	125	155	1,292	91%	133	9%	1,425	12%
		Both					2,638	99%	19	1%	2,657	60	250	310	2,698	91%	269	9%	2,967	12%
2	Cochrane Road, north of Half Road	Northbound	09/18/21	45	39.4	No	460	97%	12	3%	472	10	30	40	470	92%	42	8%	512	8%
		Southbound	09/18/21	45	40.4	No	484	98%	10	2%	494	10	30	40	494	93%	40	7%	534	8%
		Both					944	98%	22	2%	966	20	60	80	964	92%	82	8%	1,046	8%
3	Cochrane Road, between Half Road and Main Avenue	Northbound	09/18/21	45	44.0	No	445	99%	5	1%	450	10	30	40	455	93%	35	7%	490	9%
		Southbound	09/18/21	45	46.0	No	473	####	2	0%	475	10	30	40	483	94%	32	6%	515	8%
		Both					918	99%	7	1%	925	20	60	80	938	93%	67	7%	1,005	9%
4	Peet Road, between Avenida De Los Padres and Half Road	Northbound	09/18/21	35	42.3	**Yes**	305	94%	21	6%	326	0	0	0	305	94%	21	6%	326	0%
		Southbound	09/18/21	35	46.4	**Yes**	297	93%	21	7%	318	0	0	0	297	93%	21	7%	318	0%
		Both					602	93%	42	7%	644	0	0	0	602	93%	42	7%	644	0%
5	Half Road, between Mission View Drive and Condit Road	Eastbound	09/25/21	40	44.6	No	2,227	99%	15	1%	2,242	0	0	0	2,227	99%	15	1%	2,242	0%
		Westbound	09/25/21	40	44.4	No	2,006	99%	11	1%	2,017	0	0	0	2,006	99%	11	1%	2,017	0%
		Both					4,233	99%	26	1%	4,259	0	0	0	4,233	99%	26	1%	4,259	0%
6	Half Road, between Cochrane Road and Peet Road	Eastbound	09/18/21	25*	30.0	No	16	84%	3	16%	19	0	0	0	16	84%	3	16%	19	0%
		Westbound	09/18/21	25*	32.4	**Yes**	16	89%	2	11%	18	0	0	0	16	89%	2	11%	18	0%
		Both					32	86%	5	14%	37	0	0	0	32	86%	5	14%	37	0%
7	Main Avenue, between Hill Road and Cochrane Road	Eastbound	09/25/21	40	43.2	No	447	99%	5	1%	452	10	30	40	457	93%	35	7%	492	9%
		Westbound	09/25/21	40	44.1	No	466	99%	3	1%	469	10	30	40	476	94%	33	6%	509	9%
		Both					913	99%	8	1%	921	20	60	80	933	93%	68	7%	1,001	9%
8	Hill Road, between Main Avenue and Diana Avenue	Northbound	09/18/21	40	47.1	**Yes**	1,391	####	5	0%	1,396	5	30	35	1,396	98%	35	2%	1,431	3%
		Southbound	09/18/21	40	47.6	**Yes**	1,962	99%	11	1%	1,973	5	30	35	1,967	98%	41	2%	2,008	2%
		Both					3,353	####	16	0%	3,369	10	60	70	3,363	98%	76	2%	3,439	2%
9	Condit Road, between Main Avenue and Diana Avenue	Northbound	09/18/21	40	49.5	**Yes**	2,551	####	12	0%	2,563	5	0	5	2,556	####	12	0%	2,568	0%
		Southbound	09/18/21	40	49.2	**Yes**	3,098	99%	17	1%	3,115	5	0	5	3,103	99%	17	1%	3,120	0%
		Both					5,649	99%	29	1%	5,678	10	0	10	5,659	99%	29	1%	5,688	0%
10	Hill Road, between Barrett Avenue and San Pedro Avenue	Northbound	09/18/21	40	49.1	**Yes**	1,998	99%	17	1%	2,015	137	30	167	2,135	98%	47	2%	2,182	8%
		Southbound	09/18/21	40	48.7	**Yes**	2,063	99%	15	1%	2,078	137	30	167	2,200	98%	45	2%	2,245	8%
		Both					4,061	99%	32	1%	4,093	274	60	334	4,335	98%	92	2%	4,427	8%

Notes:

* Assumed speed limit, based on the California Vehicle Code which states that the speed limit for residential districts is 25 miles per hour, unless otherwise posted.

[1] Includes shuttle buses

- Cochrane Road would serve as the primary route for construction truck traffic. Therefore, increases in the composition of truck traffic along the study roadways, outside of Cochrane Road, will be minimal.
- Speeds along eight of the ten study roadway segments currently exceed the posted speed limit by more than 5 mph in at least one direction.

Freeway Off-Ramp Queuing Evaluation

A queuing analysis was completed for freeway off-ramps where the project will result in the addition of peak hour trips. These freeway off-ramps are controlled by a traffic signal at their intersection with the local arterial. The project is expected to add peak hour trips to the freeway off-ramps in the project vicinity listed below.

Study Freeway Ramps

1. US 101 off-ramps at Dunne Avenue
2. US 101 off-ramps at Tennant Avenue
3. US 101 off-ramps at Cochrane Road

The results of the analysis (see Table 13) show that the 95th percentile queue lengths at each of the US 101 off-ramps to Dunne Avenue, Cochrane Road, and Tennant Avenue are projected to be accommodated entirely on the ramps and would not extend back and disrupt the freeway mainline.

Table 13
Freeway Off-Ramp Vehicle Queuing Analysis

Storage				**2,025**			**2,400**			**2,750**			**2,700**			**2,175**			**2,225**
Existing	AM	200	350	550	100	50	150	425	300	725	150	225	375	50	550	600	175	100	275
	PM	225	350	575	200	100	300	575	300	875	150	300	450	125	400	525	175	50	225
	MonAM	225	375	600	225	100	325	400	275	675	50	75	125	100	550	650	200	100	300
	FriPM	225	375	600	200	100	300	550	275	825	125	250	375	100	550	650	200	100	300
	SatPM	200	350	550	200	100	300	375	225	600	125	275	400	100	500	600	175	75	250
Existing Plus Project	AM	225	350	575	100	50	150	425	300	725	150	250	400	50	550	600	175	100	275
	PM	250	375	625	200	100	300	600	300	900	150	325	475	125	425	550	175	75	250
	MonAM	225	375	600	225	100	325	400	275	675	50	100	150	100	550	650	200	100	300
	FriPM	250	375	625	225	100	325	550	275	825	125	275	400	100	575	675	200	100	300
	SatPM	225	350	575	200	100	300	400	225	625	125	300	425	100	525	625	175	100	275
Maximum				**625**			**325**			**900**			**475**			**675**			**300**
Storage - Maximum				**1,400**			**2,075**			**1,850**			**2,225**			**1,500**			**1,925**

Notes:
[1]Queue lengths were obtained from Traffix assuming 25 feet per vehicle.
[2]SBT/L = southbound through/left; SBR = southbound right; NBL = northbound left; NBR = northbound right; SBL/R = southbound left/right; NBL/R = northbound left/right;

Pedestrian, Bicycle, and Transit Analysis

The project is not expected to generate bicycle and transit trips. Pedestrian trips for the project are expected to be on-site only. The project is not expected to have an adverse effect on the existing pedestrian, bicycle, and transit facilities.

5. Conservation Measures and Temporary Access Roads

This chapter provides a qualitative evaluation of the effects on traffic operations due to the construction activities associated with the conservation measures at Ogier Ponds (approximately 4 miles downstream of Anderson Dam) and the Coyote Percolation Dam (approximately 10 miles downstream of Anderson Dam). Additionally, construction activities associated with the construction of temporary access roads via Shingle Valley Road (north haul road) and via Holiday Estates (south haul road) as well as the sediment augmentation program are evaluated.

Each of the conservation measure and haul road project components will consist of much smaller project areas and shorter construction time periods than those of the ADSRP. Each of the conservation measure sites also are separate of the ADSRP site and its construction schedule. Therefore, the effects of the conservation measure components and haul roads are evaluated individually at only a qualitative level.

Ogier Ponds

The Ogier Ponds complex is a series of historic gravel mining ponds located along the east side of the Coyote Creek channel approximately 4 miles downstream of Anderson Dam on County-owned property. The Ogier Ponds Restoration includes the reconstruction of the Coyote Creek channel to separate the creek from the Ogier Ponds. Based on information provided by Valley Water, construction at the Ogier Ponds is scheduled to occur over a 3-year period. Vehicular access to the project area will be provided from Monterey Road via its intersections with Barnhart Avenue and Ogier Avenue. Secondary also may be provided from US 101 and Coyote Creek Golf Drive via a gated restricted access point. Traffic associated with construction activities is summarized in Table 14. Based on the construction activities and schedule, the following can be concluded:

- A maximum of 558 daily trips would be added to roadways adjacent to the project site.
- A maximum of 147 hourly trips (inbound and outbound) would be added to roadways adjacent to the project site. Of the maximum hourly trips, 133 trips would occur in the peak direction of travel.
- The estimated daily and peak hour trips upon which the evaluation is based represents a temporary worst-case scenario (one-month period) during construction.
- The daily and peak hour trips generated by the Ogier Ponds construction would be much less during the remainder of the 3-year construction period since fewer employees and construction activities are anticipated on a daily basis.

- On average, no greater than 362 daily and 86 peak hour trips would be added to adjacent roadway during the three-year construction period.

The Ogier Ponds would generate no daily or peak hour trips upon completion of the conservation measure construction. Therefore, the construction traffic generated during the completion of the Ogier Pond conservation measure can be considered a temporary condition that does not warrant physical improvement of the roadways in the project area.

Phase 2 Coyote Percolation Dam

The Coyote Creek Percolation Dam is located approximately 10 miles downstream of Anderson Dam and will include the construction of a roughened ramp fishway to allow for improved fish passage over the deflated bladder dam over a range of flow conditions. Based on information provided by Valley Water, construction of the Phase 2 Coyote Percolation Dam Fish Passage Enhancements is scheduled to occur over a 6-month period. Vehicular access to the project area will be provided from Monterey Road via its intersection Metcalf Road. Traffic associated with construction activities is summarized in Table 15. Based on the construction schedule, the following can be concluded:

- A maximum of 248 daily trips would be added to roadways adjacent to the project site.
- A maximum of 87 hourly trips (inbound and outbound) would be added to roadways adjacent to the project site. Of the maximum hourly trips, 84 trips would occur in the peak direction of travel.
- The estimated daily and peak hour trips upon which the evaluation is based represents a temporary worst-case scenario (6-month period) during construction.
- The daily and peak hour trips generated by the Coyote Percolation Dam construction would be much less during the remainder of the one-year construction period since fewer employees and construction activities are anticipated on a daily basis.
- On average, no greater than 188 daily and 66 peak hour trips would be added to adjacent roadway during the three-year construction period.

The Coyote Creek Percolation Dam would generate no daily or peak hour trips upon completion of the conservation measure construction. Therefore, the construction traffic generated during the completion of the Coyote Creek Percolation Dam conservation measure can be considered a temporary condition that does not warrant physical improvement of the roadways in the project area.

Sediment Augmentation Program

The sediment augmentation program would consist of removing and stockpiling approximately 55,000 cubic yards of sediment from the exposed reservoir between the Dunne Avenue Bridge and the Holiday Estates boat launch. Access to the area would occur via Holiday Lake Drive and through the in-reservoir haul roads. Sediment materials would then be placed in Coyote Creek at multiple locations between the Anderson Dam and Ogier Ponds using in reservoir access roads or public roads (Cochrane Road, Monterey Road, Barnhart Avenue). Construction activities associated with the Sediment Augmentation Program would occur from ADSRP Construction Year 2 through Construction Year 10, with monitoring and off-hauling continuing through Year 15.

Traffic associated with construction activities is summarized in Table 16. Based on the construction activities and schedule, the following can be concluded:

- A maximum of 34 daily trips would be added to roadways adjacent to the project site.
- A maximum of 16 hourly trips (inbound and outbound) would be added to roadways adjacent to the project site.

- On average, no greater than 34 daily and 16 peak hour trips would be added to adjacent roadway during each of the three-year construction periods.

The traffic that will be added to the roadways system due to the sediment augmentation program would be an ongoing process for an extended length of time beyond the completion of the ADSRP construction. However, the evaluation of the construction activities and schedule indicate that the number of trips added to the roadway system would be minimal and would not warrant physical improvement of the roadways in the project area.

North and South Haul Roads

In addition to the main site access point along Cochrane Road to the ADSRP project area, two emergency egress routes would be provided in the case of an emergency requiring evacuation from the reservoir area. Each of the emergency access/haul roads are described below:

(1) The north haul road (Shingle Valley Road) will provide access from Highway 101 to Metcalf Road to Shingle Valley Road (Private) to Stockpile Area L. Construction of the north haul road will occur over a 15-week period during Year 1 of ADRSP construction. Usage of the north haul road will be limited to emergency uses only during the remaining Years 2 through 6 of project construction. Construction of the north and south haul roads would occur within a 15-week period and 12-week period, respectively.

(2) The south haul road (Holiday Estates) will provide access from Highway 101 to Dunne Avenue to Holiday Drive to Staging Area 6 (Boat Marina). Construction of the south haul road will occur over a 12-week period during Year 1 of ADRSP construction. During Year 2 of ADRSP construction, the road may be used to provide access for construction equipment and personnel for construction of landslide mitigations. Usage of the south haul road will be limited to emergency uses only thereafter.

Traffic associated with construction activities is summarized in Table 17. Based on the construction activities and schedule, the following can be concluded:

- A maximum of 244 daily trips would be added to roadways serving each of the haul roads (including Dunne Avenue, Holiday Drive, Metcalf Road).
- A maximum of 30 hourly trips (inbound and outbound) would be added to roadways serving each of the haul roads. Of the maximum hourly trips, only 21 trips would occur in the peak direction of travel.
- The estimated daily and peak hour trips upon which the roadway analysis is based represents a temporary worst-case scenario (5-month period) during construction.
- The daily and peak hour trips generated by the haul roads construction would be much less during the remainder of the one-to-two-year construction period since fewer employees and construction activities are anticipated on a daily basis.
- On average, no greater than 168 daily and 24 peak hour trips would be added to roadways serving each of the haul roads during the one-to-two-year construction periods.

Upon completion of the ADSRP project, the haul roads will be eliminated. Therefore, the construction traffic generated during the completion of the haul roads can be considered a temporary condition that does not warrant physical improvement of the roadways in the project area.

Table 14
Ogier Ponds Construction Traffic Estimates

Year 1 (6/1/2031-8/1/2031)	2	60	0	16	120	0	32	152	60	3	63
Year 1 (8/1/2031-9/1/2031)	1	120	127	32	240	254	64	**558**	120	27	**147**
Year 1 (9/1/2031-10/1/2031)	1	60	127	16	120	254	32	406	60	24	84
Year 1 (10/1/2031-1/1/2032)	3	30	127	8	60	254	16	330	30	23	53
							Average	**362**		**Average**	**86**
Year 2 (6/1/2032-10/1/2032)	4	90	88	24	180	176	48	404	90	19	109
Years 2-3 (10/1/2032-2/1/2033)	4	60	0	16	120	0	32	152	60	3	63
							Average	**278**		**Average**	**86**
Year 3 (4/1/2033-9/1/2033)	5	30	0	8	60	0	16	76	30	1	31

Notes:
[1] Per information provided by Valley Water via email dated November 10, 2022
[2] Assumes one inbound and one outbound trip per day
[3] Assumes 12-hour work day (arrival/departure period for trucks). Both directions of travel.

Table 15
Phase 2 Coyote Percolation Dam Construction Traffic Estimates

Year 1 (6/1/2025-7/1/2025)	1	80	4	40	160	8	80	**248**	80	7	**87**
Year 1 (7/1/2025-11/1/2025)	4	40	4	20	80	8	40	128	40	4	44
Year 1 (11/1/2025-12/1/2025)	1	60	4	30	120	8	60	188	60	6	66
							Average	**188**		**Average**	**66**

Notes:
[1] Per information provided by Valley Water.
[2] Assumes one inbound and one outbound trip per day
[3] Assumes 12-hour work day (arrival/departure period for trucks). Both directions of travel.

Table 16
Sediment Augmentation Program Construction Traffic Estimates

Year 1	0.5	15	0	30	0	30	15	0	15
Year 1	9	15	2	30	4	**34**	15	1	**16**
						32		**Average**	**16**
Years 2-9	96	15	2	30	4	34	15	1	16
Years 10-14	60	15	2	30	4	34	15	1	16
						34		**Average**	**16**

Notes:
[1] Assumes one inbound and one outbound trip per day
[2] Assumes 12-hour work day (arrival/departure period for trucks). Both directions of travel.

Table 17
North and South Haul Roads Construction Traffic Estimates

South Haul Road (Holiday Estate)								```		
Year 1	12	12	24	10	24	48	20	92	12	6	18
Year 2	20	12	100	10	24	200	20	**244**	12	18	**30**
							Average	**168**		**Average**	**24**
North Haul Road (Shingle Valley Road)											
Year 1	15	12	75	10	24	150	20	194	12	14	**26**

Notes:
[1] Per information provided by Valley Water via email dated Oct. 24, 2022)
[2] Assumes one inbound and one outbound trip per day
[3] Assumes 12-hour work day (arrival/departure period for trucks). Both directions of travel.

6. Conclusions

The potential impacts of the project were evaluated in accordance with the California Environmental Quality Act (CEQA) guidelines and the Governor's Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA, December 2018.

Transportation Analysis Scope

The TA consists of a California Environmental Quality Act (CEQA) required vehicle miles traveled (VMT) analysis and a supplemental traffic operations analysis.

CEQA VMT Analysis

The evaluation of the project's effects on VMT was completed using the Santa Clara Countywide Vehicle Miles Traveled Evaluation Tool (VMT Evaluation Tool). The City of Morgan Hill, at the time of this report, has not yet adopted analysis procedures, standards, or guidelines consistent with SB 743. In the absence of an adopted policy with impact thresholds, this assessment relies on guidelines published by the Governor's Office of Planning and Research (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018 in analyzing the project's effects on VMT. However, since OPR does not provide specific recommended impact thresholds for industrial uses, the existing regional VMT per industrial worker is used as the impact threshold for the construction employees of the project. The VMT Evaluation Tool indicates that the regional average VMT per industrial worker is currently 15.33.

Based on the VMT Evaluation Tool the VMT per worker (25.47) in the project area is currently greater than the regional average. The VMT generated by the project would be 24.69 per worker, which is less than the current project area VMT per worker. Per CEQA guidelines, project's that decrease VMT in the project areas when compared to current conditions should be presumed to have a less than significant transportation impact. In addition, the estimated daily trips upon which the VMT for the project is based represents a temporary worst-case scenario (one-year period) during its construction. Once the dam reconstruction is complete, there will be minimal VMT generated by the project site. Therefore, the project would result in a less than significant impact on the transportation system.

Traffic Operations Analysis

The traffic operations analysis supplements the CEQA required VMT analysis. However, the determination of project impacts per CEQA requirements is based solely on the VMT analysis.

The effects of the project on traffic operations on the surrounding roadway system were evaluated following the standards and methodologies set forth by the City of Morgan Hill in its *Guidelines for Preparation of Transportation Impact Reports*, February 2010, the 2035 MH General Plan, and the Santa Clara Valley Transportation Authority (VTA). The VTA administers the County Congestion Management Program (CMP). The traffic operations analysis includes the evaluation of the standard weekday AM and PM commute peak-hour operations at selected intersections for the purpose of identifying operational issues at intersections in the general vicinity of the project site. At the request of Valley Water, the weekday AM and PM peak-hour analysis was supplemented with an analysis of weekday (Monday AM and Friday PM) and weekend peak conditions since peak direction traffic conditions can be abnormally worse on Monday mornings and Friday evenings along US 101.

Project Trip Generation

Based on the information provided by Valley Water, it is estimated that the project would generate a total of 756 daily vehicle trips with 48 trips occurring during the AM peak hour (33 inbound and 15 outbound) and 271 occurring during the PM peak hour (67 inbound and 204 outbound). Note that the project trip generation is based on the Year 6 (Stage 3b) estimated daily maximum employee, truck, and shuttle trips, which is the peak construction conditions during the 7-year construction period. As such, this analysis represents a worst-case scenario in regard to project generated construction traffic and is much greater than expected during the majority of the 7-year construction period.

Intersection Operation Analysis

The results of the level of service and peak hour warrant analysis indicate that, when measured against the City of Morgan Hill level of service standards, all of the study intersections currently operate and are projected to operate at acceptable levels of service during each of the peak hours analyzed under existing and existing plus project conditions and would not have peak hour volumes that meet signal warrant thresholds. Thus, intersection operation analysis shows that the project would not have a significant adverse effect on traffic conditions at the study intersections.

Freeway Segment Analysis

The results show that the mixed-flow lanes for each study segment would operate at an unacceptable LOS F during at least one peak hour, and that the southbound HOV lane from Coyote Creek Golf Drive and Cochrane round would operate an unacceptable LOS F during the PM peak hour.

Improvement of freeway segment operations would require freeway widening to construct additional through lanes, thereby increasing freeway capacity. VTA's Valley Transportation Plan (VTP) 2040 identifies freeway express lane projects along US 101 between Cochrane Road and Whipple Avenue. The planned improvements consist of the conversion of the existing HOV lane to an express lane and the construction of a second express lane in each direction on US 101. These improvements would increase the capacity of the freeway and help to address the deficiency in freeway operations. However, it is not feasible for an individual project to bear responsibility for implementing such extensive transportation system improvements due to constraints in the acquisition and cost of right-of-way. In addition, the estimated peak hour trips upon which the freeway analysis is based represents a temporary worst-case scenario (one-year period) during its construction. The peak hour trips generated by the project would be much less during the remainder of the 7-year construction period since fewer employees and construction activities are anticipated on a daily basis. Furthermore, there would be minimal peak hour trips generated by the project site upon completion of the ADSRP construction.

Other Transportation Issues

Analyses of other transportation issues associated with the project site, including roadway segment analysis, freeway off-ramp queuing analysis, and a review of the project's effects on pedestrian, bicycle, and transit facilities also was completed. Unlike the level of service traffic operations methodology, which is adopted by local and regional agencies, the analyses in this chapter are based on professional judgment in accordance with the standards and methods employed by the traffic engineering community.

Roadway Segment Evaluation

The following conclusions can be drawn from the evaluation of the study roadway segments:

- Traffic volumes at each study roadway segment are and would continue to be within the volume range characteristic for LOS D or better operations based on volume thresholds identified in the 2035 MH General Plan.
- Increases in traffic volumes on roadways other than Cochrane Road will be less than 10%.Cochrane Road would serve as the primary route for construction truck traffic. Therefore, increases in the composition of truck traffic along the study roadways, outside of Cochrane Road, will be minimal.
- Speeds along eight of the ten study roadway segments currently exceed the posted speed limit by more than 5 mph in at least one direction.

Freeway Off-Ramp Queuing Analysis

The results of the analysis show that the 95th percentile queue lengths at each of the US 101 off-ramps to Dunne Avenue, Cochrane Road, and Tennant Avenue are projected to be accommodated entirely on the ramps and would not extend back and disrupt the freeway mainline.

Effects on Pedestrian, Bicycle, and Transit Facilities

The project is not expected to have an adverse effect on the existing pedestrian, bicycle, and transit facilities.

Conservation Measures and Temporary Access Roads

A qualitative evaluation of the effects on traffic operations due to the construction activities associated with the conservation measures at Ogier Ponds and the Coyote Percolation Dam was completed. Additionally, construction activities associated with the construction of temporary access roads via Shingle Valley Road (north haul road) and via Holiday Estates (south haul road) as well as the sediment augmentation program also were evaluated.

Each of the conservation measure and haul road project components will consist of much smaller project areas and shorter construction time periods than those of the ADSRP. Each of the conservation measure sites also are separate of the ADSRP site and its construction schedule. Therefore, the effects of the conservation measure components and haul roads are evaluated individually at only a qualitative level.

- The Ogier Ponds and Coyote Creek Percolation Dam conservation measures would generate no daily or peak hour trips upon completion of their construction. Therefore, the construction traffic generated during the completion of the conservation measures can be considered a temporary condition that does not warrant physical improvement of the roadways in the project areas.

- Upon completion of the ADSRP project, the temporary haul roads will be eliminated. Therefore, the construction traffic generated during the completion of the haul roads can be considered a temporary condition that does not warrant physical improvement of the roadways in the project area.
- The traffic that will be added to the roadways system due to the sediment augmentation program would be an ongoing process for an extended length of time beyond the completion of the ADSRP construction. However, the evaluation of the construction activities and schedule indicate that the number of trips added to the roadway system would be minimal and would not warrant physical improvement of the roadways in the project area.

Anderson Dam Seismic Retrofit Project

Final Environmental Impact Report

Appendix P

Paleontological Resources Impact Assessment

Post-Paleontological Survey for the Anderson Dam Drawdown to Deadpool Project, Santa Clara County, California

By:
Russell Shapiro, Ph.D.

January 2023

Prepared for:
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

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EXECUTIVE SUMMARY

As part of the Santa Clara Valley Water District (Valley Water) Anderson Dam Reservoir Drawdown to Deadpool (Drawdown Project, or Project), Far Western has prepared this paleontological inventory investigation. The Drawdown Project is a component of the Federal Energy Regulatory Commission (FERC) Order Compliance Project (FOCP) in order to draw the reservoir down to, and maintain the reservoir at, "deadpool" (elevation 488 feet). FERC mandated the FOCP in February 2020, citing a need to imminently reduce risk to the public in advance of implementation of Valley Water's Anderson Dam Seismic Retrofit Project (ADSRP). FERC is the federal lead agency responsible for compliance with the National Environmental Policy Act (NEPA) and the Paleontological Resources Preservation Act (PRPA). The portion of the FOCP Project Area considered relevant for the Drawdown Project Area is limited to within the reservoir and includes approximately 1,090 acres. The Project Area consists of the entirety of Anderson Reservoir below the reservoir's ordinary high-water mark at an elevation of 627.9 feet, although only the areas above 488 feet elevation will be exposed. The Drawdown Project will not include any ground-disturbing activities, or any additional activities other than the drawdown itself. During drawdown, it was determined that new exposures of the Pliocene Santa Clara Formation could yield significant vertebrate fossils and that these fossils should be collected and deposited in a museum for future scientific study as guided by NEPA and PRPA.

Paleontological surveys were carried out by Far Western Anthropological Research Group, Inc., (Far Western) and resulted in the recovery of one significant fossil to add to the two fossils previously collected on an archaeological field survey and the notation of an additional fossil by an archaeological monitor. The identification, recording, and collecting of these fossils ensured compliance with NEPA guidelines on the protection of paleontological resources.

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The Santa Clara Valley Water District (Valley Water) is conducting the Anderson Dam Reservoir Drawdown to Deadpool (Drawdown Project, or Project), a component of the Federal Energy Regulatory Commission (FERC) Order Compliance Project (FOCP) in order to draw the reservoir down to, and maintain the reservoir at, deadpool (elevation 488 feet). FERC mandated the FOCP in February 2020, citing a need to imminently reduce risk to the public in advance of implementation of Valley Water's Anderson Dam Seismic Retrofit Project (ADSRP). FERC is the federal lead agency responsible for compliance with the National Environmental Policy Act (NEPA) and the Paleontological Resources Preservation Act (PRPA).

On behalf of Valley Water, Far Western Anthropological Research Group, Inc., (Far Western) has prepared this paleontological survey report as an avoidance and minimization measure for potential adverse effects to significant fossil resources within the Anderson Dam Drawdown Project Area (Drawdown Project Area, or Project Area). Fieldwork for this study was conducted in the summer of 2022 in support of FOCP regulatory compliance.

DRAWDOWN PROJECT DESCRIPTION

Initial reservoir drawdown to an elevation of 488 feet, deadpool, was required to commence no later than October 1, 2020, through the existing outlet, with deadpool initially reached in December 2020. Anderson Reservoir may potentially be maintained at deadpool until ADSRP construction. At deadpool the reservoir will cover approximately 150 acres, exposing areas that have previously been underwater. Reservoir drawdown was conducted using the existing outlet works in advance of the onset of construction and installation of the FOCP Anderson Dam Tunnel Project (tunnel and new low-level outlet works). Reservoir drawdown was planned to occur gradually in order to minimize the potential for landslides or instability around the rim of the reservoir or existing intake structure, minimize sediment transport downstream, and avoid potential harm to unhoused individuals that may be occupying areas in proximity to Coyote Creek. While the reservoir is at deadpool, outlet works will be left fully open to maximize releases during storm events and minimize the time the reservoir is above an elevation of 488 feet. There are no ground-disturbing activities planned as part of the drawdown.

VARIANCE DESCRIPTION

In response to the extreme drought conditions that are impacting water supplies throughout California, Valley Water submitted a request to FERC on September 24, 2021, for a variance from the FOCP defined deadpool storage level of 3,000 acre-feet in Anderson Reservoir. The purpose of the variance is to provide additional water to offset risks to water supply and the potential for imported water disruptions (loss of water allocations or distribution line outages), which includes prioritizing releases to Coyote Creek as water is available. The incremental changes in the water storage level within Anderson Reservoir would provide the ability for Valley Water to minimize dryback conditions within Coyote Creek throughout the year. If FERC approves a variance from deadpool, Valley Water will use the stored local water beneficially in the creek for managed recharge and to buffer against disruptions in imported water.

The variable water storage volumes allowable throughout the year could result in additional changes to the elevation of the stored water within the reservoir from the original drawdown project, as the deadpool water level throughout proposed FOCP project implementation would remain constant at an elevation of 488 feet, depending on precipitation, watershed inflows, and imported water availability. Implementation of the variance could result in fluctuations within the stored reservoir volume of approximately 56 feet over the course the nine-month variance. Elevations would range from the deadpool elevation of 488 feet and reach a maximum elevation of 544 feet when the reservoir is holding 20,000 acre-feet of water.

DRAWDOWN PROJECT AREA – A COMPONENT OF THE FOCP AREA OF POTENTIAL EFFECTS

The FOCP Area of Potential Effects (APE) encompasses the maximum potential horizontal and vertical extent of all FOCP components, including the entire Drawdown Project Area (Figures 1 and 2). The Drawdown Project Area includes the area of variance and consists of the entirety of Anderson Reservoir below the reservoir's ordinary high-water mark at an elevation of 627.9 feet, although only the areas above 488 feet elevation will be exposed (Figure 3). The reservoir is located immediately east of Anderson Dam at the junction of Cochrane Road and Coyote Road in Santa Clara County, California—0.8 miles east of US Highway 101 (US 101; Cochrane Road exit), 18.0 miles southeast of downtown San Jose, and 2.5 miles northeast of downtown Morgan Hill. The reservoir is fed by Packwood Creek, Las Animas Creek, San Felipe Creek, and Coyote Creek; Anderson Reservoir releases into Coyote Creek, which is a tributary to the San Francisco Bay. The Drawdown Project Area is located on land owned by Valley Water.

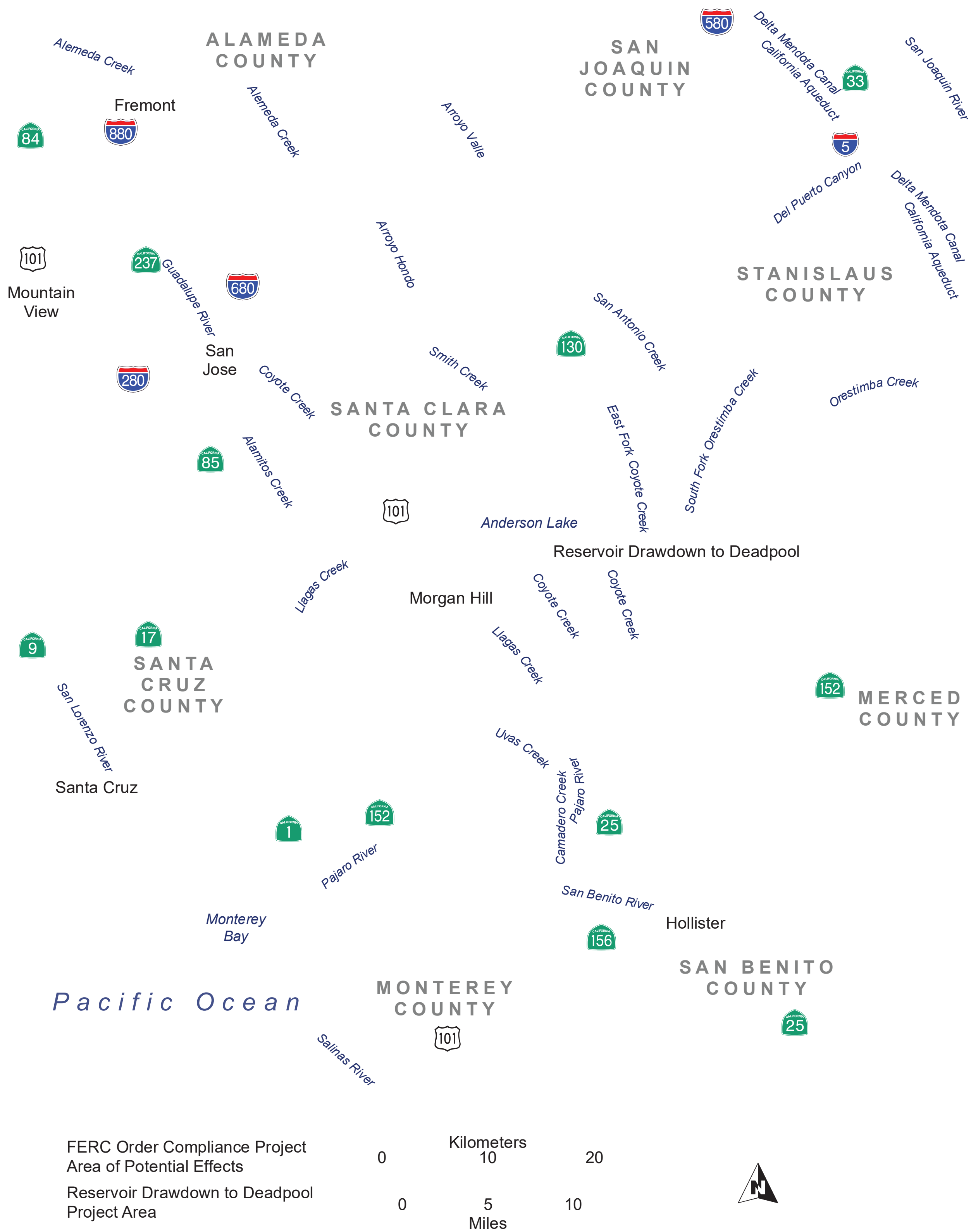

Figure 1. Reservoir Drawdown to Deadpool Project Vicinity.

Figure 2. Project Location within the Federal Energy Regulatory Commission (FERC) Order of Compliance Project (FOCP) Area of Potential Effects (APE).

Figure 3. Anderson Dam Drawdown Project Area.

DEFINITION AND SIGNIFICANCE OF PALEONTOLOGICAL RESOURCES

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value. Fossils are any remains, trace, or imprint of past life that have been preserved by natural processes in the rock record. Paleontological resources include both fossils themselves as well as the rocks in which fossils are preserved because the geologic character of the rock record preserves the ecological, geographic, and evolutionary context of past life represented by fossils themselves. Paleontological resources are objects of national significance that are worthy of preservation for the inspiration and interpretive opportunities they offer.

While the Bureau of Land Management (BLM) is not involved in this project, guidelines provided by the BLM are broadly relevant to the proper treatment of paleontological resources and serve as industry standards in paleontology, particularly on federally managed lands (BLM 2009, 2016). The BLM (2009, 2016) notes that paleontological resources are a fragile and non-renewable scientific record of the history of life on earth. Once damaged, destroyed, or improperly collected, fossils lose their scientific and educational value. Significant paleontological resources are defined as those possessing scientific importance due to distinguishing characteristics of identity, context, or preservation. Significant paleontological resources include invertebrate, plant, and vertebrate fossils that further paleontological knowledge about the history of life on earth. Scientific importance may be attributed to the actual fossil specimen, to fossil context (e.g., location in time and space, intimate association with other evidence of scientific significance), or to fossil preservation.

REGULATORY SETTING

Paleontological resources are afforded protection under federal and state laws and regulations. This study conforms to guidelines provided on the treatment of paleontological resources on lands under FERC oversight as well as the State of California and local agencies.

FEDERAL ENERGY REGULATORY COMMISSION GUIDANCE MANUAL 2017 (4.6.6)

FERC has issued a series of manuals relating to environmental protection for projects under their oversight. Specific to this project, the Guidance Manual for Environmental Report Preparation (2017) details protection of paleontological resources. Section 4.6.6 of the FERC guidance manual states that if a project area is known to contain sensitive paleontological resources (based on published information, field surveys, or stakeholder comments), the issues should be addressed and paleontological studies should be conducted where appropriate. Desktop review and field investigations should provide references for any identified paleontological resources. The section further provides guidance to describe proposed measures to avoid or minimize impacts and provide an unanticipated discovery plan. As the project does have known, sensitive paleontological resources, the recommendations of the guidance manual are appropriate.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

The National Environmental Policy Act of 1969, as amended (Public Law [PL] 91-190, 42 USC 4321-4347, January 1, 1970, as amended by PL 94-52, July 3, 1975, PL 94-83, August 9, 1975, and PL 97-258 § 4(b), Sept. 13, 1982) recognizes the continuing responsibility of the federal government to "preserve important historic, cultural, and natural aspects of our national heritage…" (Sec. 101 [42 USC § 4321])(#382). With the passage of the Paleontological Resources Preservation Act in 2009, paleontological resources are considered a significant resource and it is therefore now standard practice to include paleontological resources in NEPA studies in all instances where there is a possible impact.

OMNIBUS PUBLIC LANDS ACT, PUBLIC LAW 111-011, TITLE VI, SUBTITLE D (PRPA, 2009)

In 2009, the Paleontological Resources Preservation Act (PRPA) was signed into law, codified in Title VI of the larger Omnibus Public Lands Act (Public Law 111-011, Title VI, Subtitle D). It is stated under the PRPA that the Secretaries of the Interior and Agriculture shall manage and protect paleontological resources on federally managed land using scientific principles and expertise. The PRPA is modeled after the Archaeological Resources Protection Act and incorporates the recommendations of the May 2000 report of the Secretary of the Interior, Assessment of Fossil Management on Federal and Indian Lands, regarding future actions to formulate a consistent paleontological resources management framework. With the passage of the PRPA, Congress officially defined fossils as paleontological resources and reaffirmed that fossils from public lands are federal property. The PRPA codifies existing policies of the Bureau of Land Management (BLM), National Park Service, Forest Service, Bureau of Reclamation, and US Fish and Wildlife Service. The PRPA provides the following:

- Uniform definitions for paleontological resources and casual collecting;
- Uniform, minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants);
- Uniform criminal and civil penalties for illegal sale and transport, and theft and vandalism, of fossils from public lands; and
- Uniform requirements for curation of fossils from public lands in approved repositories.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Guidelines for the Implementation of CEQA, as amended March 29, 1999 (Title 14, Chapter 3, California Code of Regulations: 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Recent updates to CEQA (January 1, 2019) moved paleontological resources into "Geology and Soils" and requires the following to be answered in the Environmental Checklist (Appendix G, Section VII, Part f): "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?"

STATE OF CALIFORNIA PUBLIC RESOURCES CODE (PRC) SECTIONS 5097 AND 30244 (GOVERNOR'S OFFICE OF PLANNING AND RESEARCH 1998).

Other state requirements for paleontological resource management are included in the Public Resources Code (Chapter 1.7), Section 5097.5 and 30244. These statutes prohibit the removal of any paleontological site or feature on public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state-managed) lands.

PROFESSIONAL STANDARDS

The BLM (2009, 2016) has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. The BLM's paleontological guidelines are designed to meet the requirements of NEPA and are usually relevant to projects under other federal oversight.

As defined by the BLM (2009:19), significant paleontological resources are:

> … any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils. A significant paleontological resource is considered to be scientifically important because it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has identified educational or recreational value. Paleontological resources that may be considered to not have paleontological significance include those that lack provenience or context, lack physical integrity because of decay or natural erosion, or that are overly redundant or are otherwise not useful for research. Vertebrate fossil remains and traces include bone, scales, scutes, skin impressions, burrows, tracks, tail drag marks, vertebrate coprolites (feces), gastroliths (stomach stones), or other physical evidence of past vertebrate life or activities.

Numerous paleontological studies have developed criteria for the assessment of significance for fossil discoveries (e.g., Eisentraut and Cooper 2002, Murphey et al. 2019, Scott and Springer 2003). In general, these studies assess fossils as significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; or
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

A geologic unit known to contain significant fossils is considered sensitive to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from the definition for archaeological resources as follows:

It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontological sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case (SVP 1995). Many archaeological sites contain features visually detectable on the surface. In contrast, fossils are often contained within surficial sediments or bedrock, and are therefore not observable or detectable unless exposed by erosion or human activity.

Paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or human-caused exposure. As a result, even in the absence of fossils on the surface, it is necessary to assess the sensitivity of rock units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside the study area), a similar geologic unit, or based on whether the unit in question was deposited in a type of environment known to be favorable for fossil preservation. In areas where there are known fossil resources exposed at the surface, a pre-impact survey will lead to a more accurate accounting of the fossil-bearing regions. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken to prevent adverse impacts to these resources.

PALEONTOLOGICAL SENSITIVITY

Paleontological sensitivity is the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey.

The BLM's Potential Fossil Yield Classification (PFYC) system provides baseline guidance for predicting, assessing, and mitigating impacts to paleontological resources. The PFYC system ranks geologic formations or members on a 1 to 5 scale, with 5 having the highest potential for preserving fossil resources and uses geologic mapping as a predictive tool to identify areas of paleontological sensitivity (Table 1).

This classification does not reflect rare or isolated occurrences of significant fossils or individual localities, only the relative occurrence on a formation or member-wide basis. Any rare occurrences will require additional assessment and mitigation if they fall within the area of anticipated impacts. The PFYC system is based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts (BLM 2016).

The following descriptions of paleontological sensitivity class rankings pertinent to this project and drawn directly from the BLM Guidelines (2016) are provided below:

> **Class 1 – Very Low**. Geologic units that are not likely to contain recognizable paleontological resources. Units assigned to Class 1 typically have one or more of the following characteristics:
>
> - Geologic units are igneous or metamorphic, excluding air-fall and reworked volcanic ash units.
> - Geologic Units are Precambrian in age.
>
> Management concerns for paleontological resources in Class 1 units are usually negligible or not applicable.
>
> Mitigation for potential adverse impacts to paleontological resources is unlikely to be necessary except in very rare or isolated circumstances that result in the unanticipated presence of paleontological resources, such as unmapped geology contained within a mapped geologic unit. For example, young fissure-fill deposits often contain fossils but are too limited in extent to be represented on a geological map; a lava flow that preserves evidence of past life, or caves that contain important paleontological resources. Such exceptions are the reason that no geologic unit is assigned a Class 0.
>
> Overall, the probability of impacting significant paleontological resources is very low and further assessment of paleontological resources is usually unnecessary. An assignment of Class 1 normally does not trigger further analysis unless paleontological resources are known or found to exist. However, standard stipulations should be put in place prior to authorizing any land use action in order to accommodate an unanticipated discovery.
>
> **Class 2 – Low**. Geologic units that are not likely to contain paleontological resources. Units assigned to Class 2 typically have one or more of the following characteristics:
>
> - Field surveys have verified that significant paleontological resources are not present or are very rare.
> - Units are generally younger than 10,000 years before present.
> - Recent aeolian deposits.
> - Sediments exhibit significant physical and chemical changes (i.e., diagenetic alteration) that make fossil preservation unlikely.

Except where paleontological resources are known or found to exist, management concerns for paleontological resources are generally low and further assessment is usually unnecessary except in occasional or isolated circumstances.

Paleontological mitigation is only necessary where paleontological resources are known or found to exist. The probability of impacting significant paleontological resources is low. Localities containing important paleontological resources may exist, but are occasional and should be managed on a case-by-case basis. An assignment of Class 2 may not trigger further analysis unless paleontological resources are known or found to exist. However, standard stipulations should be put in place prior to authorizing any land use action in order to accommodate unanticipated discoveries.

Class 3 – Moderate. Sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence. Units assigned to Class 3 have some of the following characteristics:

- Marine in origin with sporadic known occurrences of paleontological resources.
- Paleontological resources may occur intermittently, but abundance is known to be low.
- Units may contain significant paleontological resources, but these occurrences are widely scattered.
- The potential for an authorized land use to impact a significant paleontological resource is known to be low-to-moderate.

Management concerns for paleontological resources are moderate because the existence of significant paleontological resources is known to be low. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for casual collecting.

Paleontological mitigation strategies will be proposed based on the nature of the proposed activity. This classification includes units of moderate or infrequent occurrence of paleontological resources. Management considerations cover a broad range of options that may include record searches, pre-disturbance surveys, monitoring, mitigation, or avoidance. Surface-disturbing activities may require assessment by a qualified paleontologist to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources.

Class 4 – High. Geologic units that are known to contain a high occurrence of paleontological resources. Units assigned to Class 4 typically have the following characteristics:

- Significant paleontological resources have been documented but may vary in occurrence and predictability.
- Surface disturbing activities may adversely affect paleontological resources.
- Rare or uncommon fossils, including nonvertebrate (such as soft body preservation) or unusual plant fossils, may be present.
- Illegal collecting activities may impact some areas.

Management concerns for paleontological resources in Class 4 are moderate to high, depending on the proposed action.

Paleontological mitigation strategies will depend on the nature of the proposed activity, but field assessment by a qualified paleontologist is normally needed to assess local conditions.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation plans must consider the nature of the proposed disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access that could result in looting. Detailed field assessment is normally required, and on-site monitoring or spot-checking may be necessary during land disturbing activities. In some cases avoidance of known paleontological resources may be necessary.

Class 5 – Very High. Highly fossiliferous geologic units that consistently and predictably produce significant paleontological resources. Units assigned to Class 5 have some or all of the following characteristics:

- Significant paleontological resources have been documented and occur consistently.
- Paleontological resources are highly susceptible to adverse impacts from surface disturbing activities.
- Unit is frequently the focus of illegal collecting activities.

Management concerns for paleontological resources in Class 5 areas are high to very high. A field survey by a qualified paleontologist is almost always needed. Paleontological mitigation may be necessary before or during surface disturbing activities. The probability for impacting significant paleontological resources is high. The area should be assessed prior to land tenure adjustments. Pre-work surveys are usually needed and on-site monitoring may be necessary during land use activities. Avoidance or resource preservation through controlled access, designation of areas of avoidance, or special management designations should be considered.

Class U – Unknown Potential. Geologic units that cannot receive an informed PFYC assignment. Characteristics of Class U may include:

- Geological units may exhibit features or preservational conditions that suggest significant paleontological resources could be present, but little information about the actual paleontological resources of the unit or area is known.
- Geological units represented on a map are based on lithologic character or basis of origin, but have not been studied in detail.
- Scientific literature does not exist or does not reveal the nature of paleontological resources.
- Reports of paleontological resources are anecdotal or have not been verified.
- Area or geologic unit is poorly or under-studied.
- BLM staff has not yet been able to assess the nature of the geologic unit.

Until a provisional assignment is made, geologic units that have an unknown potential have medium to high management concerns.

Lacking other information, field surveys are normally necessary, especially prior to authorizing a ground-disturbing activity. An assignment of "Unknown" may indicate the unit or area is poorly studied, and field surveys are needed to verify the presence or absence of paleontological resources. Literature searches or consultation with professional colleagues may allow an unknown unit to be provisionally assigned to another Class, but the geological unit should be formally assigned to a Class after adequate survey and research is performed to make an informed determination.

Table 1. Potential Fossil Yield Classification (BLM 2016).

BLM PFYC DESIGNATION	ASSIGNMENT CRITERIA GUIDELINES AND MANAGEMENT SUMMARY (PFYC SYSTEM)
1=Very Low Potential	Geologic units are not likely to contain recognizable paleontological resources.
	Units are igneous or metamorphic, excluding air-fall and reworked volcanic ash units.
	Units are Precambrian in age.
	Management concern is usually negligible, and impact mitigation is unnecessary except in rare or isolated circumstances.
2=Low Potential	Geologic units are not likely to contain paleontological resources.
	Field surveys have verified that significant paleontological resources are not present or are very rare.
	Units are generally younger than 10,000 years before present.
	Recent eolian deposits.
	Sediments exhibit significant physical and chemical changes (i.e., diagenetic alteration) that make fossil preservation unlikely.
	Management concern is generally low, and impact mitigation is usually unnecessary except in occasional or isolated circumstances.
3=Moderate Potential	Sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence.
	Marine in origin with sporadic known occurrences of paleontological resources.
	Paleontological resources may occur intermittently, but these occurrences are widely scattered.
	The potential for authorized land use to impact a significant paleontological resource is known to be low-to-moderate.
	Management concerns are moderate. Management options could include record searches, pre-disturbance surveys, monitoring, mitigation, or avoidance. Opportunities may exist for hobby collecting. Surface-disturbing activities may require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action and whether the action could affect the paleontological resources.
4=High Potential	Geologic units that are known to contain a high occurrence of paleontological resources.
	Significant paleontological resources have been documented but may vary in occurrence and predictability.
	Surface-disturbing activities may adversely affect paleontological resources.
	Rare or uncommon fossils, including nonvertebrate (such as soft body preservation) or unusual plant fossils, may be present.
	Illegal collecting activities may impact some areas.
	Management concern is moderate to high depending on the proposed action. A field survey by a qualified paleontologist is often needed to assess local conditions. On-site monitoring or spot-checking may be necessary during land disturbing activities. Avoidance of known paleontological resources may be necessary.
5=Very High Potential	Highly fossiliferous geologic units that consistently and predictably produce significant paleontological resources.
	Significant paleontological resources have been documented and occur consistently.
	Paleontological resources are highly susceptible to adverse impacts from surface disturbing activities.
	Unit is frequently the focus of illegal collecting activities.
	Management concern is high to very high. A field survey by a qualified paleontologist is almost always needed and on-site monitoring may be necessary during land use activities. Avoidance or resource preservation through controlled access, designation of areas of avoidance, or special management designations should be considered.

SUMMARY OF PREVIOUS WORK

A review of the published and publicly available evidence for paleontological resources for the ADSRP t was prepared by Shapiro (2021). The key elements are summarized below.

PROJECT AREA GEOLOGY

The project area is within a fault-bound basin between the Santa Cruz Mountains on the west and the Diablo Range on the east. The bedrock is a combination of Mesozoic ocean crust, accreted prism, and forearc sediments (Dibblee and Minch 2005a, 2005b). The valley follows the trace of the Calaveras Fault and other faults that are part of the larger right-lateral San Andreas Fault System (Lagenheim et al., 2015). The hills west of Anderson Lake are underlain by metamorphic ocean crust (chiefly serpentinite with basalt) of the Coast Range Ophiolite. To the east, the hills are comprised of the subduction zone forearc sediments of the Jurassic Knoxville Formation, the Cretaceous Panoche Formation and Paleogene (termed Tertiary in the older literature) sands and shale, equivalent to the Moreno Shale to the south. These sediments are in fault contact on the east with the Franciscan Formation which is the subduction zone accretionary prism.

Faulting along west-dipping thrust faults led to the dropping of the basin during the Pliocene (Vanderhurst et al., 1982). The basin was subsequently filled with sediments washing in from the mountains. This formation fills most of the project area and is mapped as the Pliocene to Pleistocene Santa Clara Formation. This deposit is primarily conglomerate but has significant units of sand and clay. As sea levels rose and fell during the Pleistocene, the northern part of the valley was occasionally flooded by marine waters. The Santa Clara Formation has been studied by several groups as it contains an excellent record of relative uplift of the Santa Cruz Mountains and Diablo Range (Vanderhurst et al., 1982; Wills, 1995; Holland and Allen, 2000; Albert et al., 2005). Additional units mapped by Dibblee and Minch (2005a, 2005b) in the project area are Quaternary landslides and alluvium, resulting from ongoing erosion activity.

Of critical importance to the deadpool drawdown is the exposure of the Santa Clara Formation. The Santa Clara Formation (QTs) is composed of valley sediments that are weakly to moderately lithified. The QTs is primarily bedded gravel conglomerate composed of clasts derived from the Franciscan Formation in gray sandy matrix. The upper part of the formation is locally called the Packwood Gravel and contains detritus derived from the Panoche Formation and is generally Pleistocene in age. The lower part of the formation is locally referred to as the Silver Creek Gravel and ranges back to the Pliocene. In addition to the conglomerate, there are interbeds of gray, green, and red sandstone and claystone. The formation also contains local basalt flows.

PALEONTOLOGICAL RECORDS

The paleontological record was based on a combination of an internet search of the records of the University of California Museum of Paleontology (UCMP) on June 14, 2020, and a search of the published literature.

UCMP Records

The records of UCMP were searched for all known localities in Santa Clara County. It is important to note that this record is the minimum of the holdings of UCMP as many specimens are not digitized in the online catalogue. The final list included those specimens collected from Pliocene or Pleistocene deposits. Many of these records specify the “Santa Clara Formation,” others do not list a formation. Based on the localities and ages, it is very likely all of the fossils are from the Santa Clara Formation.

The results show that 52 fossils were collected from 12 separate localities in Santa Clara County (Table 2). Eighteen of these are plant fossils from the Pliocene part of the Santa Clara Formation. Of the vertebrates, nearly all are mammals and the list is dominated by large herbivores such as bison, mammoths, horses, and camelids, but also includes sloth, pronghorn, and peccary. Ages for the fossils include both the Irvingtonian (1.9 to 0.25 million years ago) and Rancholabrean (250,000 to 11,000 years ago). Where listed, the lithology of the collections is dominantly sandstone with minor gravel and claystone. Of particular note is specimen V139034, an artiodactyl (camelid) tibia from Anderson Lake that was collected by Anderson Lake Park staff and identified in 1993 (Table 2).

Additionally, during an archaeological field study conducted by Far Western in 2019, two significant fossils were discovered in the Drawdown Project Area, around the reservoir rim. One was an incomplete metatarsal of a large artiodactyl, most likely a camelid. The other was a large rib from coarse gravel that has not been identified. The fossils are reposited in the Earth Materials Collection at California State University, Chico.

Table 2. List of Santa Clara County Fossil Localities.

Specimen	Class	Genus/ID	Locality Name	Formation	Epoch	Biozone
P343	Magnoliopsida	Alnus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P352	Magnoliopsida	Quercus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P353	Magnoliopsida	Quercus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P382	Magnoliopsida	Ribes	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P383	Magnoliopsida	Ribes	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P384	Magnoliopsida	Ribes	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P385	Magnoliopsida	Cercocarpus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P386	Magnoliopsida	Cercocarpus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P387	Magnoliopsida	Prunus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P392	Magnoliopsida	Amelanchier	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P393	Magnoliopsida	Amelanchier	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P403	Magnoliopsida	Ceanothus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
P404	Magnoliopsida	Ceanothus	Calabazas Canyon	Santa Clara Formation	Pliocene	"Blancan"
V139034	Mammalia	Artiodactyl tibia	Anderson Lake	Santa Clara Formation	Pleistocene	Irvingtonian
V218830	Mammalia	Paramylodon	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218831	Mammalia	Equus	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218832	Mammalia	Capromeryx	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218833	Mammalia	Capromeryx	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218834	Mammalia	Camelops	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218835	Mammalia	Camelops	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218836	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218837	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218838	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218839	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218840	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218841	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218842	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218843	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218844	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218845	Mammalia	Bison	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218846	Mammalia	Artiodactyl astragalus	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218847	Mammalia	Artiodactyl naviculocuboid	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218848	Mammalia	Artiodactyl metapodial	Babcock's Bones	Not listed	Pleistocene	Rancholabrean

Table 2. List of Santa Clara County Fossil Localities *continued*.

SPECIMEN	CLASS	GENUS/ID	LOCALITY NAME	FORMATION	EPOCH	BIOZONE
V218849	Mammalia	Femoral diaphysis	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218850	Mammalia	Equus	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218851	Mammalia	Verterbrae	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V218852	Mammalia	Limb bone	Babcock's Bones	Not listed	Pleistocene	Rancholabrean
V192754	Mammalia	Equus	Calabazas Creek	Santa Clara Formation	Pleistocene	Irvingtonian
V137236	Mammalia	Mammuthus	Lawrence Expressway E	Not listed	Pleistocene	Rancholabrean
V39212	Mammalia	Bison	Milpitas	Not listed	Pleistocene	Rancholabrean
V136495	Mammalia	Bison	Molecular Medicine Bldg.	Santa Clara Formation	Pleistocene	Rancholabrean
V8753	Mammalia	Platygonus	San Felipe	Not listed	Pleistocene	Rancholabrean
V43992	Mammalia	Equus	Scott Creek	Santa Clara Formation	Pleistocene	Irvingtonian
V248425	Mammalia	Proboscidea	SCVWD Humerus	Not listed	Pleistocene	Rancholabrean
V150077	Mammalia	Mammuthus	SCVWD Mammoth	Not listed	Pleistocene	Rancholabrean
V148568	Mammalia	Equus	Strannigan Backyard	Santa Clara Formation	Not listed	Not listed
V43993	Osteichthyes	Not listed	Scott Creek	Santa Clara Formation	Pleistocene	Irvingtonian

Literature Search

A focused study on the Santa Clara Formation was published by Adam et al. (1983). The authors report on a single locality near Saratoga approximately 460 meters above the base of the Santa Clara Formation. The fauna list is quite diverse and includes terrestrial mammals (e.g., *Acinoyx* a large cat), birds, plants, and non-marine fish and mollusks. The sediments are described as sands and clays from lacustrine and fluvial facies. Based primarily on the plant fossils, the authors determined the North American Land Mammal Age of 'Blancan' (~4.75 to 1.8 million years ago). Note that when the article was published, the Blancan was considered latest Pliocene but now would include the early Pleistocene.

The most valuable compilation is the recently published summary of known Pleistocene vertebrates of Silicon Valley (Maguire and Holroyd 2016). While Silicon Valley lies northwest of the project area, the geology is similar and is useful for assessing the project area. Maguire and Holroyd (2016) describe a diverse assemblage from throughout the region in sediments of the Santa Clara Formation, including bison, camelids, mammoths, and horses. It is important to note that many of these fossils were recovered from gravels. The authors introduce many localities and fossils not included in the UCMP online database.

In addition to these two key papers, there are several other papers that focus on a few specimens from the Santa Clara Formation. In a study of the composition of the gravels to define various lithofacies, Holland and Allen (2000) noted beds of abundant small non-marine gastropods and bivalves. Casteel (1978) described a new species of superperch, *Damalichthys saratogensis*, from the Santa Clara Formation in the Santa Cruz Mountains. He also noted that the associated fossil flora indicated a redwood forest near sea level, with conditions both cooler and wetter than today (Axelrod 1944).

PALEONTOLOGICAL SIGNIFICANCE

Based on the accessed records and published literature, coupled with the lithology and depositional facies of the geological units, the following determinations have been made in accordance with the BLM's Potential Fossil Yield Classification (PFYC) system; it was determined that the Pleistocene-Pliocene Santa Clara Formation is ranked at 4-High for its "known and diverse significant paleontological resources."

METHODOLOGY

The surface collecting survey was carried out by Far Western Paleontological Technician Jake Farhar (B.S., Geology) under the direct supervision of Principal Paleontologist, Russell Shapiro (Ph.D., Federally Qualified Paleontologist).

Pedestrian surveys of the area below the ordinary high water mark and above deadpool occurred between September 12 and September 15, 2022 (Appendix A). One significant vertebrate bone was carefully collected in the field and prepared in the paleontological laboratory space in Chico, California (Figures 4 and 5). The fossil is a nearly complete and large camelid metapodial that is highly silicified (Figures 4 and 5). Preliminary identification of the genus is *Camelops* though further study will be necessary. As per the mitigation plan, the fossil has been prepped to museum standards using Butvar as a preservative and has been curated at California State University, Chico Earth Materials Collection (Appendix B).

The fossil joins two others previously collected by Far Western field archaeologists: another camelid metapodial and a rib of an unknown large mammal (Figure 6; Appendix B). In addition to these collections, archaeological monitors from Far Western also photographed and recorded a large perissodactyl (e.g., horse or rhinoceros) limb bone fragment that was not identifiable. The sample was not collected.

In addition to the camelid metapodial, Mr. Farhar also noted non-significant (by federal and industry standards) bivalve mollusks as well as an intact silicified tree trunk. As with the previous archaeological monitors, Mr. Farhar did note abundant wood fragments in the region. These were not collected as fossil wood itself is not deemed significant.

Figure 4. In situ Camelid Bone as Found in the Field with Minor Excavation.

Figure 5. Camelid Metapodial Post-Preparation.

a) Fractured rib recovered from cemented gravels.

b) Heavily silicified camelid metapodial. Note the tooth marks.

Figure 6. Additional Fossils Collected or Observed by Far Western Archaeologists.

Figure 7. Example of Well-Preserved Fossilized Wood in the Project.

Figure 8. Location Map of Fossil Resources.

CONCLUSION

The collection of the significant vertebrate fossils and curation in a federally recognized museum collection as well as detailed survey by a trained paleontologist ensures that this phase of the project was mitigated against loss of paleontological resources under NEPA. No further paleontological investigation or mitigation is recommended for the Drawdown Project.

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APPENDIX A

FIELD LOGS OF JAKE FARHAR, B.S., PALEONTOLOGIST

9/12/22:

Southwest section of the dry lakebed survey project area

No fossils. Conglomerate; fine sandstone matrix. Clasts ranging from boulder to sand-sized. Mostly intermediate to slightly mafic volcanic clasts, lesser metamorphic and sedimentary.

Southeast section of the dry lakebed survey project area

No fossils. Conglomerate; greenish-gray, silty matrix. Clasts are sub-angular to well-rounded, mostly pebble to large cobble sized. Some medium-grained sandstone bedding layers, some caliche nodules and thin caliche beds.

9/13/22:

Northernmost section of the dry lakebed survey project area

Two small (~6 in diameter) blocks of a gray sandstone with not quite enough bivalves to be considered a coquina. Bivalves poorly preserved, bleached white.

Northeastern section of the dry lakebed survey project area

Tree trunk. Full fossilized tree trunk, well silicified, partially coated in calcium carbonate, in-situ. Longer than approximately 15ft. and approximately 18in in diameter at base of trunk. Beds striking N35E and dipping approximately 30 degrees. Pebbly conglomerate, greenish-gray, alternating with beds of fine to medium-grained sandstone, both ~1”-5” thick.

Eastern section of the dry lakebed survey project area

Possible proximal metapodial. Long bone end with articulating surface and fossilized leaves, and some plant hash, all ex-situ. Leaves and plant hash are relatively poorly preserved. Fossils appear to have originated from similar beds. Reddish-tan, cobbly, cliff-forming conglomerate, which alternates with fine- to medium-grained sandstone. Location is roughly midway up the slope from the water to the top of the ridge. Abundant red iron-oxide staining in this and other beds.

9/14/22:

Northwest section of the dry lakebed survey project area

No fossils. Surveyed this section of the lake north of the dam. Little to no visible sedimentary units.

Eastern section of the dry lakebed survey project area

Found in-situ metapodial. Returned to location of bone fragment. Discovered the in-situ bone from which the fragment had originated, roughly 30 feet up-slope from the bone fragment discovered the previous day.

9/15/22:

Eastern section of the dry lakebed survey project area

Extracted the metapodial. In-situ bone fully extracted, taking longer than expected due to increased level of calcium carbonate cementation as the bone went deeper below the erosional surface. Bone in relatively good condition, preservation level is fairly high, some fractures and splintering from erosion/exposure. Cavity of the hollow center of the bone has been partially in-filled with chalcedony mineral growth. Exterior of bone was coated in fine, mostly non-destructive, rootlets.

During extraction process a consolidant (Butvar) was used to stabilize splintered or friable sections of bone, a small amount of cyanoacrylate glue was also used.

The bedding plane hosting the fossil was approximately 6 in thick, a cobbly conglomerate with sub-rounded to well-rounded clasts. Host bed is sandwiched between two layers of sandstone, the first a very coarse sandstone above, and then a medium-grained sandstone below.

APPENDIX B

CURATION LETTER FROM CALIFORNIA STATE UNIVERSITY, CHICO

CSU, CHICO
Earth Sciences Collection

CURATORIAL AGREEMENT

The California State University, Chico Earth Sciences Collection (ESC) will serve as a repository for rock, mineral, and/or paleontological collections under the following conditions:

1) Curatorial agreements with the ESC must be renewed annually
2) All specimens and collections are legally collected; the ESC shall be held harmless from all claims
3) Donated specimens are the property of the ESC who shall be solely responsible for the storage, display, or disposal of specimens with the following exception:
    a. Specimens obtained from public lands are the property of that agency, and are deposited with the ESC with the permission of that agency.
4) Collections will only be accepted from localities that are approved by the Collections Advisory Board of the ESC. As a guiding principle, this limits collections to regions serviced by the mission of California State University, Chico.
5) Depositors must comply with all applicable procedures for fees, labels, packaging, documentation and depositing collections within the ESC guidelines.

Name of Institution or Company: Far Western Anthropological Research Group

Principal Investigator: Russell Shapiro, Ph.D. Principal Paleontologist

Address: 2727 Del Rio Pl, Davis, CA 95618

Contact Phone: 530-513-2296 Contact E-mail: russell@farwestern.com

Project location and expected material: Anderson Dam, Santa Clara County, CA. Pliocene vertebrates,

This curatorial agreement is valid for one year beginning 2021 through 2022, and will cover projects initiated with the repository that year.

Earth Sciences Collection Curator	**Depositor**
William Koperwhats	Russell Shapiro
Authorized Agent	Authorized Agent
6/6/2021	6/1/2021
Signature/Date	Signature/Date

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