City of Merced
Wastewater Collection System Master Plan Update
Draft Environmental Impact Report

February 19, 2025

Prepared for:

City of Merced

Stantec

Prepared by:

Stantec Consulting Services, Inc.

EXECUTIVE SUMMARY

ES.1 INTRODUCTION AND BACKGROUND

The City of Merced's (City's) Vision 2030 General Plan (2030 General Plan) discusses City growth that may occur by the year 2030. As a part of the infrastructure planning associated with accommodating this growth, the City prepared the 2022 Wastewater Collection System Master Plan Update (2022 WCSMP) that set forth a strategy to meet the long-term sewer system needs of the 2030 General Plan (City of Merced 2023). Key infrastructure needs relevant to the 2022 WCSMP include the wastewater collection system itself; wastewater treatment, disposal, and reuse facilities; and various potable and non-potable water needs for growing areas of the City. The City, as the lead agency pursuant to the California Environmental Quality Act (CEQA), is proposing to implement the 2022 WCSMP, which outlines a general roadmap or a programmatic plan (i.e., referred to as the 'Program' in this Recirculated Draft Environmental Impact Report [RDEIR]) as well as specific projects (capital improvement projects) for developing the City's wastewater collection system in the City (Figure ES-1) to reach reasonable build-out as identified in the 2030 General Plan (City of Merced 2012).

The Program, identified as Alternative Plan A in the former 2017 WCSMP, describes the City's preferred approach for how the wastewater collection system infrastructure would be built to meet the future growth and sewer demands of the City's planning area, which is comprised of the 2030 General Plan Specific Urban Development Plan (SUDP)/Sphere of Influence (SOI) areas. The Program was selected for its ability to best meet the long-range sewer system conveyance needs of the City. These needs were determined by the Program's use of gravity sewers, which are more reliable, require no energy to operate, and no moving parts (i.e. pump stations) to maintain, where feasible. Thus limiting the life-cycle and energy costs associated with operation of the system.

The Program proposes the City's collection system take all municipal wastewater to the City's existing 12 million gallons per day (Mgal/d) capacity Wastewater Treatment Facility (WWTF). The existing WWTF would be expanded, as needed in 4-to 5-Mgal/d increments, to handle 2030 General Plan flows, referred to as WWTF expansion in this RDEIR. The effluent disposal and reuse facilities at the WWTF are believed to have sufficient land and disposal potential to serve a reasonable build-out design flow estimate of 27.2 Mgal/d, if and when build-out is needed.

The Program proposes major and minor main sewer improvements within existing City road rights-of-way consistent with the 2030 General Plan Circulation Element to serve anticipated growth in north and South Merced. These sewers would maintain gravity flows where feasible. Where infeasible, force main sewers and pump/lift stations would be used. Specifically, three trunk sewer projects—the North Merced Major Improvements, South Merced Major Improvements, and Program Minor Improvements—have been identified as the first steps to supporting the construction of the 2022 WCSMP. These projects would be sized to accommodate the reasonable build-out of the SUDP/SOI and would be required prior to further development within North Merced or South Merced, respectively. These trunk sewers would serve as the key routes for wastewater to be delivered to the WWTF and as interceptors for the new smaller collector sewers. Collectively, the North Merced Major Improvements, South Merced Major Improvements, Program Minor Improvements, and WWTF expansion are referred to collectively as the 'Program' within

this RDEIR. The interim sewer improvements (CIPs 1-6) are part of the Program but also referred to collectively as the Interim Collection System Improvements (CIPs 1-6) within this RDEIR. Please see Chapter 2.0 for a detailed Project Description.

This RDEIR has been prepared in compliance with the CEQA of 1970 (as amended), codified at California Public Resources Code (PRC) Sections 21000 et seq., and the State CEQA Guidelines in the Code of Regulations, Title 14, Division 6, Chapter 3. The Program is described further in Chapter 2.0 of this document.

This RDEIR also incorporates by reference the analysis and other information contained in the City's 2022 WCSMP, as well as the planning documents that helped define the Program Study Area, the 2017 WCSMP growth projections, program capacity estimates, and overlapping environmental analysis including the following:

- The 2022 WCSMP, February 9, 2023 (City of Merced 2023)[1]
- The 2017 WCSMP, December 15, 2017 (City of Merced 2017)[2]
- The 2030 General Plan (City of Merced 2012)[3]
- The 2030 General Plan Draft and Final EIRs (State Clearinghouse Number [SCH] No. 2008071069) (City of Merced 2010)[4]
- The 2009 University of California (UC) Merced 2020 Project Addendum Long-Range Development EIS/EIR (SCH Number 200841009) (UC California 2008)[5]
- City of Merced, North Merced Sewer Master Plan (City of Merced 2002, Draft) *Available upon request at the City*
- The City's Draft and Final Wastewater Treatment Plan Expansion Project EIR (SCH Number 2005101135) August 2006 (City of Merced 2006)[6]
- The 2015 Bellevue Community Plan (City of Merced 2015)[7]
- The 2004 University Community Plan (Merced County 2004)[8]

As described in the 2022 WCSMP, service demands based on varying growth projections identified by the 2030 General Plan, and as further refined in the localized community planning, were used as a basis for this RDEIR. Communities such as Celeste, UC Campus, and University Community area were considered as well as service to the Bellevue, University, and other community plan areas within the Program Study Area.

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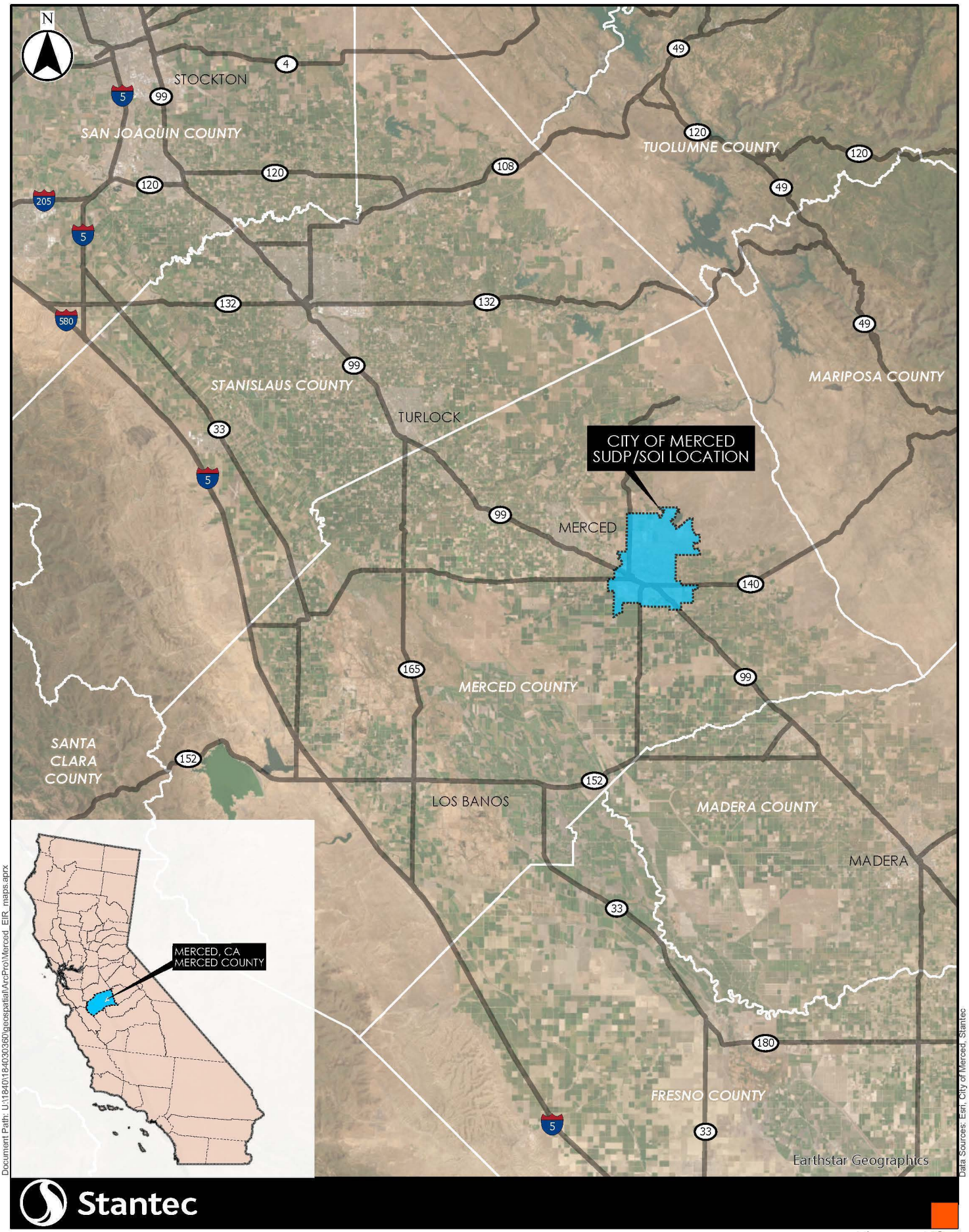
[1] https://www.cityofmerced.org/departments/engineering/sewer-master-plan/-folder-2561
[2] https://www.cityofmerced.org/depts/engineering_division/sewer_master_plan.asp
[3] https://www.cityofmerced.org/departments/development-services/planning-division/merced-vision-2030-general-plan#:~:text=The%20Merced%20Vision%202030%20General%20Plan%20was%20adopted%20on%20January,which%20can%20be%20downloaded%20below
[4] https://www.cityofmerced.org/civicax/filebank/blobdload.aspx?BlobID=9183
[5] https://merced2020.ucmerced.edu/sites/merced2020.ucmerced.edu/files/documents/2020_adeir102708web.pdf
[6] https://www.cityofmerced.org/civicax/filebank/blobdload.aspx?blobid=4782
[7] https://www.cityofmerced.org/Home/ShowDocument?id=8608
[8] http://web2.co.merced.ca.us/pdfs/planning/cplan/completed/university/final_university_community_plan.pdf



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Data Sources: Esri, City of Merced, Stantec

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City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure ES-1
Wastewater Collection System Master Plan Program Vicinity

ES.2 PURPOSE AND OBJECTIVES

The purpose of the 2022 WCSMP was to strategically and comprehensively plan development of the wastewater infrastructure necessary to support reasonable build-out of the SUDP/SOI and meet these long-term projected needs. The objectives of the Program are to achieve the following:

1. Construct and maintain safe and reliable wastewater infrastructure facilities.
2. Meet interim and build-out wastewater collection system needs by constructing the components of the collection system incrementally, in phases.
3. Achieve lower overall life-cycle cost and maintain relatively low costs for sewer service considering upfront costs and anticipated operation and maintenance (O&M) costs over the coming decades.
4. Maintain high water quality and wastewater treatment standards.
5. Reduce or maintain relatively low operational costs and energy demand by selecting gravity systems where feasible.
6. Maintain consistency with the Merced 2030 General Plan.
7. Plan collection system infrastructure that meets reasonable build-out conditions of 27.2 Mgal/d.
8. Minimize land use and environmental impacts.
9. Adhere to federal and state policies and regulations in support of regionalization, reclamation, recycling, and conservation for wastewater treatment plants (such as Central Valley Regional Water Quality Control Board [CVRWQCB] Resolution Number R5-2009-0028) (CVRWQCB 2009).
10. Use the existing publicly owned property, roadways, and right-of-way (ROW) to the extent feasible.

Project Alternatives

An EIR must describe a range of reasonable alternatives to the project or alternative project locations that could feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the significant environmental impacts of the proposed Project. The alternative analysis must include the “No Project Alternative” as a point of comparison. The No Project Alternative includes existing conditions and reasonably foreseeable future conditions that would exist if the proposed Project were not approved (CEQA Guidelines Section 15126.6). The following alternatives are discussed further in Chapter 4.0, Alternatives, of this document.

No Project Alternative

The No Project Alternative assumes that if selected, the Program would not be implemented, the wastewater collection system within the City of Merced would remain operating under existing conditions, and limited connections would be available to future wastewater connections. It also means that developers or others may explore other means to provide sewer service (e.g. septic). None of the

environmental impacts identified in Chapter 3.0, Sections 3.1 through 3.15 would occur; however, additional impacts could result from the existing system reaching capacity, aging, or conflicting with the 2030 General Plan. Furthermore, implementation of the No Project Alternative would not meet any of the Program objectives.

North Merced Satellite Treatment Alternative

The City's methodology for identifying potential action alternatives included consideration of the following: the updated 2022 Wastewater Collection System Master Plan (WCSMP), the 2017 WCSMP (City of Merced 2017), CEQA Notice of Preparation scoping public and agency written comments (Chapter 1.0), and professional judgment for feasible alternatives that would reduce environmental impacts while still meeting most or all of the Program objectives. The alternative would consist of building a second WWTF in North Merced to accommodate new wastewater associated with development as the area grows to reasonable build-out of the SUDP/SOI. The new facility would require the City to purchase the industrial zoned property located west of the intersection of West Yosemite Avenue and State Route (SR) 59. The facility would initially accommodate 4 to 5 Mgal/d wastewater flows with plans to expand to a maximum capacity of 14 to 15 Mgal/d at reasonable build-out, while the existing WWTF would accommodate wastewater flows from the rest of the SUDP/SOI with an initial expansion to 16 Mgal/d and subsequent expansion as reasonable build-out is neared to reach a maximum capacity of 20 Mgal/d. Between the two treatment facilities the alternative would achieve the total 34 to 35 Mgal/d treatment capacity required to meet reasonable build-out conditions under the 2030 General Plan. Additionally, this alternative would require new effluent disposal and or reuse facilities and discharge permits to serve the new treatment facility. Additional land for effluent disposal could total approximately 4,550 acres. Key wastewater collection system trunk lines for this alternative would be similar to the proposed Projects, however, would exclude areas crossing from North to South Merced.

Campus Parkway Alternative

The Campus Parkway Alternative is a variation on the Eastern Trunk Servicing Concept that was explored during the past 2017 WCSMP development process (which is described in Appendix E) and was based on public input. The alternative would require an additional trunk sewer to be placed outside of the City's SUDP/SOI from the UC Merced Campus to Campus Parkway where it would connect with the existing sewer collection system. This alternative would involve two phases to reach the reasonable build-out capacity needed and analyzed in the 2030 General Plan. Phase 1 of the Campus Parkway Alternative would involve conveyance of wastewater within the campus community area, and possibly from additional portions of the service area to flow down through this system and eventually reach the City's existing WWTF near the southwest portion of the City's SUDP/SOI. Trunk sewers in the north would be reduced in size as flow from the northwestern portion of the service area would be conveyed via this expansion of the existing WWTF. Phase 2 of this alternative would require additional wastewater infrastructure for the new development in the far north and northwestern portions of the City (partially outside of the City's SUDP/SOI).

Decentralized Treatment Facilities Alternative

This alternative would consist of a decentralized system with multiple treatment facilities developed in phases to accommodate anticipated growth within the City. These new WWTFs would be built in new development areas and would treat the wastewater associated with each new development as they occur. This alternative would require the placement of trunk and collector pipelines, using gravity-fed systems to the maximum extent feasible to convey wastewater flows to the new decentralized facilities as well as to the existing WWTF throughout the City's SUDP/SOI. This alternative would require the individual treatment and permitted disposal of effluent at each new site as well as operations and maintenance associated with each new facility added. Each facility would require a treatment train sufficient to treat the wastewater generated within a particular development area and would be required to meet waste discharge permitting requirements and maintain an individual National Pollutant Discharge Elimination Service permit, or provide reclamation lands on which to reuse treated effluent, as well as appropriate discharge permits issued by the CVRWQCB.

Recycled Water Reclamation Alternative

This alternative would implement the concept to recharge groundwater use in North Merced by returning effluent from the WWTF to North Merced through a network of reclaimed water pipes. Based on the evaluation for pipeline placement of the proposed Projects for implementation of the Program, it is assumed that recycled pipelines would follow the same alignments as the proposed Projects and future program collector infrastructure. These recycled water pipelines would likely be required to have appropriate health and safety setbacks from the Program pipelines (typically a minimum distance of 50 feet or other form of sewer containment such as double walled pipes). Recycled water uses and connections within the City would be required under this alternative for areas such as City parks or landscaped areas. Where the Program pipelines gravity flow to the WWTF, pumping the recycled water back through the system would be required. Pumping would require placement of one or more pumps or lift stations.

Reduced Build-Out Sewer Capacity Alternative

The former 2017 WCSMP evaluated different scenarios in which interim conditions with or without participation of certain neighborhoods within the City would occur. These evaluations are extrapolated out to develop this reduced build-out alternative that would serve 20 Mgal/d capacity. This alternative would have the same footprint and construction and operations activities as the Program and proposed Projects; however, it would be downsized, and development would only need to accommodate 20 Mgal/d capacity. The 20 Mgal/d capacity would likely not be able to serve the development of the City's entire SUDP/SOI at the densities illustrated in the 2030 General Plan. Trunk sewer pipelines would be downsized from the proposed Projects and the pump station would have a smaller footprint; no expansion beyond what was previously planned in the 2006 WWTF EIR would be required.

Parallel or Upsized Existing System Alternative

The former 2017 WCSMP also explored installing parallel sewers adjacent to the main existing trunk lines within the City limits to accommodate interim wastewater flows and to allow for additional sewer connections within north and eastern Merced. This alternative expands on that concept by considering

the parallel or upsized trunk lines within the City adjacent to trunk sewers. This alternative would target critically impacted sewers, installing a parallel or upsized trunk sewer within the ROW associated with West Avenue and Olive Avenue and adjacent to or within the ROW of existing sewers at or near capacity. This alternative would require construction throughout many of the developed areas within the City, would require utility relocations, and would require resolution of conflicts with other utilities and infrastructure. This alternative would be designed to meet reasonable build-out flows identified within the 2030 General Plan and would require parallel pipes or upsized replacement pipes throughout much of the existing system.

ES.3 RESPONSIBLE AND TRUSTEE AGENCIES

In accordance with CEQA, a responsible agency is a public agency other than the lead agency that has responsibility to carry out or approve a project (PRC Section 21069). A trustee agency is a state agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California (PRC Section 21070).

The following public or state agencies may serve as responsible and/or trustee agencies for the Program:

- California Air Resources Board
- San Joaquin Valley Air Pollution Control District
- CVRWQCB
- California Department of Fish and Wildlife
- Office of Historic Preservation

ES.4 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

During the Notice of Preparation (NOP) public review period, concerns were raised regarding the potential adverse impacts to the following: air quality and greenhouse gases, agricultural resources, hydrology and groundwater resources, hazards and hazardous materials, noise, odor, aesthetics, biological resources, and traffic and transportation. Additionally, concerns regarding alternatives, cumulative impacts, and General Plan consistency were also raised. These concerns have been addressed in Chapter 3.0, Environmental Impact Assessment. Additionally, concerns of urban blight, environmental justice, impacts to minority communities, and economic impacts were also raised during the NOP process. Generally, and as raised by comments, these topics would not result in an environmental impact as a result of the project and are not topics that are required for consideration under the CEQA Guidelines. Where these topics overlap discussions of potential environmental impacts, potential impacts from these topics were also discussed within a specific environmental resource area as applicable. The NOP and comments received on the NOP are included in Appendix A of this RDEIR and a summary of issues raised in these comments is included in Section 1.1.2.1, Notice of Preparation.

ES.5 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table ES-1 summarizes the potential environmental effects of the Program, the recommended mitigation measures, if applicable, and the level of significance after mitigation. Pursuant to CEQA Guidelines Section 15093, if the Program is approved as proposed, any impact noted in the summary as “significant” after mitigation would require the adoption of overriding considerations. As shown in Table ES-1, development of the Program with mitigation measures would not result in any significant and unavoidable impacts. Therefore, a statement of overriding considerations would not be required.

Additionally, CEQA requires public agencies to establish a monitoring and reporting program for the purpose of ensuring compliance with those mitigation measures adopted as conditions of approval in order to mitigate or avoid significant environmental impacts identified in an EIR. A Mitigation Monitoring and Reporting Program, incorporating the mitigation measures set forth in this document, would be adopted at the time of certification of the Final EIR.

Table ES.1: Executive Summary of Impacts and Mitigation

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
3.1 Aesthetics and Visual Resources				
AES-1: Potential to have a substantial adverse effect on a scenic vista.	LTS	LTS	NI	None Required
AES-2: Potential to damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a scenic highway.	NI	NI	NI	None Required
AES-3: In non-urbanized areas, potential to substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public Views are those that are experienced from publicly accessible vantage point). If the Project is in an urbanized area, the potential of the project to conflict with applicable zoning and other regulations governing quality.	LTS/M	LTS/M	LTS	**MM AES-1:** Restoration of Disturbed Areas **MM AES-2:** Guidance for Design and Maintenance of Above-Ground Facilities
AES-4: Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	LTS/M	LTS/M	LTS/M	**MM AES-3:** Use of Best Management Practices to Minimize Lighting Impacts from Construction and Operation
3.2 Agricultural and Forestry Resources				
AG-1: Potential to result in the loss of forest land or conversion of forest land to non-forest use.	LTS	LTS	NI	None Required
AG-2: Potential to covert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring program of the California Resources Agency, to non-agricultural use.	NI	NI	NI	None Required
AG-3: Potential to conflict with existing zoning for agricultural use, or Williamson Act contract.	NI	NI	NI	None Required
AG-4: Potential to conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code (PRC) Section 12220(g)), timberland (as defined by PRC Section 4526), or	NI	NI	NI	None Required

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).				
AG-5: Potential to 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.	NI	NI	NI	None Required
3.3 Air Quality				
AIR-1: Potential to conflict with or obstruct implementation of the applicable air quality plan.	LTS	LTS	LTS	None Required
AIR-2: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard.	LTS	LTS	LTS	None Required
AIR-3: Potential to expose sensitive receptors to substantial pollutant concentrations.	LTS/M	LTS/M	LTS/M	**MM AIR-1:** Pre-Construction Worker Environmental Awareness Program (Air Quality) **MM AIR-2:** Implement Hazardous Materials Measures **MM AIR-3:** Minimize Construction Emissions **MM AIR-4:** Design Considerations for Future WWTF Improvements
AIR-4: Potential to result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	LTS	LTS	LTS	None Required
3.4 Biological Resources				
BIO-1: Potential to 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.	LTS/M	LTS/M	LTS/M	**MM BIO-1:** Pre-Construction Botanical Surveys **MM BIO-2:** Pre-Construction Worker Environmental Awareness Program Training (Biological Resources) **MM BIO-3**: Reduce the Spread and Introduction of Invasive Noxious Weeds **MM BIO-4:** Avoid Disturbance to California Tiger Salamander

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
				MM BIO-5: Avoid Disturbance to Breeding Burrowing Owl **MM BIO-6:** Avoid Disturbance to Nesting Swainson's Hawk **MM BIO-7:** Avoid Disturbance to Breeding Colonies of Tricolored Blackbird **MM BIO-8:** Avoid Disturbance to Nesting Raptors and Other Migratory Birds **MM BIO-9:** Avoid Disturbance to Breeding San Joaquin Fox **MM BIO-10**: Install Exclusion Fencing for Environmentally Sensitive Areas
BIO-2: Potential to have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	LTS/M	LTS/M	LTS	**MM BIO-2:** Pre-Construction Worker Environmental Awareness Program Training (Biological Resources) **MM BIO-10**: Install Exclusion Fencing for Environmentally Sensitive Areas **MM BIO-11:** Avoid and Reduce Disturbance and Impacts to Riparian Habitat and/or Sensitive Natural Communities **MM GEO-1:** Prepare an Erosion Control Plan and Stormwater Pollution Prevention Plan
BIO-3: Potential to conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or potential to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	LTS/M	LTS/M	NI	**MM BIO-1:** Pre-Construction Botanical Surveys **MM BIO-2:** Pre-Construction Worker Environmental Awareness Program Training (Biological Resources) **MM BIO-3**: Reduce the Spread and Introduction of Invasive Noxious Weeds **MM BIO-4:** Avoid Disturbance to California Tiger Salamander **MM BIO-5:** Avoid Disturbance to Breeding Burrowing Owl **MM BIO-6:** Avoid Disturbance to Nesting Swainson's Hawk **MM BIO-7:** Avoid Disturbance to Breeding Colonies of Tricolored Blackbird

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
				MM BIO-8: Avoid Disturbance to Nesting Raptors and Other Migratory Birds **MM BIO-9:** Avoid Disturbance to Breeding San Joaquin Fox **MM BIO-10**: Install Exclusion Fencing for Environmentally Sensitive Areas
BIO-4: Potential to have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	LTS/M	LTS/M	NI	**MM BIO-2:** Pre-Construction Worker Environmental Awareness Program Training (Biological Resources) **MM BIO-10**: Install Exclusion Fencing for Environmentally Sensitive Areas **MM BIO-12:** Avoid and Reduce Disturbance to WOTUS, Other WOTUS, and/or WOTS **MM GEO-1:** Prepare an Erosion Control Plan and Stormwater Pollution Prevention Plan
BIO-5: Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.	LTS	LTS	NI	None Required
3.5 Cultural and Tribal Resources				
CUL-1: Potential to cause a substantial adverse change in the significance of a historical resource as defined in §15064.5.	LTS/M	LTS/M	LTS/M	**MM CUL-1:** California Environmental Quality Act-Level Cultural Resource Study for Proposed Projects **MM CUL-2**: Evaluation of Cultural Resources and Treatment of Cultural Resources if Found Eligible for the California Register of Historical Resources **MM CUL-3:** Proper Handling of Inadvertent Discovery of Cultural and Tribal Cultural Resources **MM CUL-5:** Worker Environmental Awareness Program (Cultural Resources)
CUL-2: Potential to cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.	LTS/M	LTS/M	LTS/M	**MM CUL-1:** California Environmental Quality Act-Level Cultural Resource Study for Proposed Projects

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
				MM CUL-2: Evaluation of Cultural Resources and Treatment of Cultural Resources if Found Eligible for the California Register of Historical Resources **MM CUL-3:** Proper Handling of Inadvertent Discovery of Cultural and Tribal Cultural Resources **MM CUL-5:** Worker Environmental Awareness Program (Cultural Resources)
CUL-3: Potential to disturb human remains, including those interred outside of formal cemeteries.	LTS/M	LTS/M	LTS/M	**MM CUL-4:** Proper Handling of Inadvertent Discovery of Human Remains
CUL-4: Potential to cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is 1) listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in PRC Section 5020.1(k); or 2) a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1.	LTS/M	LTS/M	LTS/M	**MM CUL-1:** California Environmental Quality Act-Level Cultural Resource Study for Proposed Projects **MM CUL-3:** Proper Handling of Inadvertent Discovery of Cultural and Tribal Cultural Resources **MM CUL-5:** Worker Environmental Awareness Program (Cultural Resources)
3.6 Geology, Soils, and Minerals				
GEO-1: Potential to directly or indirectly expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: 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 as defined by the Division of Mines	LTS	LTS	LTS	None Required

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
and Geology Special Publication 42 or strong seismic ground shaking; Seismic-related ground failure, including liquefaction; or Landslides.				
GEO-2: Potential to result in substantial soil erosion or the loss of topsoil.	LTS/M	LTS/M	LTS/M	**MM GEO-1:** Prepare an Erosion Control Plan and Stormwater Pollution Prevention Plan
GEO-3: Potential to 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 offsite landslide, lateral spreading, subsidence, liquefaction or collapse.	LTS	LTS	LTS	None Required
GEO-4: Potential to be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.	LTS	LTS	LTS	None Required
GEO-5: Potential to have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	NI	NI	NI	None Required
GEO-6: Potential to directly or indirectly destroy a unique paleontological resources or site or unique geologic feature.	LTS/M	LTS/M	LTS/M	**MM GEO-2:** Pre-Construction Worker Environmental Awareness Training (Paleontological Resources) **MM GEO-3:** Proper Handling of the Unanticipated Discovery of Paleontological Resources or Unique Geologic Features
GEO-7: Potential to 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.	NI	NI	NI	None Required
GEO-8: Potential to result in the loss of availability of a local-important mineral resource recovery site delineated on a local General Plan, specific plan or other land use plan.	NI	NI	NI	None Required
3.7 Greenhouse Gases and Energy Resources				

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
GHG-1: Generate greenhouse gas emissions, either directly, or indirectly, that may have a significant impact on the environment.	LTS	LTS	LTS	None Required
GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing the emissions of greenhouse gases.	LTS	LTS	LTS	None Required
GHG-3: Result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	LTS	LTS	LTS	None Required
GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	LTS	LTS	None Required
3.8 Hazards, Hazardous Materials, and Wildfires				
HAZ-1: Potential to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LTS	LTS	LTS	**MM HYD-1:** Avoid/Minimize Potential Impacts from Construction Material Release **MM HAZ-1:** Prepare and Implement a Hazardous Materials Release Prevention Plan
HAZ-2: Potential to 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.	LTS/M	LTS/M	LTS/M	**MM AIR-2:** Implement Hazardous Materials Measures **MM HYD-1:** Avoid/Minimize Potential Impacts from Construction Material Release **MM HAZ-1:** Prepare and Implement a Hazardous Materials Release Prevention Plan **MM HAZ-2**: Worker Environmental Awareness Program (Hazards)
HAZ-3: Potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LTS/M	NI	NI	**MM AIR-2:** Implement Hazardous Materials Measures **MM AIR-3**: Minimize Construction Emissions
HAZ-4: Potential to 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.	LTS/M	LTS/M	NI	**MM HAZ-3:** Updated Active Cortese List Site Identification and Hazardous Site Remediation

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
HAZ-5: Potential to be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public or private airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the Project area.	LTS/M	LTS/M	LTS	**MM AIR-2:** Implement Hazardous Materials Measures **MM HAZ-4:** Coordination with Airports
HAZ-6: Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LTS/M	LTS/M	LTS	**MM TRA-1:** Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan
HAZ-7: Potential to expose people or structures either directly or indirectly, to a significant loss, injury or death involving wildland fires.	LTS	LTS	LTS	None Required
HAZ-8: If located in or near a state responsibility area or lands classified as very high fire hazard severity zones: Impair an adopted emergency response plan or emergency evacuation plan; Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or Expose people or structures to significant risks, including downslope downstream flooding or landslides, as a result of, runoff, post-fire slope stability, or drainage change.	LTS	LTS	LTS	None Required
3.9 Hydrology and Water Quality				
HYD-1: Violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.	LTS/M	LTS/M	LTS/M	**MM HYD-1:** Avoid/Minimize Potential Impacts from Construction Material Release **MM HYD-2:** Construction Dewatering Management Plan

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
				MM GEO-1: Prepare an Erosion Control Plan and Stormwater Pollution Prevention Plan
HYD-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	LTS/M	LTS/M	LTS/M	**MM HYD-2:** Construction Dewatering Management Plan
HYD-3: Potential to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner which would: Result in substantial erosion or siltation on- or offsite; Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or Impede or redirect flood flows.	LTS/M	LTS/M	LTS/M	**MM HYD-1:** Avoid/Minimize Potential Impacts from Construction Material Release **MM GEO-1:** Prepare an Erosion Control Plan and Stormwater Pollution Prevention Plan
HYD-4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.	LTS	LTS	LTS	None Required
HYD-5: Potential to conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	LTS	LTS	LTS	None Required
3.10 Land Use and Planning				
LAND-1: Potential to physically divide an established community.	NI	NI	NI	None Required
LAND-2: Potential to cause a significant environmental impact due to a conflict with any land use, plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	NI	NI	NI	None Required
3.11 Noise and Vibrations				

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
NOS-1: Potential to generate 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 or other agencies.	LTS/M	LTS/M	LTS/M	**MM NOS-1:** Noise and Vibration Reduction Measures **MM NOS-2:** Notification and Coordination with Noise-Sensitive Receptors **MM NOS-3:** Implement Standards for Noise Reduction of Pump Stations
NOS-2: Potential to generate excessive groundborne vibration or groundborne noise levels.	LTS/M	LTS/M	LTS	**MM NOS-1:** Noise and Vibration Reduction Measures **MM NOS-2:** Notification and Coordination with Noise-Sensitive Receptors
3.12 Population and Housing				
POP-1: Potential to induce substantial unplanned population 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).	LTS	LTS	LTS	None Required
POP-2: Potential to displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.	NI	NI	NI	None Required
3.13 Public Services and Utilities				
PUB-1: Potential to 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: Fire protection; Police protection; Schools; Parks; or Other public facilities	NI	NI	NI	None Required
PUB-2: Potential to require or result in the relocation or construction of new or expanded water,	LTS	LTS	LTS	None Required

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
wastewater, or stormwater drainage, electrical power, natural gas, or telecommunications facilities or expansion of existing facilities, the construction or relocation of which could cause significant environmental effects.				
PUB-3: Potential to have sufficient water supply to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	LTS	LTS	LTS	None Required
PUB-4: Potential to 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.	LTS	LTS	LTS	None Required
PUB-5: Potential to generate waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LTS	LTS	LTS	None Required
PUB-6: Potential to comply with federal, state, and local management and reduction statutes and regulations related to solid waste.	LTS	LTS	LTS	None Required
3.14 Recreation				
REC-1: Potential to 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; or include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	NI	NI	NI	None Required
3.15: Transportation and Traffic				
TRA-1: Potential to conflict with a program plan, ordinance, or policy, addressing the circulation systems, including transit, roadway, bicycle and pedestrian facilities.	LTS/M	LTS/M	LTS	**MM TRA-1**: Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan **MM TRA-2:** Inform Public and Emergency Service Agencies of Lane Closures and Detours

Environmental Impact	Finding			Mitigation Measure (MM)
	Overall Program	New Trunk Sewer Infrastructure Projects	WWTF Expansion Projects	
TRA-2: Potential to conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).	LTS	LTS	LTS	None Required
TRA-3: Potential to substantially increase hazards due to a geometric design feature (e.g. sharp curves or dangerous intersection(s) or incompatible uses (e.g. farm equipment)).	LTS/M	LTS/M	LTS/M	**MM TRA-1**: Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan
TRA-4: Potential to result in inadequate emergency access.	LTS/M	LTS/M	LTS/M	**MM TRA-1**: Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan **MM TRA-2:** Inform Public and Emergency Service Agencies of Lane Closures and Detours

Notes:
NI = No Impact
LTS = Less-than-Significant
LTS/M = Less-than-Significant with Mitigation

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Acronyms / Abbreviations

°F	Degrees Fahrenheit
2017 WCSMP	2017 Wastewater Collection System Master Plan
2018 Basin Plan	2018 Water Quality Control Plan for the Sacramento and San Joaquin River Basins
2022 WCSMP	2022 Wastewater Collection System Master Plan
2030 General Plan	City of Merced 2030 General Plan
2030 General Plan	City of Merced Vision 2030 General Plan
AB	Assembly Bill
AC	Asbestos Cement
ac	acre
ADWF	average dry weather flow
af	acre-feet
AMP	Archaeological Monitoring Plan
AMSL	Above Mean Sea Level
AP Act	Alquist-Priolo Fault Zoning Act
APCO	Air Pollution Control Officer
AQP	Air Quality Plan
ATCM	Airborne Toxic Control Measures
BACT	Best Available Control Technologies
BAT	Best Available Technology
BAU	Business-As-Usual
BCC	Birds of Conservation Concern
BERD	Built Environment Resource Directory
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
BNSF	Burlington Northern/Santa Fe
BP	Before Present
BPS	Best Performance Standards
BRPS	Bellevue Ranch Pump Station
BSA	Biological Study Area
C2H3Cl	Vinyl Chloride
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAL EMA	California Emergency Management Agency
CAL EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimate Model
Caltrans	California Department of Transportation
CALVEG	Classification and Assessment with Landsat of Visible Ecological Groupings

CAP	Climate Action Plan
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCIC	Central California Information Center
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFC	California Fire Code
CFR	Code of Federal Regulations
CGC	California Government Code
CGS	California Geological Survey
CH_4	Methane
CHRIS	California Historical Resources Information Systems
CIP	capital improvement project
City	City of Merced
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	Carbon Dioxide
County	Merced County
COWCA	California Oak Woodland Conservation Act
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CTS	California tiger salamander
CUPA	Certified Unified Program Agency
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CWC	California Water Code
dB	Decibel
dBA	Decibel A-Weighted
DBH	Diameter at Breast Height
DCH	Designated Critical Habitat
DEIR	Draft Environmental Impact Report
DOC	California Department of Conservation
DOSH	Division of Occupational Safety and Health
DPM	Diesel Particulate Matter
DTSC	California Department of Toxic Substances Control

DWR	Department of Water Resources
EDU	equivalent dwelling unit
EIA	U.S. Energy Information Administration
EIR	Environmental Impact Report
EO	Executive Order
EPCA	Energy Policy and Conservation Act
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FCAA	Federal Clean Air Act
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FGC	California Fish and Game Code
FHWA	Federal Highway Administration
FIRMs	Flood Rate Insurance Maps
FMMP	Farmland Mapping and Monitoring Program
FRAP	Fire and Resources Assessment Program
FTA	Federal Transit Administration
g	Percent of acceleration of gravity
GAMAQI	Guidance for Assessing and Mitigating Air Quality Impacts
General Permit	General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GPM	Gallons Per Minute
GSA	Groundwater Sustainability Agencies
GSP	Groundwater Sustainability Plan
GWh	Gigawatt-Hour
GWMP	Groundwater Management Plan
H_2S	Hydrogen Sulfide
H59PS	Highway 59 Pump Station
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAP	Hazardous Air Pollutants
HCP	Habitat Conservation Plan
HDD	Horizontal Directional Drilling
HFCs	Hydrofluorocarbons
HMRP	Hazardous Materials Release and Prevention Plan
HP	Horsepower
HRER	Historical Resource Evaluation Report
IBC	International Building Code

IRWMP	Integrated Regional Water Management Plan
ISR	Indirect Source Review
ITP	Incidental Take Permit
kV	Kilovolt
kWh	Kilowatt Hours
L	sound level
LAFCO	Local Agency Formation Commission
lbs/day	pounds per day
LCFS	Low Carbon Fuel Standard
Ldn	Day/Night Noise Level
Leq	Equivalent Noise Level
Lmax	maximum A-weighted noise level
Lmin	minimum A-weighted noise level
LOS	Level of Service
LSAA	Lake and Streambed Alternation Agreement
LTS	Less-than-Significant
LTS/M	Less-than-Significant with Mitigation
LUST	Leaking Underground Storage Tank
MAGPI	Merced Area Groundwater Pool Interests
MBTA	Migratory Bird Treaty Act
MCAG	Merced County Association of Governments
MCV	Manual of California Vegetation
mg/L	milligrams per liter
mg/m^3	Milligrams per cubic meter
Mgal/d	Million Gallons Per Day
MID	Merced Irrigation District
MLD	Most Likely Descendant
MM	Mitigation Measure
MMTCO2e	Million Metric Tons of Carbon Dioxide Equivalent
MRZ	Mineral Resource Zone
MTCO2e	Metric Tons of Carbon Dioxide Equivalent
MWh	Megawatt-Hour
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NEHRP	National Earthquake Hazards Reduction Program
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NI	No Impact
NMFS	National Marine Fisheries Service
NO	Nitric Oxide

NO_2	Nitrogen Dioxide
NOA	Notice of Availability
NOC	Notice of Completion
NOP	Notice of Preparation
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NVC	National Vegetation Classification
NWI	National Wetland Inventory
O&M	operation and maintenance
OEHHA	Office of Environmental Health Hazards Assessment
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
Pb	Lead
PFCs	Perfluorinated Chemicals
PG&E	Pacific Gas and Electric Company
PM	Particulate Matter
PM10	respirable particulate matter
PM2.5	fine particulate matter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PPM	Parts Per Million
PPV	Peak Particle Velocity
PRC	Public Resources Code
RACT	Reasonably Available Control Technology
RCNM	Roadway Construction Noise Model
RCRA	Resources Conservation and Recovery Act
RDEIR	Recirculated Draft Environmental Impact Report
ROG	Reactive Organic Gases
ROW	Right-Of-Way
RPS	Renewables Portfolio Standard
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCB	Regional Water Quality Control Board
SAFE	Safer Affordable Fuel-Efficient
SB	Senate Bill
SB	Senate Bill
SCH	State Clearinghouse
SGMA	Sustainable Groundwater Management Ac
SIP	State Implementation Plan
SJKF	San Joaquin Kit Fox
SJVAB	San Joaquin Valley Air Basin

SJVAPCD	San Joaquin Valley Air Pollution Control District
SJVB	San Joaquin Valley Blueprint
SLCP	Short-Lived Climate Pollutant
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SO2	Sulfur Dioxide
SOC	Statement of Overriding Considerations
SOI	Sphere of Influence
SPCC	Spill Prevention, Control, and Countermeasure
SPCP	Spill Prevention and Contingency Plan
SR	State Route
SRA	State Responsibility Area
SSC	Species of Special Concern
Standards	Standards for the Treatment of Historic Properties
Stantec	Stantec Consulting Services Inc.
SUDP/SOI	Specific Urban Development Plan/Sphere of Influence
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TCR	Tribal Cultural Resource
TPD	Tons Per Day
TPZ	Timberland Production Zone
U.S.	United States
UBC	Uniform Building Code
UC	University of California
UC Merced	University of California, Merced
UFC	Uniform Fire Code
Unified Program	Unified Hazardous Waste and Hazardous materials Management Regulatory Program
UPRR	Union Pacific Railroad
USACE	United States Army Corp Of Engineers
USC	United States Code
USDA	United States Department of Agricultural
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
UV	ultraviolet
UWMP	Urban Water Management Plan
VdB	Vibration Decibels
VDE	Visible Dust Emissions

VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WCSMP	Wastewater Collection System Master Plan
WDR	Waste Discharge Requirement
WEAP	Worker Environmental Awareness Program
Williamson Act	California Land Conservation Act
WOTS	Waters of the State
WOTUS	Waters of the United States
WWTF	Wastewater Treatment Facility
WWTRF	Wastewater Treatment and Reclamation Facility
µg/m3	Microgram per cubic meter

1.0 INTRODUCTION

1.1 ENVIRONMENTAL REVIEW PROCESS

The CEQA (codified in Title 14 California Code of Regulations [CCR] Chapter 3 Section 15000 et seq. [the CEQA Guidelines] and California Public Resources Code [PRC] 21000 et seq.) requires public agencies to identify, disclose, and consider the potential environmental impacts of proposed discretionary actions that the agencies are considering for approval. When a project may have significant environmental impacts, the lead agency must prepare an Environmental Impact Report (EIR) and certify its adequacy before it considers whether to approve the project. A project that may have a significant impact on the environment cannot be approved unless the lead agency adopts mitigation measures that would reduce that impact to a less-than-significant level if feasible. If the impact would remain significant after mitigation (significant and unavoidable), the lead agency is still required to mitigate the impact to the extent feasible. An EIR is an informational document used for this purpose in state, regional, and local planning and decision-making processes to disclose potential environmental effects.

The City of Merced (City) is recirculating the Draft Environmental Impact Report (DEIR) prepared for the City of Merced's Wastewater Collection System (Sewer) Master Plan Project (Project) proposed by the City's Engineering Department (hereby referred to as the "Applicant"). The DEIR was originally circulated for public review on September 15, 2020 and the public review and comment period lasted until October 29, 2020. The City received a large number of public comments on the DEIR and made substantive changes to the Project. These comments are described in detail in **Section 1.1.1**. In accordance with Section 15088.5 of the CEQA Guidelines, the City has determined that the changes to the Project merits recirculation of the DEIR.

This chapter provides background on the comments received and the reasons for the recirculation; as well as public review of the Recirculated DEIR (RDEIR) and the CEQA process going forward. The RDEIR will then follow. The RDEIR will be circulated for 45 days until April 15, 2025. After reviewing these comments, the City will prepare a final EIR (FEIR). The FEIR will respond to comments received during the recirculation period that relate to the RDEIR. The FEIR will not include responses to comments received during the initial comment circulation period of the Notice of Preparation (NOP) or previous DEIR. As required under Section 15090 of the CEQA Guidelines, prior to approval, the City shall certify that the: the FEIR complies with CEQA; it has reviewed and considered the information contained in the FEIR before making their decision; and document that the FEIR reflects the City's independent judgment and analysis.

1.1.1 Lead Agency Determination

The City is designated as the lead agency for preparing this EIR. CEQA Guidelines Section 15367 defines the lead agency as, "... the public agency, which has the principal responsibility for carrying out or approving a project." Other public agencies may use this document in their decision-making or permit processes related to the undertaking proposed by the City. These agencies are considered Responsible Agencies under CEQA.

This RDEIR was prepared for the City by Stantec Consulting Services Inc. (Stantec), an independent environmental consultant. Prior to public review, this RDEIR was extensively reviewed and evaluated by City staff and, as such, this RDEIR reflects the independent judgment and analysis of City staff. A list of report preparation personnel is provided in Section 6.0.

1.1.2 Comments Received on the DEIR

In accordance with the CEQA Guidelines, the City distributed the DEIR on September 15, 2020, and gave the public an opportunity to provide comments on the DEIR. Eight comment letters were received in response to the DEIR. They are listed in **Table 1.1** and provided in Appendix A of this RDEIR.

Table 1.1: DEIR Comment Letter Summary

Date	Commenter	Affiliation	Summary	Relevant DEIR Section Related to Concern(s)
10/12/2020	Andrea Buckley, Environmental Services and Land Management Branch Chief	Central Valley Flood Protection Board	Project may require encroachment permit application and/or other federal, state, and local permits may be required and are the Applicant's responsibility to obtain.	Project Description; Hydrology
10/28/2020	Julie Vance, Regional Manager	California Department of Fish and Wildlife	Expressed concerns over many special status species that may be impacted as a result of the Project's ground-disturbing activities.	Biological Resources
10/29/2020	Arnaud Marjollet, Director of Permit Services	San Joaquin Air Pollution Control District	Project is under jurisdiction and may require permitting for emissions sources.	Air Quality; Greenhouse Gas and Energy
10/29/2020	Sheng Xiong, Jovana Morales-Tilgren, Crisantema Gallardo, Blanca Ojeda, Jesse Ornelas	Leadership Council for Justice and Applicability, 99 Rootz, Faith in the Valley – Merced, Youth Leadership Institute	Expressed concerns regarding the need to analyze service deficiencies for those residing in disadvantage communities.	Project Description
10/23/2020	Stephen Peck, Project Manager	Peck Planning and Development, LLC	Expressed concerns regarding how the DEIR did not identify and discuss feasible mitigation measures and reasonable alternatives.	Project Description; Alternatives
10/26/2020	John Kinsey, Attorney at Law	Wagner Jones Helsley	Requesting special notice of actions proposed to be taken by the City regarding the DEIR.	N/A

Date	Commenter	Affiliation	Summary	Relevant DEIR Section Related to Concern(s)
10/29/2020	William (Bill) Lyons	Mape's Ranch and Lyons' Investments	Expressed concerns with DEIR failing to acknowledge appropriate future industrial development of University Industrial Park and notices of any public works to interested parties.	Project Description; Utilities and Service Systems
11/10/2020	William Nicholson, Executive Officer	Merced Local Agency Formation Commission	Confirms Project Description.	Project Description

1.1.3 Reasoning for Recirculating DEIR

Under Section 15088.5 of the CEQA Guidelines, "A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under Section 15087 but before certification" (Section 15088.5[a]). Section 15088.5(a) of the CEQA Guidelines provides the following examples of "significant new information" requiring recirculation:

1. A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
2. A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
3. A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.
4. The draft EIR was so fundamentally flawed and basically inadequate and conclusory in nature that meaningful public review and comment were precluded (Mountain Lion Coalition v. Fish and Game Com. (1989) 214 Cal.App. 3d 1043).

Section 15088.5(b) clarifies that "Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR." Finally, Section 15088.5(c) states that "If the revision is limited to a few chapters or portions of the EIR, the lead agency need only recirculate the chapters or portions that have been modified."

The analysis included in **Chapter 3.0** focuses on the specific environmental resource topics that require further evaluation to determine if they would have a potential impact. As summarized in **Table 1-1**, comments received during the scoping process were taken into consideration in development of this RDEIR and were used to focus and refine impact analyses. Potential impacts and thresholds of significance were established by the City based on comments received, a comparison with the CEQA Guidelines Appendix G checklist, and resource-specific policy guidance and available scientific information.

In accordance with the CEQA Guidelines, the City distributed a NOP of a DEIR on September 9, 2018, and gave the public an opportunity to provide comments on the scope of the analysis that should be included in this RDEIR. A public scoping meeting was held at the Merced Civic Center on July 24, 2018, and the public scoping comment period closed on August 7, 2018. The resource areas addressed in this RDEIR are those identified in the 2018 NOP. Updates to resource areas after 2018 are not reflected in this RDEIR. Resource areas that were identified to have potential impact based on comments submitted during the scoping process and informed by scientific studies are summarized below:

- Aesthetics and Visual Resources (AES)
- Agricultural and Forest Resources (AG)
- Air Quality (AQ)
- Biological Resources (BIO)
- Cultural and Tribal Cultural Resources (CUL)
- Geology and Soils and Mineral Resources (GEO)
- Greenhouse Gases and Energy Resources (GHG)
- Hazards, Hazardous Materials, and Wildfire (HAZ)
- Hydrology and Water Quality (HYD)
- Land Use and Planning (LAND)
- Noise (NOS)
- Population and Housing (POP)
- Public Services and Utilities and Service Systems (PUB)
- Recreation (REC)
- Transportation (TRA)

1.1.4 Recirculation Process and Public Review of the RDEIR

Section 15088.5(d) of the CEQA Guidelines states that recirculation of an EIR requires notice pursuant to Section 15087, and consultation pursuant to Section 15086. As such, in recirculating of the DEIR herein, the City will follow all public noticing requirements typically required of a DEIR, including notifying responsible agencies, trustee agencies, and other applicable federal, state, and local agencies. This will include posting of the Notice of Availability (NOA) on the Project website; emailing the NOA to individuals on the Proposed Project's email list; and mailing hard copies of the NOA to properties and property owners with properties in proximity to the Project or alternative components. The City will also send a Notice of Completion to the Office of Planning and Research.

1.1.4.1 Submittal of Comments

During the public review period, the RDEIR will be available for review at the City's Planning and Public Works Departments during regular business hours as well as the Merced County Library Main Branch in Merced. The document will be posted on the City's website at:

https://www.cityofmerced.org/departments/engineering/sewer-master-plan/sewer-master-plan

Agencies, organizations, and interested parties will have the opportunity to comment on this RDEIR during the 45-day public review period. All comments concerning the RDEIR **must be in writing either by letter or email** and should be directed to the City's Public Works Director at the following address by the close of the comment period. Please include the commenter's full name and address.

Ken Elwin, PE, City of Merced Public Works Director
1776 Grogan Avenue
Merced, CA 95341
Email: elwink@cityofmerced.org

The public comment period will be identified in the NOA, which will be available on the City's website identified above.

1.1.4.2 Effectively Commenting on the RDEIR

Readers are invited to review and comment on the adequacy and completeness of this RDEIR, particularly in describing the potential impacts, the level of severity, the mitigation measures being proposed to reduce or avoid significant impacts, and the alternatives being considered.

In this regard, CEQA defines "significant effect on the environment" as a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the actions Program or proposed Projects, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance (CEQA Guidelines Section 15382).

"Mitigation" includes actions that would avoid the impact altogether; minimize the impact; rectify by repairing, rehabilitating, or restoring the impacted environment; reduce the impact over time; or compensate for the impact by replacing or providing substitute resources or environments (CEQA Guidelines Section 15370).

The City requests that public comment on this document be limited to the substantive new information in this document to avoid duplication of comments. The City also requests that reviewers limit the scope of their comments to the revised chapters of the RDEIR (CEQA Guidelines Section 15088.5[f][2]). The most effective comments are those that focus on the adequacy and completeness of the environmental analysis and that are supported by factual evidence. Comments that focus on the City's decision to approve or deny an action are not comments on the adequacy of this RDEIR.

1.1.5 Relationship to Other Documents

This RDEIR incorporates by reference the analysis and other information contained in the City's 2022 WCSMP and the previously adopted 2017 WCSMP. The full text of the City's 2022 WCSMP and 2017 WCSMP are available online[9].

The 2022 WCSMP is a planning document that utilizes updated per capita wastewater flow design criteria to create a new model for identifying future build-out improvements. The 2022 WCSMP provides revised sewage generation rates, wastewater master plan updates, a new interim system model, and a summary of recommended build-out improvements, such as the Interim Collection System Improvements (CIPs 1- 6). The 2017 WCSMP itself is a planning document that lays out the general long-range plan for how to develop the City's collection system infrastructure to meet growth and development needs associated with growth projections identified within the 2030 Merced Vision General Plan (2030 General Plan).

Section 15150 of the CEQA Guidelines permits documents of lengthy technical detail to be incorporated by reference in an EIR. Specifically, Section 15150 states that an EIR may "incorporate by reference all or portions of another document which is a matter of public record or is generally available to the public…" Consistent with the CEQA Guidelines and as a way to avoid creating an overwhelming amount of paper

[9] https://www.cityofmerced.org/departments/engineering/sewer-master-plan

for members of the public and decision-makers to sort through, this RDEIR incorporates by reference planning documents that helped define the Program Study Area, 2022 WSCMP modeling, 2017 WSCMP growth projections, Program capacity estimates, and overlapping environmental analysis. The following documents are incorporated into this RDEIR by reference:

- The 2022 WCSMP, February 9, 2023[10]
- The 2017 WCSMP, December 15, 2017 (City of Merced 2017)[11]
- The 2030 General Plan (City of Merced 2012)[12]
- The 2030 General Plan EIR (State Clearinghouse [SCH] No. 2008071069) (City of Merced 2010)[13]
- The 2009 UC Merced 2020 Project Addendum Long-Range Development EIS/EIR (SCH Number 200841009) (University of California 2008)[14]
- The City's Draft and Final Wastewater Treatment Plan Expansion Project EIR (SCH Number 2005101135) August 2006 (City of Merced 2006)[15]
- The 2015 Bellevue Community Plan (City of Merced 2015)[16]
- The 2004 University Community Plan (Merced County 2004)[17]

1.1.6 Final EIR

Upon completion of the public review period, the City will review the comments received, along with the comments submitted on the original DEIR and will prepare written responses to environmental issues raised pursuant to CEQA Guidelines Section 15088, and if necessary, will make any related revisions to the RDEIR. Comments received and the responses to comments will be included as part of the record for consideration by the City in its decision-making process. Responses will be incorporated into the FEIR and provided to any commenting public agencies at least 10 days prior to certification of the EIR (CEQA Guidelines Section 15088(b)). The general process for the preparation and certification of an EIR is described under Section 15096 of the CEQA Guidelines.

Following certification of the FEIR, the City may then consider approval of the action as described in Section 15092 of the CEQA Guidelines, which states that a public agency shall not decide to approve or carry out a project for which an EIR was prepared unless either: (1) the project as approved will not have a significant effect on the environment, or (2) the agency has eliminated or substantially lessened all

[10] https://www.cityofmerced.org/home/showpublisheddocument/20090/638417101675770000
[11] https://www.cityofmerced.org/depts/engineering_division/sewer_master_plan.asp
[12] https://www.cityofmerced.org/departments/development-services/planning-division/merced-vision-2030-general-plan#:~:text=The%20Merced%20Vision%202030%20General%20Plan%20was%20adopted%20on%20January,which%20can%20be%20downloaded%20below
[13] https://www.cityofmerced.org/civicax/filebank/blobdload.aspx?BlobID=9183
[14] https://merced2020.ucmerced.edu/sites/merced2020.ucmerced.edu/files/documents/2020_adeir102708web.pdf
[15] https://www.cityofmerced.org/civicax/filebank/blobdload.aspx?blobid=4782
[16] https://www.cityofmerced.org/Home/ShowDocument?id=8608
[17] http://web2.co.merced.ca.us/pdfs/planning/cplan/completed/university/final_university_community_plan.pdf

significant effects where feasible and made a determination that any remaining significant effects found to be unavoidable are acceptable due to overriding considerations.

If approved by the City, Section 15091 of the CEQA Guidelines requires the City to adopt findings describing how each of the significant impacts identified in the FEIR is being mitigated. The findings will describe the reasons why significant unavoidable impacts, if any, cannot be mitigated. The findings will also describe the City's findings with respect to the alternatives that were analyzed in the FEIR.

If the City decides to approve the action, for any alternative analyzed in the FEIR despite a finding that it would have significant and unavoidable impacts, the City will also adopt a statement of overriding considerations describing the benefits of the action that in the City's judgment outweigh its significant environmental impacts, pursuant to Section 15093 of the CEQA Guidelines. Finally, the City will adopt a Mitigation Monitoring and Reporting Plan as required under Section 15096 (g) and 15097 of the CEQA Guidelines, which describes how it will ensure that the mitigation measures being required will be carried out.

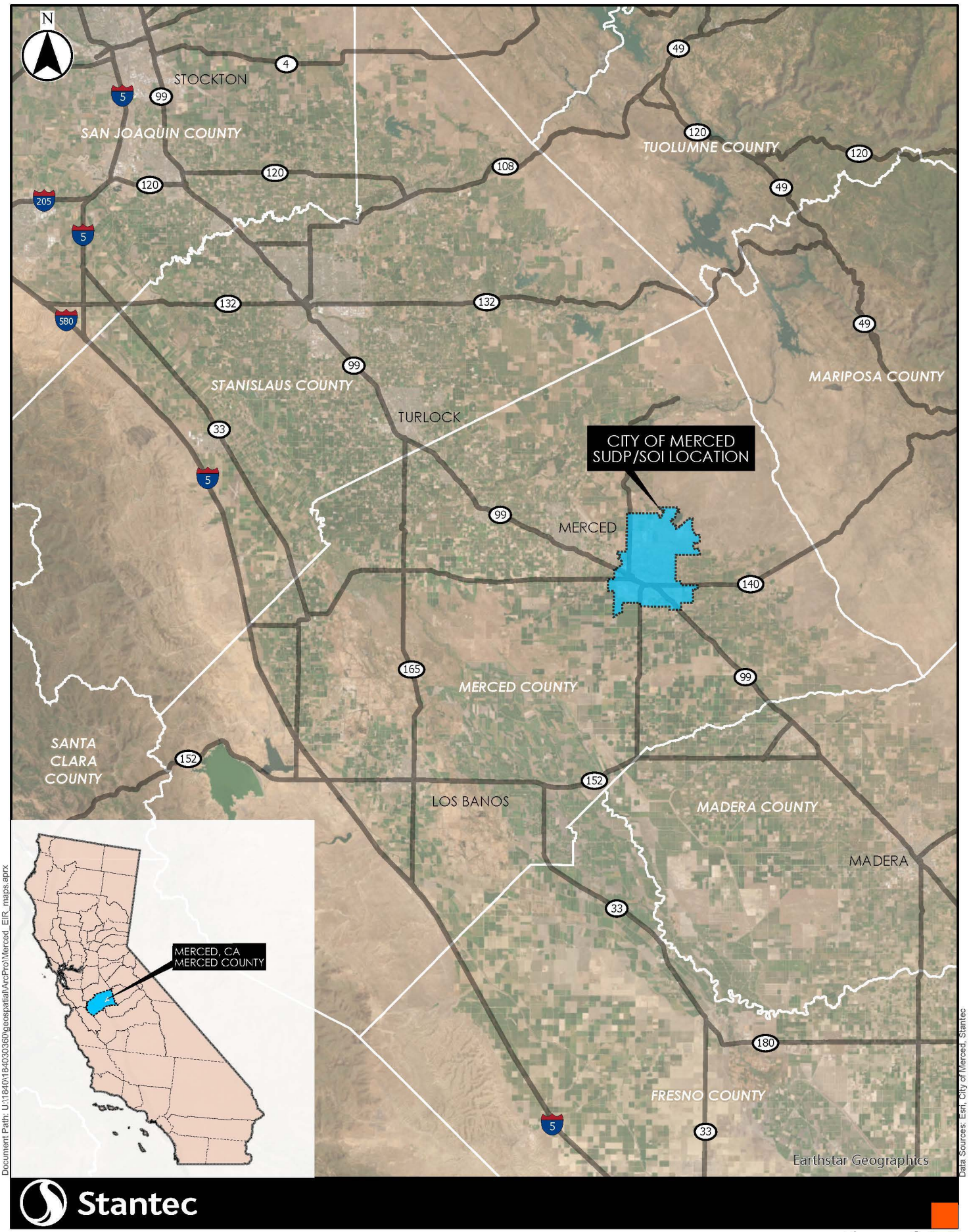
1.2 PERMITS REQUIRED

The following permits may be required prior to the start of construction activities associated with implementation of the proposed Program:

- Section 404 Clean Water Act Permit
- Section 401 Clean Water Act Water Quality Certification
- Section 1602 California Department of Fish and Wildlife Streambed Alteration Agreement
- State Water Resources Control Board Construction General Permit
- Regional Water Quality Control Board Discharge Permit
- San Joaquin Valley Air Pollution Control District Indirect Source Review
- California Department of Transportation Encroachment Permit
- Union Pacific Railroad/Burlington Northern Santa Fe Pipeline or Wire Line Encroachment Permit
- City Encroachment Permit
- Merced County Encroachment Permit

2.0 PROJECT DESCRIPTION

The City is located within California's Central Valley (**Figure 2.1-1**). The City's existing wastewater collection and treatment system serves a population of approximately 91,000 people and includes more than 400 miles of gravity sewers, force mains (pressurized sewer lines), and sewer lift stations that collect and transport wastewater generated by residential, commercial, and industrial uses throughout the City and surrounding areas to the City's Wastewater Treatment Facility (WWTF) in the southwest portion of the City (at 10260 Gove Road, Merced, California 95340). The City's existing sewer trunk system can be categorized into two major geographical service areas, North Merced and South Merced, which are separated largely by Bear Creek, which runs east to west through the City (**Figure 2.1-2**).



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Data Sources: Esri, City of Merced, Stantec

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Figure 2.1-1
Wastewater Collection System Master Plan Program Vicinity

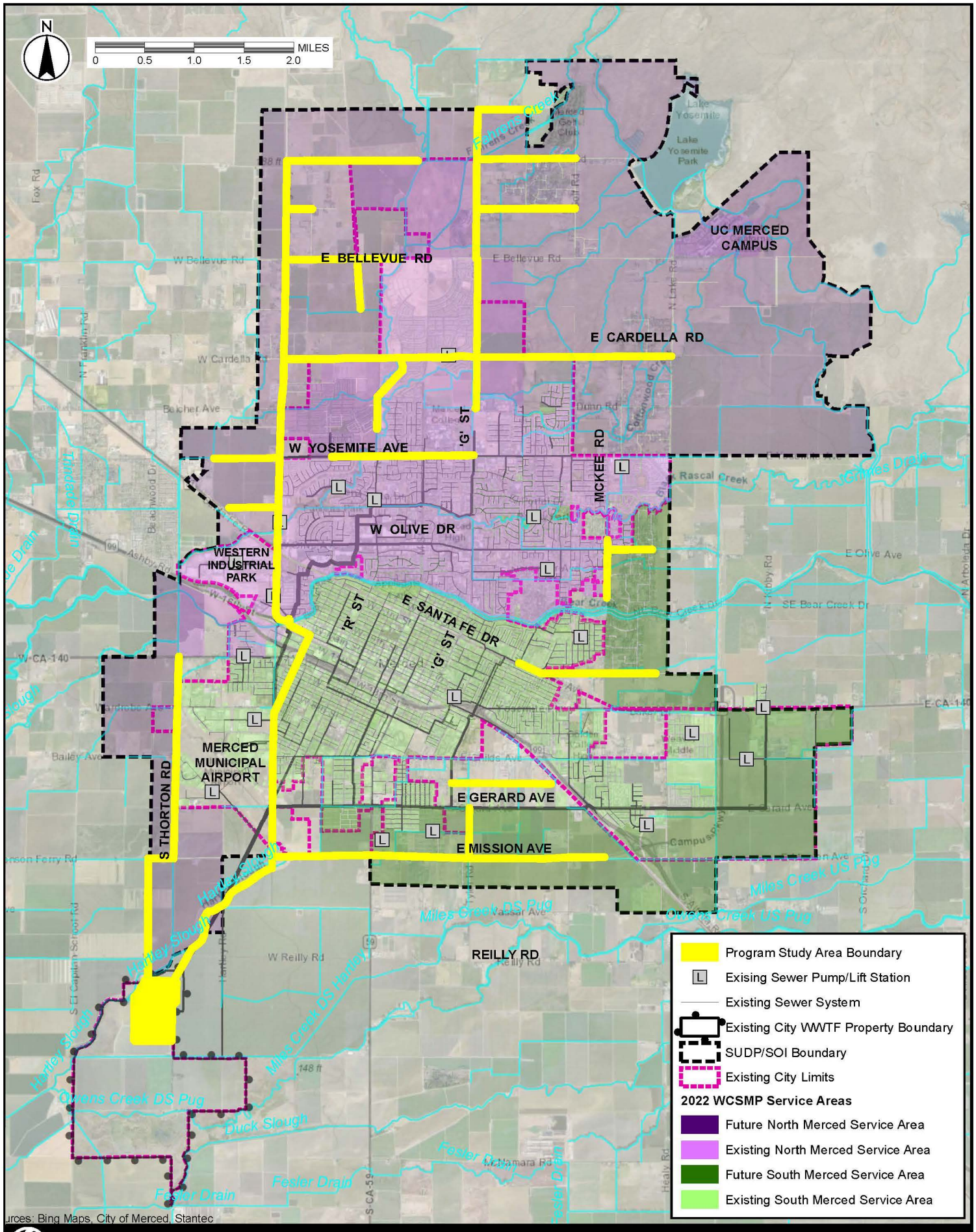

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Figure 2.1-2
2022 WCSMP Service Area

2.1 WCSMP PLANNING PROCESS

2.1.1 Planning Process Overview

The City's Vision 2030 General Plan (2030 General Plan, City of Merced 2012) discusses City growth that may occur by the year 2030. Key infrastructure needs relevant to the 2030 General Plan include the wastewater collection system; wastewater treatment, disposal, and reuse facilities; and various potable and non-potable water needs for the growing areas of the City. Much of this growth requires construction of new infrastructure to be funded by private development projects that would need public services provided by the City. As part of the infrastructure planning associated with accommodating this growth, the City updated the 2017 WCSMP in 2022 using updated per capita wastewater flow design criteria and a new hydraulic model of the wastewater collection system for predicting wastewater peak wet weather flows. The 2022 WCSMP (also referred to the "Program" in this EIR) update set forth a strategy to meet both interim and build-out wastewater collection system needs that are consistent with the 2030 General Plan.

The City's wastewater collection system is planned to serve reasonable build-out within the 2030 General Plan SUDP/SOI boundary. The SUDP/SOI (**Figure 2.1-2)** was established in the 2030 General Plan and encompasses the unincorporated areas surrounding the current City limits where the City anticipates growth to occur. Reasonable build-out conditions for City growth include wastewater flow estimates that are based on the development density assumptions outlined in the 2030 General Plan, current development trends, and professional engineering standards. The build-out scenario would increase the wastewater collection system average dry weather flow (ADWF) capacity to 27.2 million gallons per day (Mgal/d) and service approximately 130,922 equivalent dwelling units (EDUs).

A hydraulic model of the wastewater collection system was developed to identify the best approach for expanding the system to provide adequate service under peak wet weather flow conditions. The 2022 WCSMP outlines a future service area layout that uses available capacity within the existing collection system and allows a phased approach that incorporates both interim and build-out system capacity improvements. The term "interim" in the 2022 WCSMP is used to describe partial build-out of the wastewater collection system to accommodate "entitled" users (developments the City is currently committed to serve). The 2022 WCSMP identifies six Capital Improvement Projects (CIPs 1-6) for interim capacity as well as future components that are needed for the ultimate build-out of the Program (North Merced Major Improvements, South Merced Major Improvements, and Program Minor Improvements).

Like wastewater collection systems, WWTFs are master-planned to serve build-out, but construction of these facilities can be more cost-effective if phased in over time. When properly sited, WWTFs have generous buffers to limit exposure of commercial and residential land uses to objectionable odors, noise, and visual impacts associated with their operation. Additionally, construction activities occurring on WWTF sites do not typically involve significant traffic disruptions like those associated with the construction of trunk sewers and typically result in less exposure of the general public to noise and other potential impacts. So, WWTFs are planned to allow for construction of capacity expansions to keep pace with population growth and take advantage of advances in treatment process technology and consideration of regulatory requirements. Therefore, The 2017 WCSMP considered expansions of the

WWTF to occur over time as the need develops; the 2022 WCSMP maintained these WWTF improvements.

2.2 COLLECTION SYSTEM ASSESSMENT

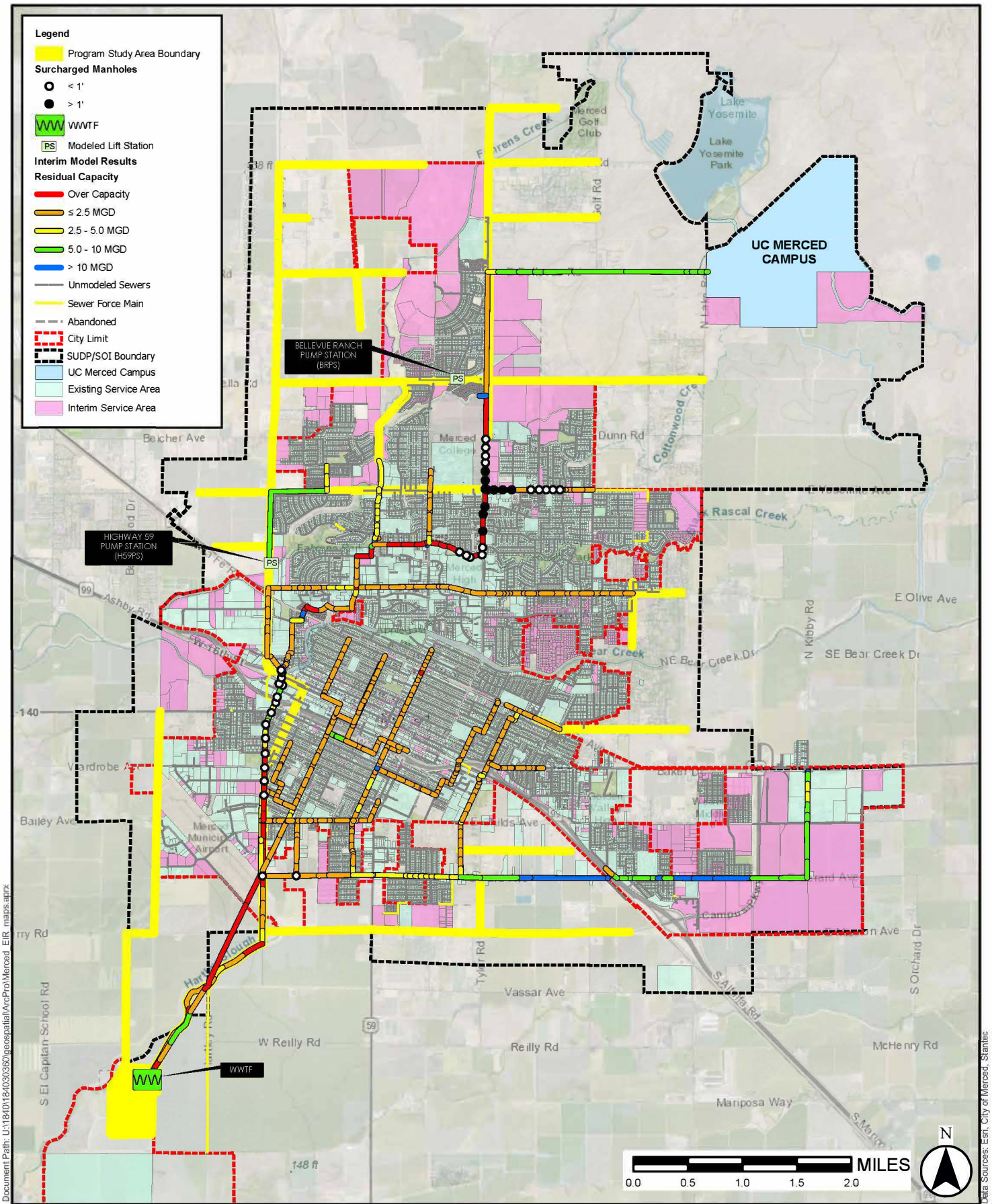
To evaluate the needs of the wastewater collection system for both interim and build-out development stages, a hydraulic model was utilized to pinpoint deficiencies in the current system and predict future land use flow scenarios. The City conducted various modeling scenarios within its wastewater collection system to determine system requirements.

The City developed three scenarios for evaluation (described in more detail in Sections 5.0 and 6.0 of the 2022 WCSMP) to identify areas where the existing wastewater collection system had remaining capacity or was at capacity or over capacity. These are as follows:

- **Existing wastewater collection system conditions** – This scenario simulated the capacity within the existing trunk sewer system using only existing connections producing wastewater flow. Under this scenario, the hydraulic model ADWF is 7.0 Mgal/d. Based on analysis of existing system conditions, as presented in Section 6.2 of the 2022 WCSMP, there is sufficient capacity to serve approximately 33,700 EDUs based on a wastewater generation rate of 208 gpd/EDU.
- **Interim wastewater collection system conditions** – This scenario incorporated the existing conditions but was expanded to include entitled users that are not yet connected to the system but are anticipated to be connected short-term as identified by City staff (i.e., tentative subdivision maps and other entitlements that have been approved and are still active, etc.). Analysis of the interim conditions identified six CIPs that would increase the ADWF capacity to 14.2 Mgal/d and serve approximately 68,330 EDUs. Results of this analysis are presented in Section 6.3 and are shown on Figure 6.2 of the 2022 WCSMP.
- **SUDP/SOI build-out conditions** – This scenario modeled conditions under reasonable build-out of the 2030 General Plan, including build-out of the UC Merced campus, the adjacent campus community, and areas within the SUDP/SOI currently on septic sanitary systems. New pipelines for future trunk sewers and rehabilitation of the Highway 59 Pump Station (H59PS), as described in Section 6.4 and shown on Figures 6-4 and 6-5 of the 2022 WCSMP, were identified to serve the entire SUDP/SOI. The build-out scenario would increase the wastewater collection system ADWF capacity to 27.2 Mgal/d and service approximately 130,922 EDUs.

Based on the results of the modeling for the existing collection system, the hydraulic modeling identified that there were no significant hydraulic deficiencies in the existing system. No significant surcharging was predicted to occur under current peak wet weather flow conditions, as described in the 2022 WCSMP.

However, modeling results for the interim and build-out scenarios identified several system hydraulic deficiencies. The results of the interim wastewater collection system model, illustrated on **Figure 2.2-1**, predicted capacity deficiencies in the following reaches of the trunk system: G Street, Rascal Creek, North Merced West Avenue, and the 48-inch interceptor trunk sewers. The modeling results were then used to identify the Program improvements described in **Section 2.3**.



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Data Sources: Esri, City of Merced, Stantec

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Figure 2.2-1
2022 WCSMP Interim System Needs

2.3 PURPOSE AND OBJECTIVES

The purpose of the Program, as identified in the 2022 WCSMP, is to strategically and comprehensively plan development of the wastewater infrastructure necessary to support reasonable, phased build-out of the SUDP/SOI. Specific objectives of the Program include the following:

1. Construct and maintain safe and reliable wastewater infrastructure and facilities;
2. Meet interim and build-out wastewater collection system needs by constructing the components of the collection system incrementally, in phases;
3. Achieve lower overall life-cycle cost and maintain relatively low costs for sewer service considering upfront costs and anticipated operation and maintenance (O&M) costs over the coming decades;
4. Maintain high water quality and wastewater treatment standards;
5. Reduce or maintain relatively low operational costs and energy demand by selecting gravity systems where feasible;
6. Maintain consistency with the 2030 General Plan;
7. Plan collection system infrastructure that meets reasonable build-out conditions of 27.2 Mgal/d;
8. Minimize land use and environmental impacts;
9. Adhere to federal and state policies and regulations in support of regionalization, reclamation, recycling, and conservation for wastewater treatment plants (such as Central Valley Regional Water Quality Control Board [CVRWQCB] Resolution No. R5-2009-0028) (CVRWQCB 2009); and
10. Use existing publicly owned property, roadways, and right-of-way (ROW) to the extent feasible.

2.4 WCSMP PROGRAM

2.4.1 WCSMP Program Overview

The 2022 WCSMP set forth a roadmap for wastewater collection services, referred to in this Recirculated Draft EIR as the “Program.” The Program represents the City’s preferred approach for building the wastewater collection system infrastructure needed to serve 2030 General Plan growth projections and City forecasts of reasonable build-out conditions.

The Program includes the following components:

Interim Collection System Improvements (CIPs 1–6). CIPs 1–6 have been identified as the first steps of the Program improvements. These projects would give the City the capacity to serve approximately 68,330 EDUs and are sized to also accommodate the reasonable build-out of the SUDP/SOI. The CIPs 1-6will provide capacity for entitled users and some future non-entitled users; these improvements are analyzed at the project-level in this EIR.

North and South Merced Major Improvements. Major system improvements are new trunk sewer extensions that generally include future trunks 18 inches in diameter or larger. These major improvements are included in this EIR as part of the programmatic analysis. A programmatic analysis evaluates the potential environmental effects of future, tentative projects within a planned program (such as the 2022 WCSMP).

Program Minor Improvements. Minor system improvements include smaller collector sewers and extensions to the system. These minor improvements are included in this EIR as part of the programmatic analysis.

WWTF Expansion Projects. The Program would use the City's collection system to route all municipal wastewater to the City's existing WWTF. The existing WWTF would include O&M improvements and be expanded as needed, in 3- to 4-Mgal/d increments to achieve up to 27.2 Mgal/d of ADWF capacity to handle anticipated build-out flows. These WWTF Expansion Projects are included in this EIR as part of the programmatic analysis.

These components are depicted on **Figure 2.4-1.** The EIR analysis evaluates the resources within the Program Study Area Boundary, which encompasses all Program components plus a 200-foot buffer. Construction of the trunk sewers would be required before additional development within the SUDP/SOI is approved, whereas expansion of the WWTF would be done incrementally as demand warrants.

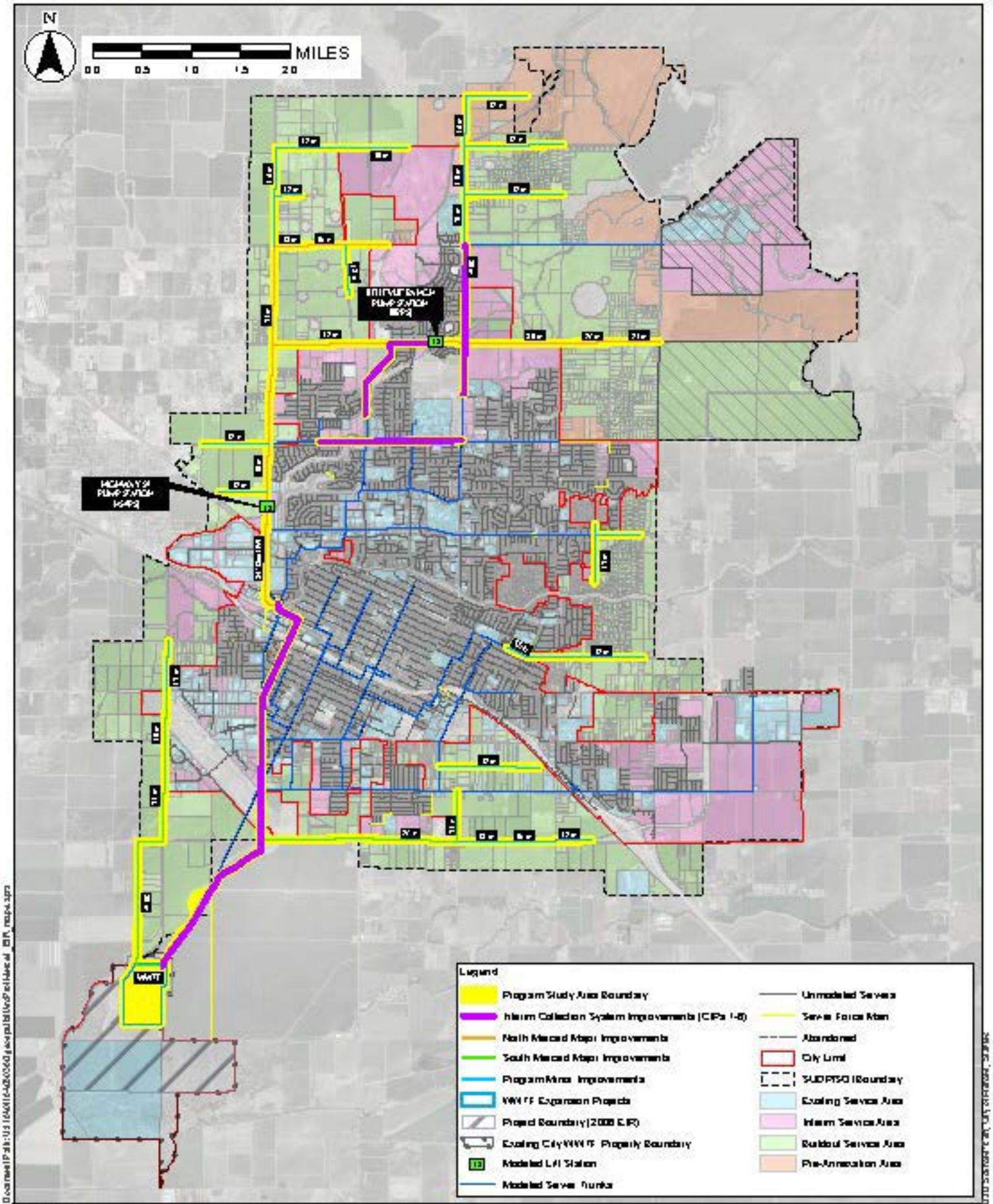

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Figure 2.4-1
Program Overview

2.4.2 Collection System Improvements

The Program includes improvements to the existing wastewater collection system that would be consistent with the 2030 General Plan to serve anticipated growth in north and South Merced. These sewers would maintain gravity flows where feasible. Where infeasible, force main sewers and pump/lift stations would be used.

A **trunk sewer** is a pipeline that receives wastewater from many tributary branches and sewer lines and serves as an outlet for a large territory or is used to feed an intercepting sewer.

New trunk sewers that would serve as the backbone of the City's collection system are needed to meet the future wastewater collection service demands estimated within the SUDP/SOI. Up to 21 miles of new trunk sewer pipeline would be placed within existing or planned roadways, consistent with the 2030 General Plan's Circulation Element. The trunk sewers would be designed to be co-located in existing or planned roads or ROWs.

The Program breaks down the recommended wastewater collection system improvements shown below in **Table 2.1**. This table identifies the name, location, size, length, and type of activities associated with each of these improvements.

Table 2.1: Interim Collection System Improvements

Trunk Feature Name	Location	Pipe Diameter	Approximate Length	Pipeline Type	Common Activities Associated with Component
CIPs 1-6(CIPs 1-6)					
BRPS Discharge (CIP 1)	BRPS – Change existing force main discharge to existing alternative force main discharge.	N/A	N/A	Force Main	Pipeline placement (site preparation, trenching, and dewatering) Grading and compaction Odor control facilities Air blow-off and air release valves Pump station Creek/canal trenchless undercrossing(s) Rail undercrossing(s) Sewer connections Testing/start-up
Parallel Sewer and Bear Creek Crossing (CIP 2)	16th Street from Bear Creek Court (across Bear Creek) to V Street. V Street from 16th Street to West Avenue.	48 inches	1.2 miles	Gravity	
Replace 48-inch Interceptor and West Avenue Sewer (CIPs 3 and 4)	West Avenue from V Street to WWTF.	60 inches	3.1 miles	Gravity	
Yosemite Avenue Sewer Extension (CIP 5)	Yosemite Avenue from G Street to El Redondo Drive.	27 inches	1.5 miles	Gravity	
Parallel G Street Sewer (CIP 6)	G Street from Bellevue Road to Community College Drive.	27 inches	1.5 miles	Gravity	

Trunk Feature Name	Location	Pipe Diameter	Approximate Length	Pipeline Type	Common Activities Associated with Component
North Merced Major Improvements					
H59PS Expansion and Force Main	Highway 59 from the H59PS to N. Bear Creek Drive.	Dual 24 inches	0.9 mile	Force Main	Pipeline placement (site preparation, trenching, and dewatering) Grading and compaction Odor control facilities Air blow-off and air release valves Creek/canal undercrossing(s) Rail undercrossing(s) Sewer connections Testing/start-up
South Highway 59 Trunk	Highway 59 from Cardella Road to the H59PS.	48 inches	1.6 miles	Gravity	
West Cardella Trunk	Cardella Road from G Street to Highway 59.	42 inches	1.9 miles	Gravity	
East Cardella Trunk	Cardella Road from Lake Road to Hatch Road.	24 inches	0.4 mile	Gravity	
	Cardella Road from Hatch Road to Gardner Avenue.	27 inches	0.4 mile	Gravity	
	Cardella Road from Gardner Avenue to G Street.	30 inches	1.2 miles	Gravity	
G Street Extension 1	G Street from Bellevue Road to Portico Drive.	30 inches	0.1 mile	Gravity	
	G Street from Portico Drive other side of canal.	24 inches	0.1 mile	Gravity	
	G Street from canal to Farmland Avenue.	21 inches	0.3 mile	Gravity	
G Street Extension 2	G Street from Farmland Avenue to Old Lake Road.	18 inches	0.5 mile	Gravity	
South Merced Major Improvements					
South Mission Trunk	Mission Avenue/Dickenson Ferry Road from Tyler Road to S. West Avenue.	27 inches	2.0 miles	Gravity	Pipeline placement (site preparation, trenching, and dewatering) Grading and compaction Odor control facilities Air blow-off and air release valves Creek/canal undercrossing(s) Sewer connections Testing/start-up
Gerard Relief Sewer	Tyler Road from Gerard Avenue to E. Mission Avenue.	24 inches	0.5 mile	Gravity	
Gove Road Sewer	Gove Road from Thornton Road to WWTF.	30 inches	1.8 miles	Gravity	May require pump station
Thornton Road Sewer 1	Thornton Road from Bailey Avenue to W. Dickenson Ferry Road.	21 inches	1.0 mile	Gravity	

Trunk Feature Name	Location	Pipe Diameter	Approximate Length	Pipeline Type	Common Activities Associated with Component
	Thornton Road from Wardrobe Avenue to Bailey Avenue.	18 inches	0.5 mile	Gravity	
Program Minor Improvements					
Program Minor Improvements include potential miscellaneous sewer extensions, new sewers, pump stations, and ROWs. While it is difficult to estimate particular development sizes, it is estimated that there would be anywhere from 500 to 5,000 collector pipelines varying in length from a few hundred feet to a few miles to serve the undeveloped areas within the SUDP/SOI at reasonable build-out conditions.					

Notes:
H59PS = Highway 59 Pump Station

Much of the City's existing sewer system uses gravity flow sewers, and the Program was thereby designed with the intent to continue the use of such a system. Where gravity sewers are infeasible, pressure flow sewers (also known as force mains) and pump stations would be used to transport pressurized wastewater from low points back into a gravity-fed system. Trunk sewers would be below ground with maximum depths of approximately 30 feet. For the purposes of this analysis throughout this EIR, a 100-foot-wide construction disturbance corridor on either side of the centerline was assumed around all newly proposed pipeline alignments to accommodate uncertainties or realignment of design (referred to as Program Study Area Boundary); however, a footprint of approximately 10- to 20-foot width is anticipated.

2.4.2.1 Interim Collection System Improvements (CIPs 1 – 6)

The CIPs 1-6listed below are CIPs, which are permanent structural changes to the City's collection system and are needed to meet interim and future wastewater collection service demands estimated within the SUDP/SOI (**Figure 2.4-2**). The following paragraphs describe the components of the CIPs.

CIP 1 – Bellevue Ranch Pump Station Discharge (Figure 2.4-3): Operational modifications to redirect the pump station discharge to R Street.

The BRPS currently uses an interim 14-inch force main that has been designed to pump a peak flow of 1.95 Mgal/d to the G Street trunk. The BRPS also includes a permanent 16-inch force main (already installed) to convey all flow from Bellevue Ranch, crossing Fahrens Creek, to the R Street trunk sewer. The force main to the G Street trunk from the BRPS is planned to be abandoned when the force main capacity is reached. This project does not require any new construction but is the first step for increasing capacity in the existing system. There are some minor system upgrades (e.g., additional valving, etc.) that may be required.

CIP 2 – Parallel Sewer and Bear Creek Crossing (Figure 2.4-4): New 48-inch parallel sewer and creek crossing to expand the capacity of the existing system to convey flow from North Merced. This project addresses capacity constraints identified in the existing Bear Creek sewer crossing and North Merced West Avenue trunk. A new parallel gravity sewer and creek crossing is proposed to expand the capacity of the existing system to convey flow from North Merced. CIP 2 would construct approximately 1.2 miles of 48-inch-diameter sewer required for build-out capacity. The parallel sewer is proposed to be routed along W. 16th Steet and V Street before meeting back with the North Merced West Avenue trunk to avoid

conflicts with existing utilities. Directional drilling will be used to construct the 48-inch-diameter sewer under Bear Creek.

CIPs 3 and 4 – Replace 48-inch Interceptor and West Avenue Sewer (Figure 2.4-5, Figure 2.4-6, and Figure 2.4-7): Replace the existing 48-inch interceptor and 42-inch West Avenue sewers with a new 60-inch trunk sewer.

This project is needed to increase capacity and address the poor physical condition of the sewers. The remaining portion of the 42-inch North Merced West Avenue trunk needs to be upsized to 60 inches along with the 48-inch interceptor to facilitate the conjunction of the new parallel sewer and Bear Creek crossing (described in CIP 2) and existing North Merced West Avenue trunk.

Replacing and expanding the 48-inch interceptor and West Avenue sewer are recommended because of their current deteriorated physical condition and the need for additional capacity to serve future development. The Draft 2007 City of Merced Sewer Master Plan described the age and condition of portions of the West Avenue trunk as “essentially poor”, and the 48-inch interceptor sewer is also known to be in poor condition. These are critical trunks in the existing collection system and will only allow for the servicing of a limited number of entitled or future connections without significant upgrades.

The shallow slope and roughness coefficient[18] of these existing sewers limit the available capacity. Therefore, replacing the 48-inch interceptor with a new sewer pipeline is recommended to provide sufficient capacity for build-out, as opposed to simply lining the sewer, which reduces the pipe’s inner diameter and does not address the risk of pipe collapse due to corrosion.

This project will require the removal and replacement of the existing 48-inch interceptor and 42-inch trunk sewer in West Avenue, downstream of the connection point of CIP 2 and extending to the WWTF. The project will cross the Hartley Slough and Lower Owens Creek as it terminates at the WWTF. The project will construct approximately 3.1 miles of 60-inch sewer. The new 60-inch sewer will tie into the existing junction structure just north of the WWTF headworks[19].

CIP 5 – Yosemite Avenue Extension (Figure 2.4-8): A new 27-inch extension of the Yosemite Avenue sewer from G Street to R Steet and crossing Fahrens Creek to further extend to El Redondo Drive connecting to the H59PS sewer shed to provide additional capacity to serve the City’s sewer service commitments and some of the pre-annexation areas.

This project will construct approximately 1.5 miles of 27-inch sewer along Yosemite Avenue from G Street to the existing manhole at El Redondo Drive. This extension includes crossing Fahren’s Creek and will also include a manhole weir at the intersection of Yosemite Avenue and R Street to ensure that flow does not exceed the reliable pumping capacity of the H59PS. Directional drilling will be used to construct the 27-inch-diameter sewer under Fahren’s Creek.

[18] The Roughness Coefficient is a value used in engineering calculations (i.e., Manning’s formula) to determine energy losses of flowing water due to pipe or channel wall roughness (CSUS 2024).
19 The headworks is the structural component at or toward the head (or beginning) of a reception or diversion (split) point in the system. In “layman’s terms,” it’s the piece in the system which adjusts the flow of wastewater

CIP 6 – Parallel G Street Sewer (Figure 2.4-9): A new parallel 27-inch sewer in G Street from Bellevue Road, crossing Cottonwood Creek, to Community College Drive. This sewer would be tied into the new Cardella Road sewer to provide additional capacity for North Merced under build-out conditions.

Adding a parallel 27-inch sewer in G Street between Bellevue Road and Community College Drive will provide added capacity under interim conditions. This project will construct approximately 1.5 miles of 27-inch sewer. This sewer will connect to the future sewer in Cardella Road under build-out conditions.

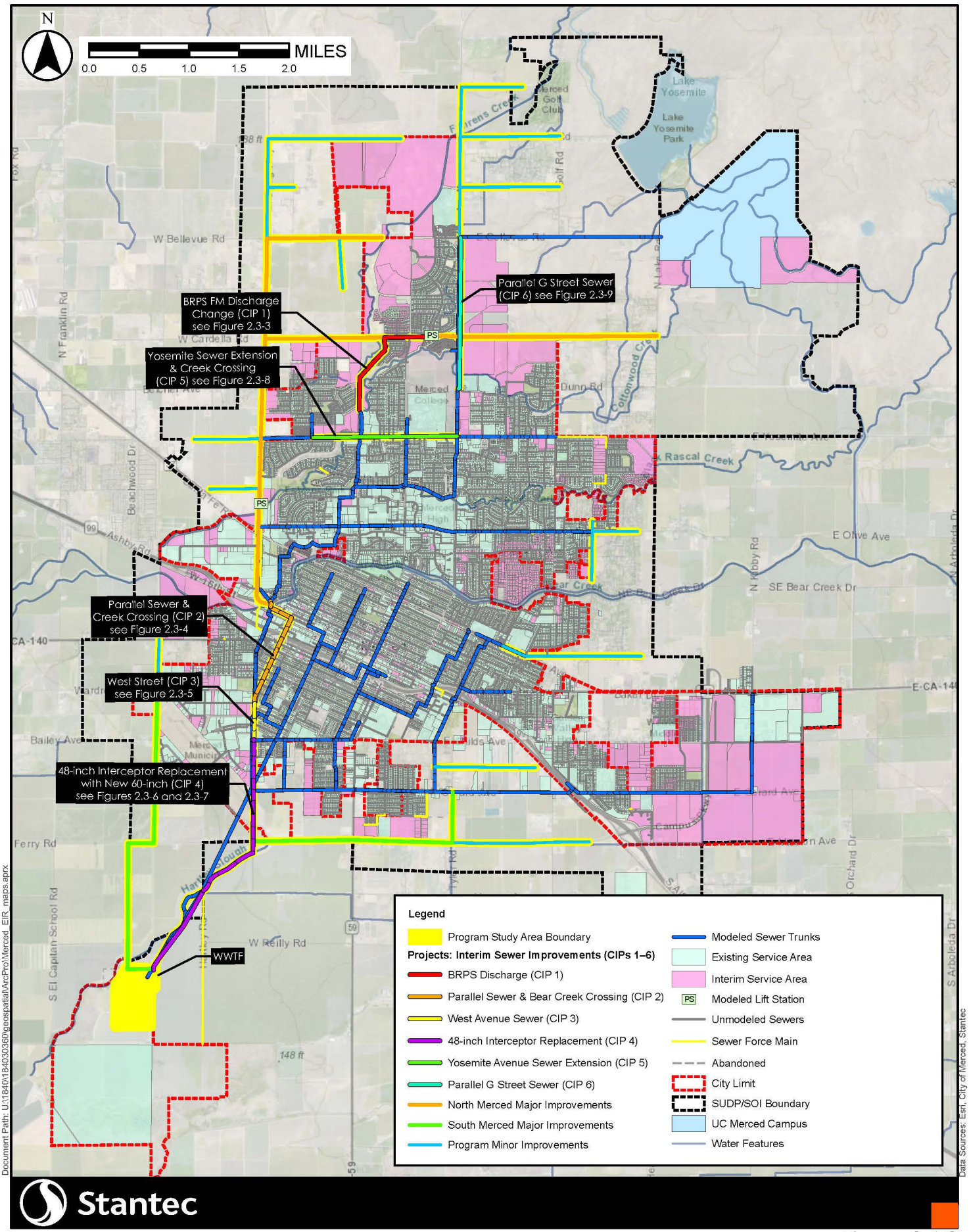

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Figure 2.4-2
Interim Collection System Improvements Key Map

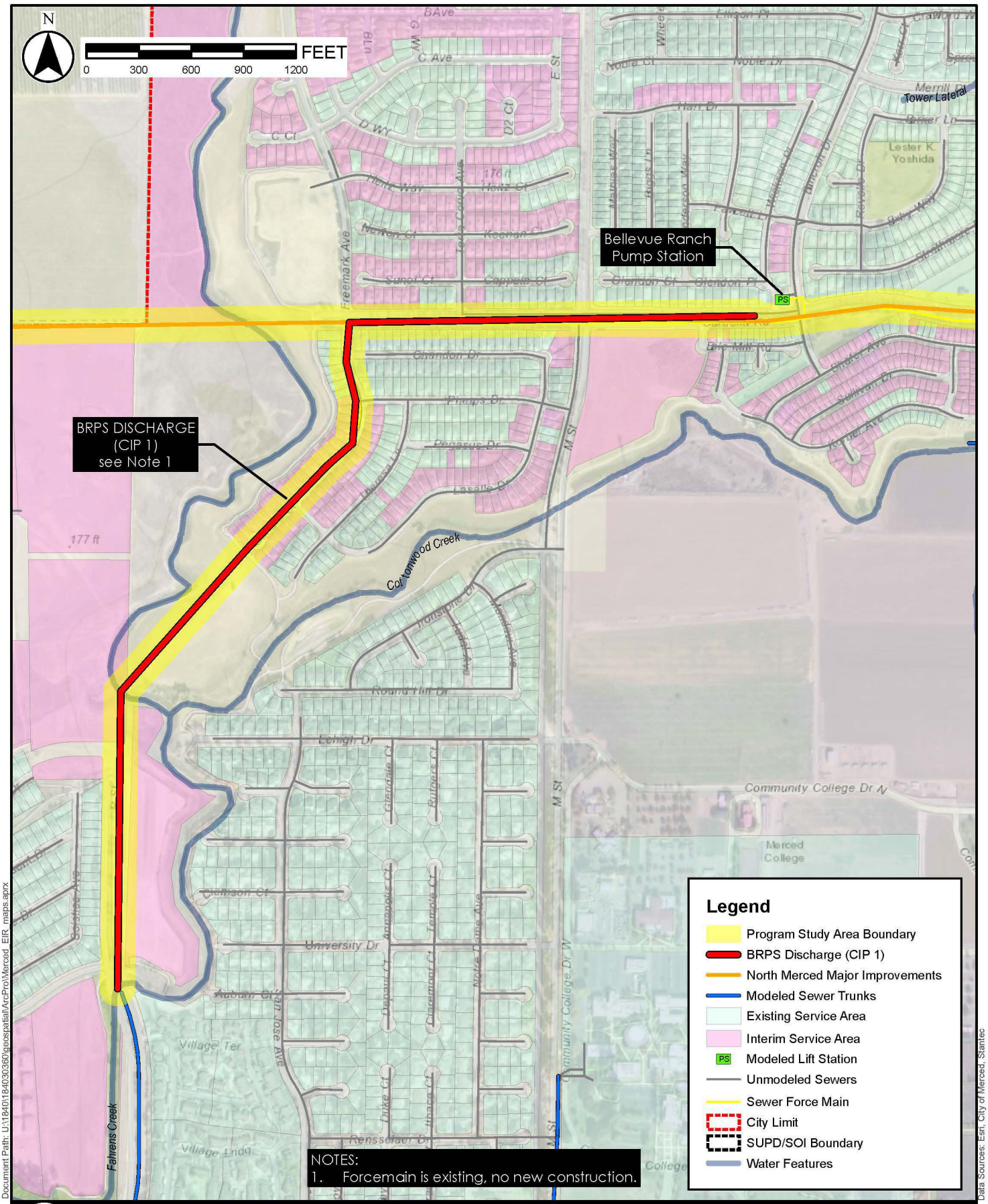

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Figure 2.4-3
Capital Improvement Project 1

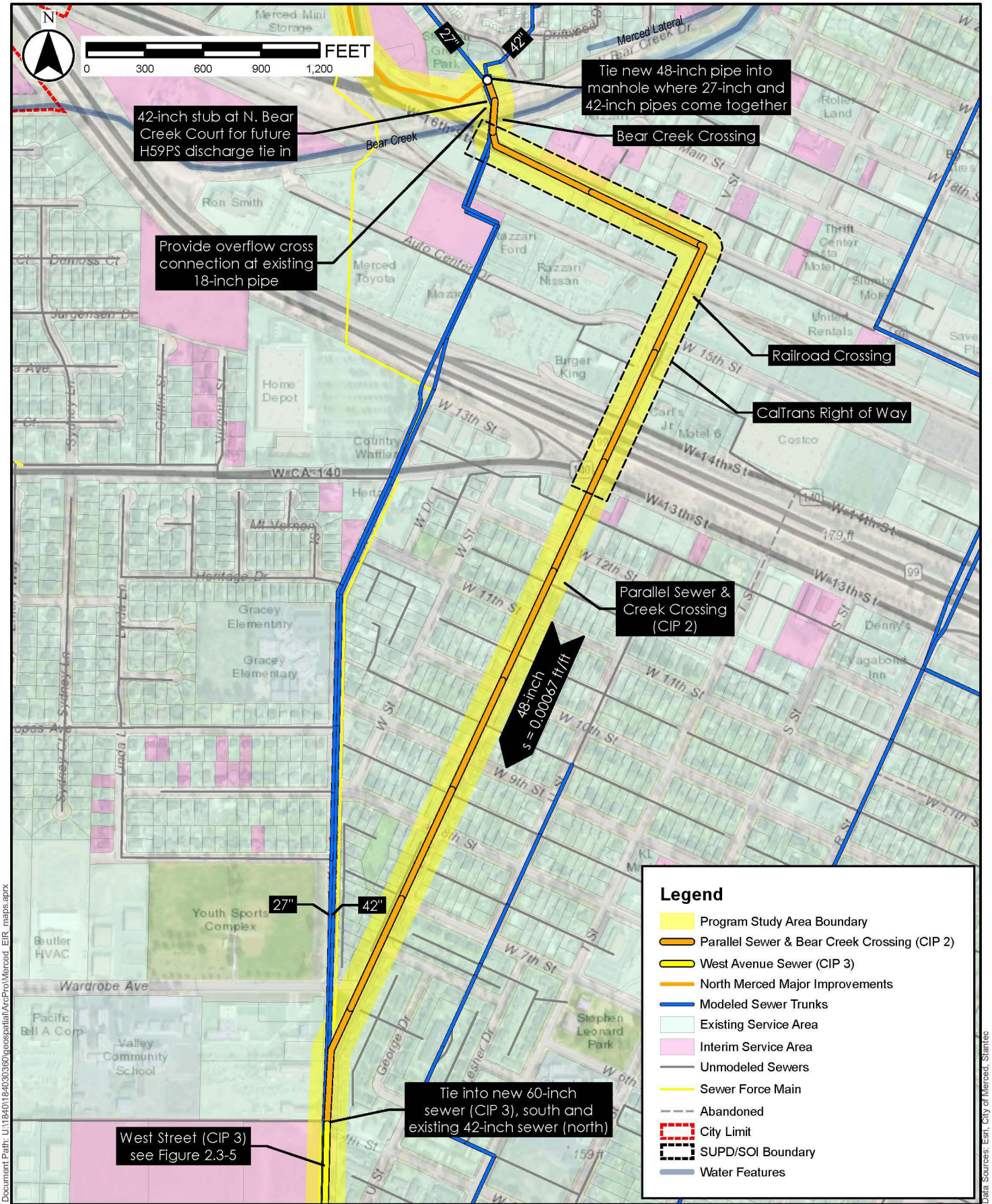

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Figure 2.4-4
Capital Improvement Project 2

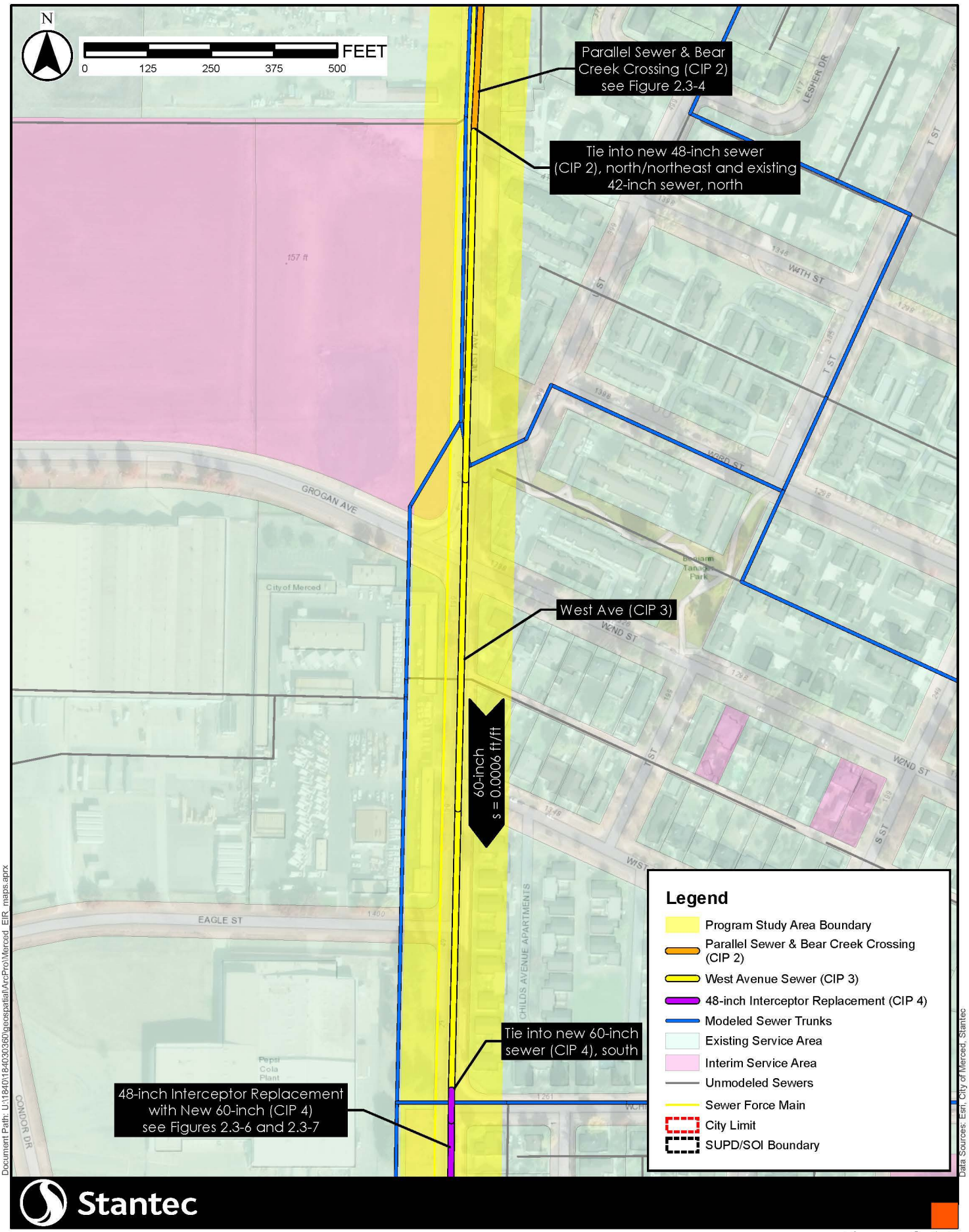

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Figure 2.4-5
Capital Improvement Project 3

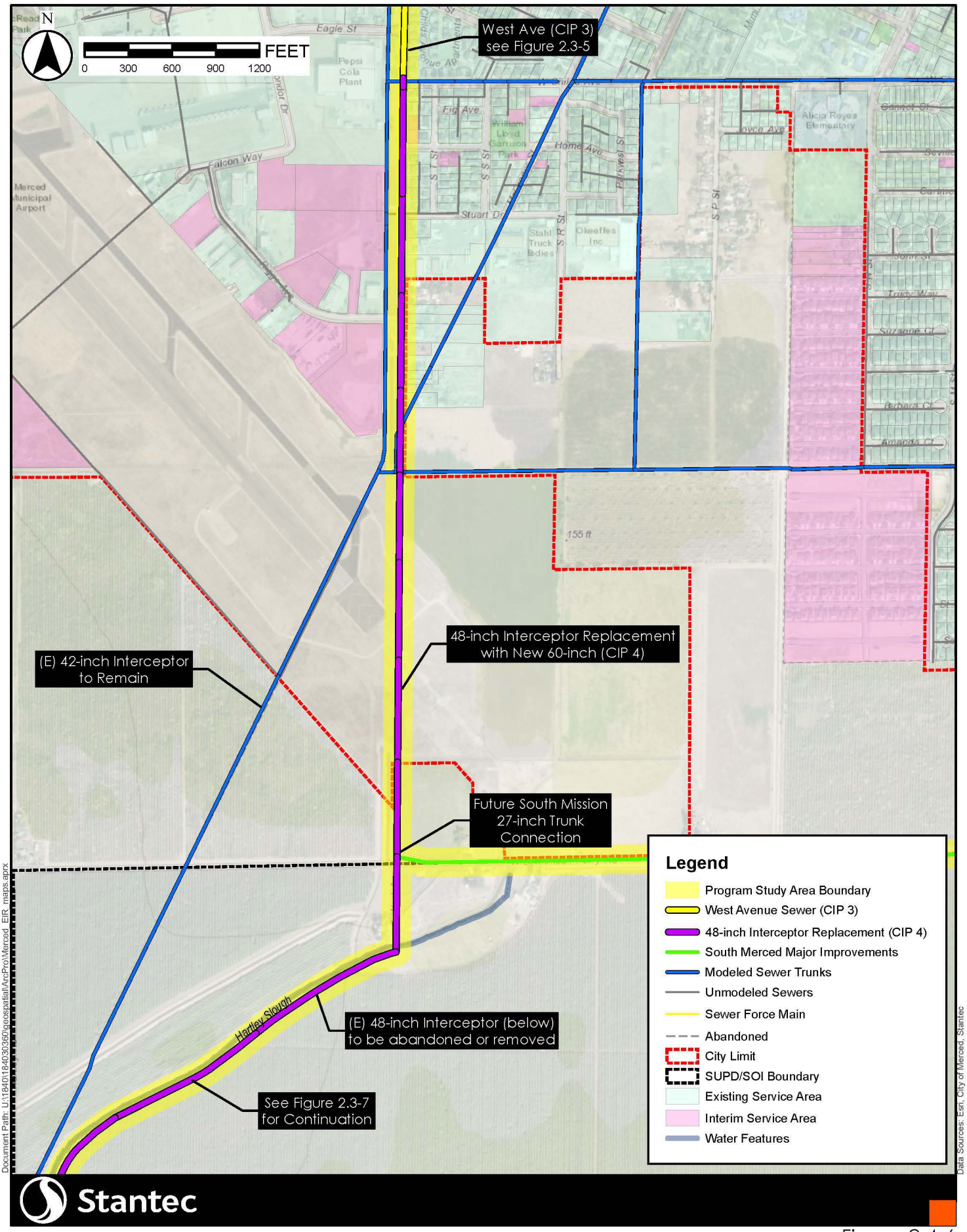

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Figure 2.4-6
Capital Improvement Project 4 (North)

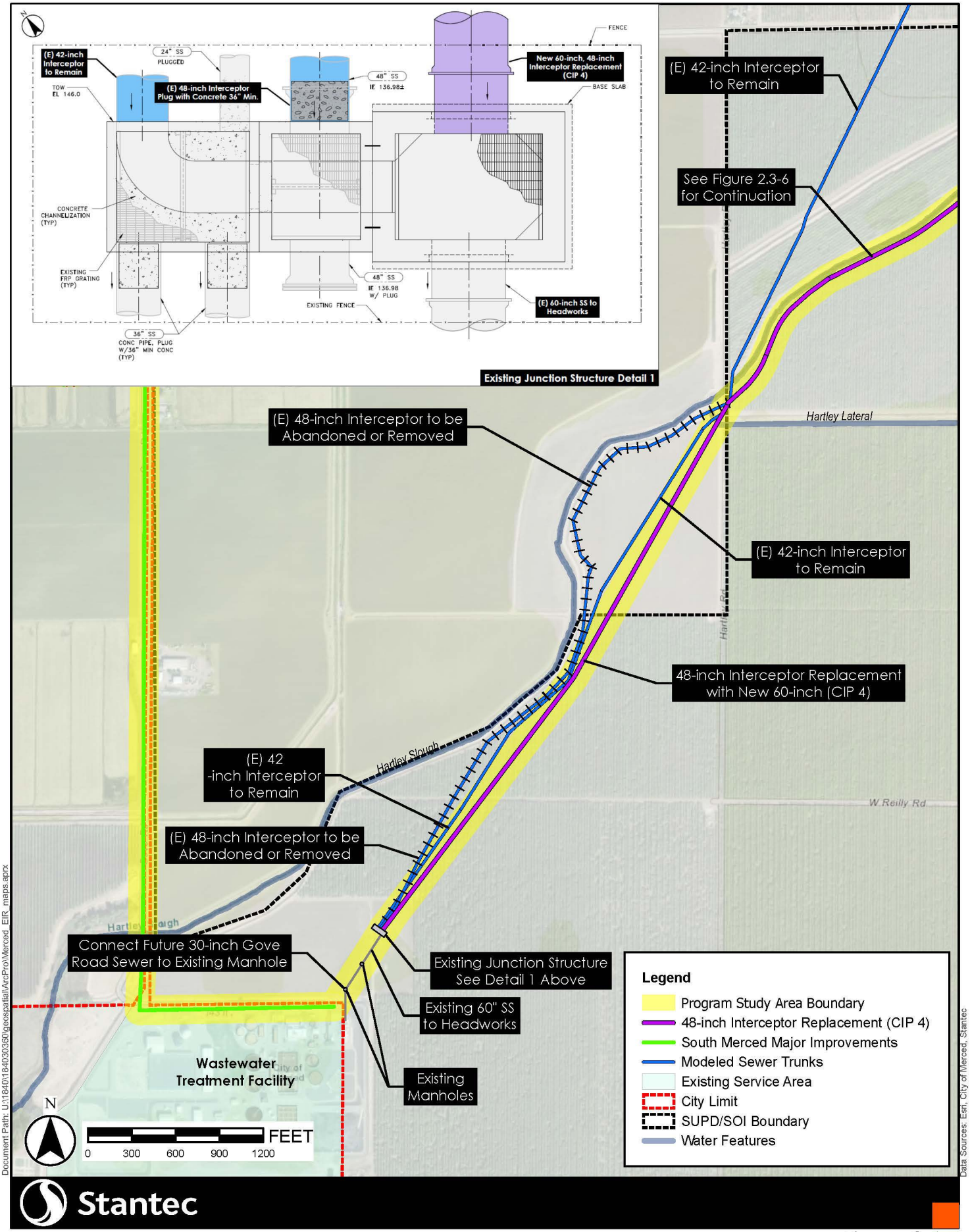

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Figure 2.4-7
Capital Improvement Project 4 (South)

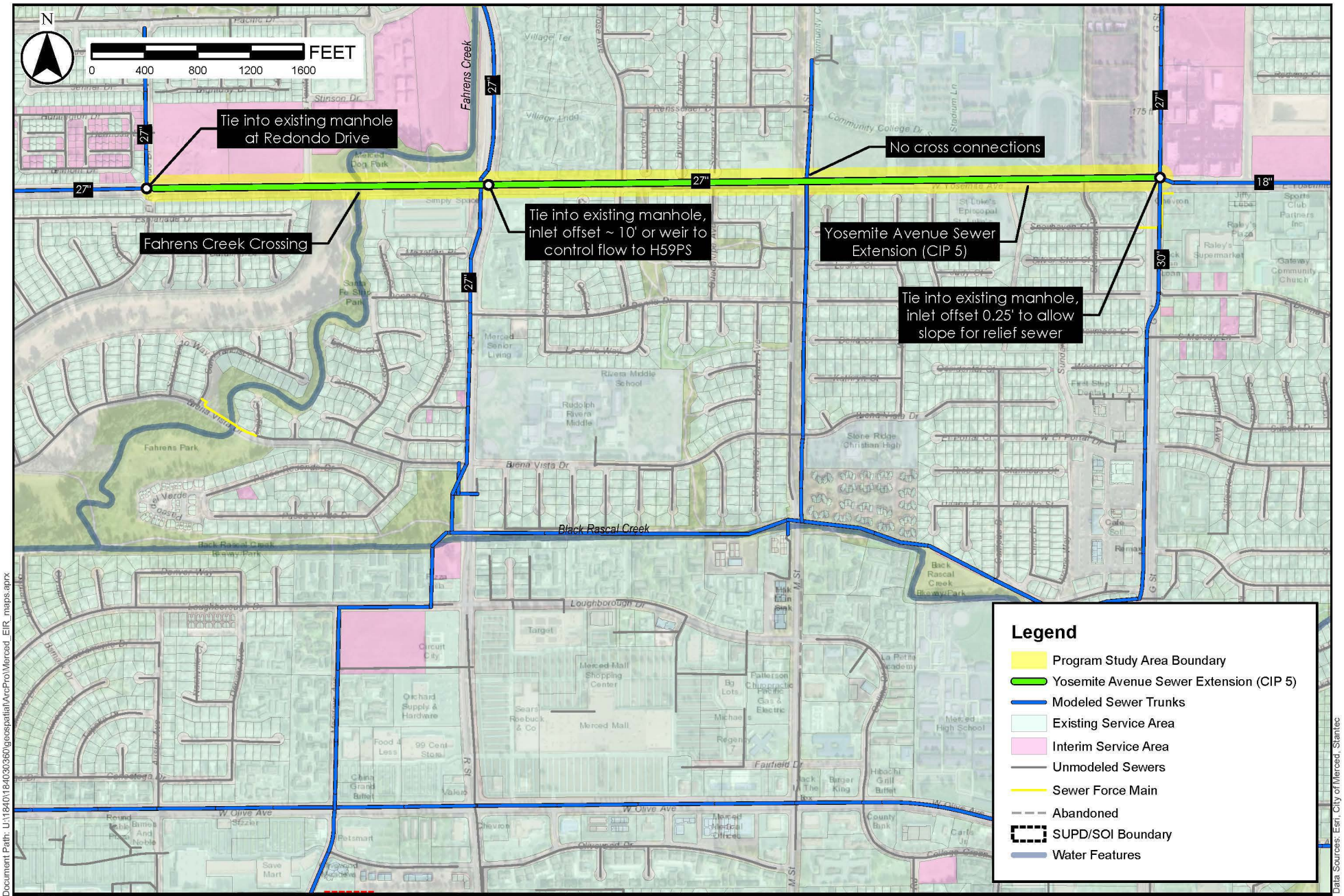

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Figure 2.4-8
Capital Improvement Project 5

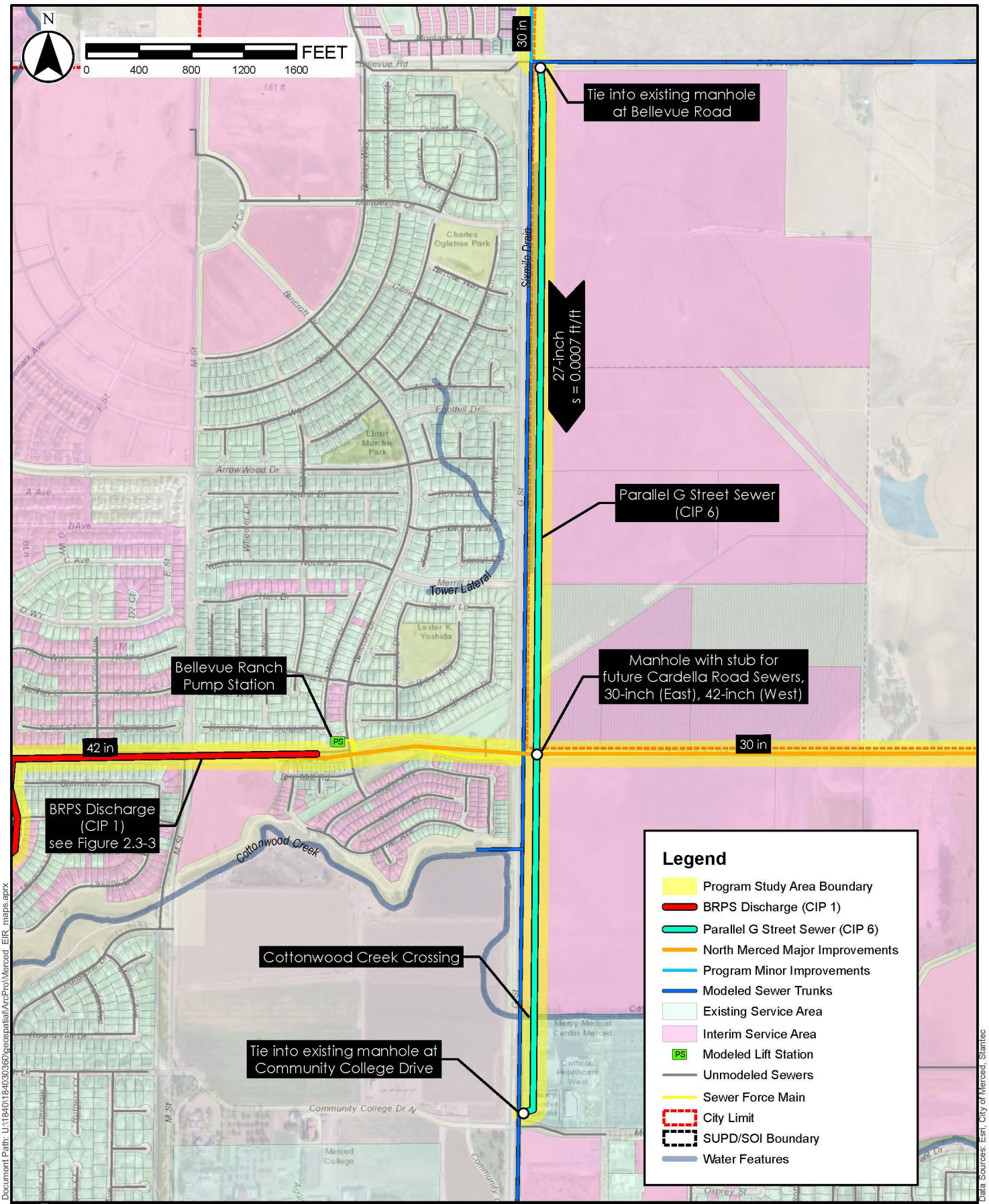

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Figure 2.4-9
Capital Improvement Project 6

2.4.2.2 North Merced Major Improvements

The North Merced major improvements include approximately 7.4 miles of pipeline ranging from 18 to 48 inches in diameter which would serve the North Merced service area (**Figure 2.4-10**). The improvements would be partially gravity-fed and partially pressurized, requiring an approximately 31 Mgal/d flow capacity expansion at the existing H59PS. The H59PS is located on the east side of Highway 59, north of Fahren's Creek, on the south end of Fahren's Park. Two new 24-inch force mains will be required from the lift station to either a new trunk south of Fahren's Creek or to connect with the proposed new Bear Creek crossing at W. 16th Street (CIP 2). North Merced's G Street Extension 3 and the West Cardella Trunk cross Fahrens Creek while the East Cardella Trunk crosses a canal.

Future improvements to accommodate build-out would consist of a new west-flowing trunk in Cardella Road and south-flowing trunk in Highway 59 connecting to the H59PS. The parallel sewer along G Street (CIP 6) would ultimately connect the existing Bellevue Road trunk to the new Cardella Road trunk to provide sufficient capacity and divert flow from the northeast SUDP/SOI. The new Highway 59 and G Street trunks would need to be extended north to the northern boundary of the SUDP/SOI with a new west-flowing sewer extending from each.

Above-ground features associated with the North Merced major sewer improvements would be limited to the expansion or replacement of the H59PS (an approximately 2,000-square-foot above-ground structure) and associated control boxes and air blow-off and air release valves, which would have a small, inconspicuous footprint of a few square feet and architectural finishes to match the surrounding area. The expanded H59PS would be sized for approximately 31 Mgal/d of flow and would require backup power generation, grid power connections, and mechanical and chemical equipment to operate. The pump station would be installed adjoining to the sewer trunk at a depth around 40 feet. Excavations associated with construction of the pump station are anticipated to require depths of up to 50 feet subsurface. Engineering studies are needed prior to identification and selection of a specific design; however, it can generally be assumed that the pumps would be submerged subsurface, pumping wastewater flows up to the elevation of the force mains.

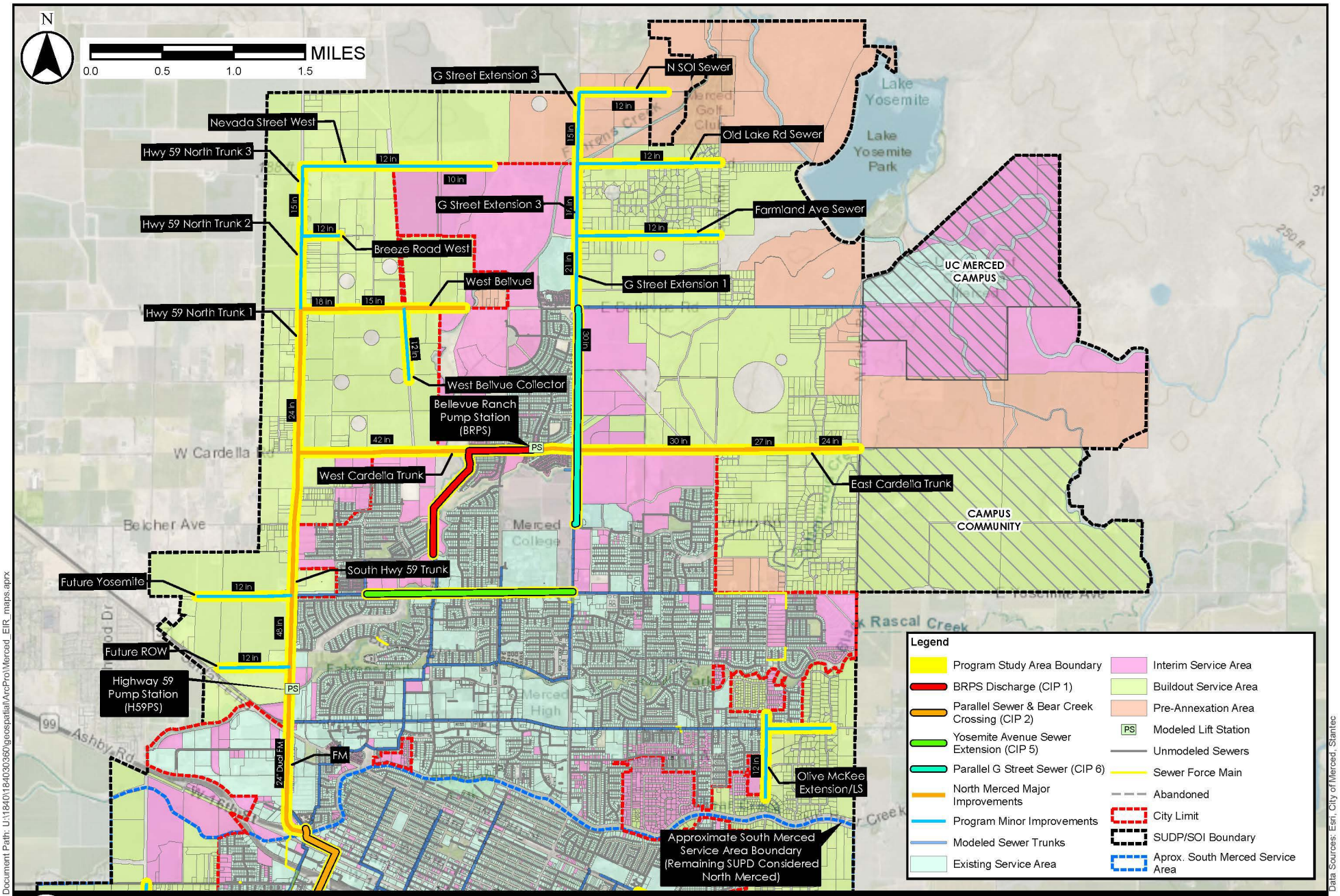

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Figure 2.4-10
North Merced Major Improvements

2.4.2.3 South Merced Major Improvements

The South Merced major improvements are composed of one gravity component made up of four trunk sewer pipelines that would make up approximately 5.8 miles of pipeline ranging from 18 to 30 inches in diameter serving the South Merced service area (**Figure 2.4-11**).

The South Merced major improvements include a new Mission Avenue trunk, referred to as the South Trunk, and relief sewer along Tyler Avenue connecting the existing Gerard Avenue trunk to the Mission Avenue trunk. Other improvements needed in South Merced would include a new main trunk line along Gove Road and Thornton Road. The South Highway 59 Trunk crosses Black Rascal Creek. South Merced's Thorton Road Sewer 1 would be installed along the El Capitan Canal and the Gove Road Sewer crosses the Hartley Slough. This trunk sewer may require a lift station due to the relatively low elevation of this area.

Above-ground features associated with the new South Merced major sewer improvements would likely be limited to the associated control boxes and air blow-off and air release valves that would all have small, inconspicuous footprints of a few square feet and architectural finishes that match the surrounding area.

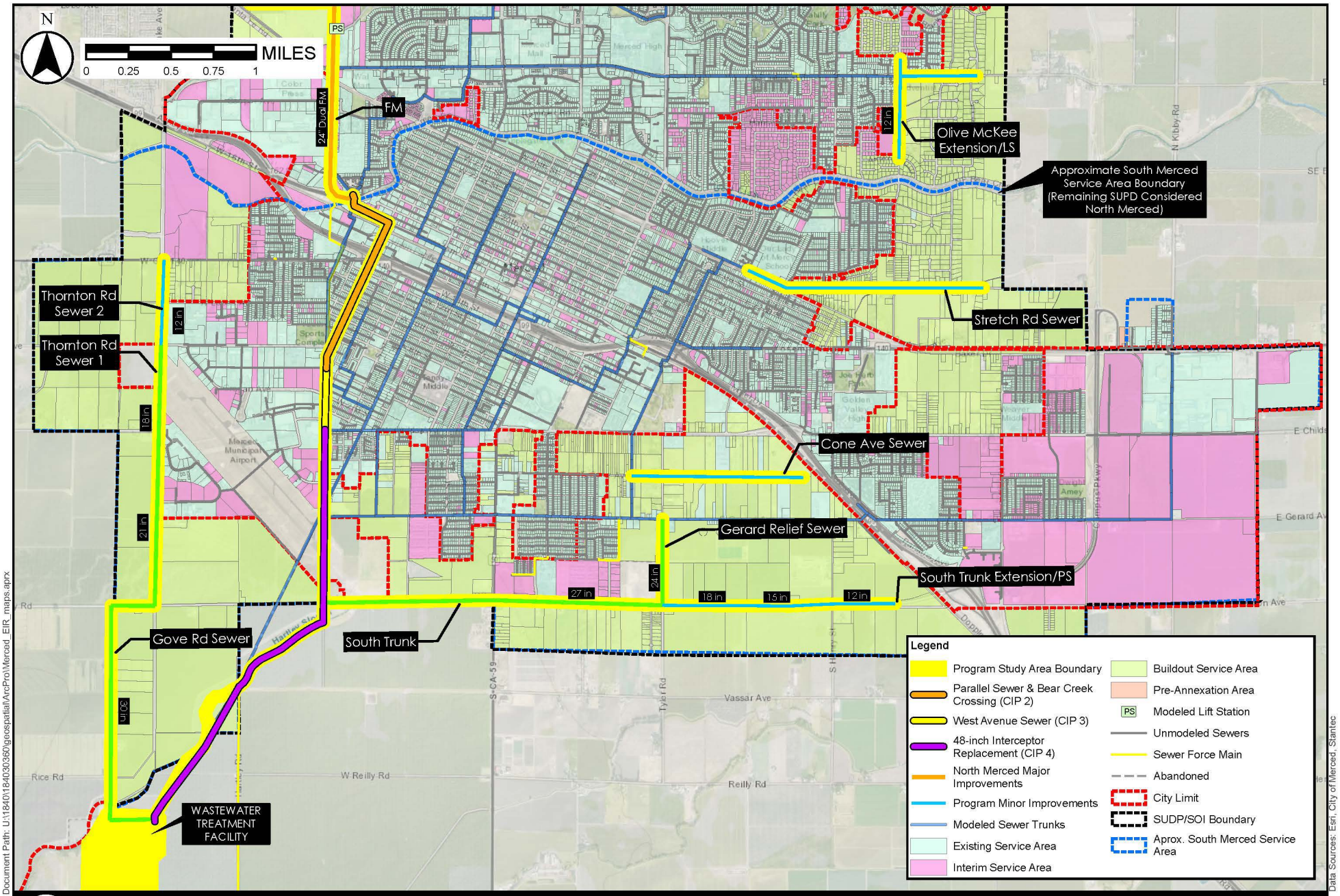

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Figure 2.4-11
South Merced Major Improvements

2.4.2.4 Program Minor Improvements

The 2022 WCSMP identifies several minor improvements for budgeting purposes that are smaller extensions of the North and South Major Improvements (identified above) that bring service to the boundaries of the SUDP/SOI. The actual size and configuration of these minor improvements are largely dependent on how and where development occurs over time.

Under the Program, it is anticipated that additional shorter trunk sewer pipelines would be required to serve the needs of reasonable build-out and private development within the SUDP/SOI. Sizing and locations of these pipelines would be determined as development occurs. The size would be restricted by the overall wastewater collection system, typically limiting pipe diameters to under 30 inches and lengths to a mile or less.

Where feasible, trunk sewers would be gravity-fed; however, pressurized force mains may be required. Force mains would be accompanied by pump/lift stations. These pump stations are anticipated to require smaller footprints than the ultimate H59PS and are not anticipated to have a footprint greater than 2,000 square feet. It is anticipated that power would be available adjacent to any required pump stations. These pipelines would be planned within roadways and utility ROW in future developments, and pump/lift stations would be located immediately adjacent to the roadway on City ROW. These trunk sewers would generally be located in the future service areas as shown on **Figure 2.4-10** and **Figure 2.4-11**.

A **collector sewer** is a pipeline used to convey wastewater from smaller tributaries feeding a larger trunk line as the wastewater flows toward the wastewater treatment plant.

The 2022 WCSMP update also identifies the need for new localized collector infrastructure to provide residential, commercial, and industrial (etc.) sewer connections to transport flows to the main trunk sewers. As development occurs within the SUDP/SOI, localized collector infrastructure would be developed to serve these future connections and to connect them to the proposed trunk sewers. These collector lines would be planned and developed as specific developments within the SUDP/SOI are proposed (i.e., future entitlements occur). While a project-specific level of detail is not available for these improvements, typical conditions for the collector system can generally be characterized as requiring trenches with a maximum 30-foot depth and a work corridor of up to 50 feet.

The Program Minor Improvements are programmatically analyzed in this document and would require further evaluation as a part of future project-specific development plans. Infrastructure needs may include new pipelines, smaller pump stations (anticipated maximum footprint of 100-foot-by-100-foot building), and associated appurtenances (such as control panels, air blow-off and air release valves, and backup generators similar to those described for the North and South Merced Major Improvements) that would connect the current and planned wastewater collection systems as growth occurs within the SUDP/SOI. Generally, these future developments are anticipated in the areas of North Merced near the UC Merced campus and in southeastern Merced as illustrated by the future service areas of north and South Merced within the SUDP/SOI shown on **Figure 2.4-1.**

The 2022 WCSMP update, in conjunction with the 2030 General Plan and community-specific plans, has developed growth projections and corresponding wastewater flow estimates for these undeveloped or unconnected areas of the SUDP/SOI, as described in Section 4.0 of the 2022 WCSMP update. A total of

approximately 130,922 EDUs were estimated to be connected to the wastewater collection system under reasonable build-out conditions, as shown in Table 4-7 of the 2022 WCSMP update. Specific pipeline sizes, lengths, and locations have yet to be finalized but would be smaller than the trunk sewers they feed into and would be placed within current or planned roadways for areas where development proposals are submitted and wastewater collection system needs are more clearly defined. While it is difficult to estimate particular development sizes, it is estimated that there would be anywhere from 500 to 5,000 collector pipelines varying in length from a few hundred feet to a few miles to serve the undeveloped areas within the SUDP/SOI at reasonable build-out conditions.

2.4.3 WWTF Expansion Projects

The City's existing WWTF currently collects and treats the wastewater that it receives from the City's existing wastewater collection system. The WWTF provides disinfected tertiary treatment that meets Title 22 treatment requirements for "effluent" discharged from the WWTF. Effluent, or treated wastewater, is either applied on the WWTF property or discharged into Hartley Slough, which is a tributary of the San Joaquin River.

Although the WWTF is currently permitted to treat 12 Mgal/d of flows, the City has already approved an expansion to 20 Mgal/d (as evaluated within the City of Merced 2006 Wastewater Treatment Plant Expansion EIR [State Clearinghouse No. 2005101135]). The limits and features of the previous approvals are shown on **Figure 2.4-12**. As part of the 2017 WCSMP, WWTF expansion options were evaluated to the level of detail needed to support reasonable build-out of the collection system. The 2022 WCSMP identified that reasonable build-out requires 27.2 Mgal/d. Therefore, this EIR analyzes the incremental increases to take the WWTF from 20 to 27.2 Mgal/d in 3 to 4 Mgal/d expansions, as needed.

Unlike the collection system that requires advanced planning for a 50- to 75-year horizon, treatment capacity is relatively easily added on in an incremental fashion as demand warrants. Expansion of the WWTF from 20 to 27.2 Mgal/d is evaluated in 3 to 4 Mgal/d expansion increments because the expansion of the WWTF would occur as demand warrants (i.e., in 3 to 4 Mgal/d increases) rather than all at once (i.e., a 7.2 Mgal/d increase). WWTFs are typically designed in a fashion that allows for the processes in the treatment train to be expanded without much interruption to the existing treatment process. At the WWTF, these expansions have historically been done in 3 to 4 Mgal/d increments, which are anticipated to continue if the growth rate within the SUDP/SOI stays consistent with historic conditions until reasonable build-out is reached. If growth rates were to increase, demand would subsequently increase, and the WWTF could be expanded in larger intervals. This flexibility in increasing capacity only "as needed" is a cost-savings measure to ensure that expensive unnecessary expansions are not undertaken.

To reach reasonable build-out, the WWTF Expansion Projects would expand the WWTF footprint to the south immediately adjacent to the existing WWTF. The expansions are projected to require a similar amount of space for siting facilities as those currently in use at the WWTF. This would require approximately 133 additional acres immediately to the south of the current facility to accommodate the full expansion., as shown on **Figure 2.4-12**. The exact configuration and processes of these improvements and the ultimate capacity would be determined as growth and development occur in accordance with the latest design standards, treatment technologies, and permit requirements and require future project-specific evaluations and approvals.

The WWTF is sited on a large parcel of land with plenty of room for expansion of the current facilities. Increased wastewater flows would continue to be treated to a tertiary level and disinfected prior to disposal. The details for achieving reasonable build-out at the WWTF are described below. Descriptions and assumptions are based on similar projects and typical wastewater treatment plant expansions. Incremental increases to the WWTF would be completed by expanding the WWTF footprint to the south, much like the expansion to 20 Mgal/d described in the City's 2006 EIR. The City is concurrently conducting engineering studies and preparing plans to provide reliable wastewater treatment capacity that is capable of serving planned future wastewater loads and that will meet National Pollutant Discharge Elimination System (NPDES) and Waste Discharge Requirements (WDRs) (CVRWQCB WDRs Order No. R5-2014-0096 and NPDES No. CA0079219). The City is in the process of renewing the NPDES permit and WDRs, which are expected to have more stringent WDRs even if the improvements associated with development of the Program are not implemented.

Specific improvements to the WWTF would include increased treatment capacity, additional effluent equalization storage capacity, and have the potential to incorporate newer wastewater treatment technologies. Anticipated equipment and processes associated with each phase of treatment include the following:

Headworks and primary treatment facilities improvements – Headworks and treatment facilities are the portion of the WWTF where wastewater is initially received and undergoes primary treatment at the plant. With the increase in capacity, facilities would need to be expanded to accommodate increased flows. Required improvements anticipated would include additional pumps at the influent pump station, additional screen and grit basins at the headworks facilities, an increase in the total capacity of the equalization basins, and improvements to the primary clarifiers.

Secondary treatment improvements – Secondary treatment is a treatment process whereby wastewater undergoes physical phase separation to remove settleable solids and a biological process to remove dissolved and suspended organic compounds. Secondary treatment facilities improvements required for expansion of the WWTF are anticipated to include expansion of the aeration basin; a splitter box, a blower building, and blowers; secondary clarifiers; and return activated sludge/waste activated sludge pump stations. However, more efficient treatment technologies, such as a membrane bioreactor facility, may be used in lieu of the traditional secondary treatment facilities. If different technologies are identified during engineering studies, they would be implemented within similar footprints and be consistent with the NPDES discharge permit.

Tertiary treatment improvements – Tertiary treatment is the final cleaning process that improves wastewater quality before it is reused, recycled, or discharged into the environment. Tertiary treatment improvements associated with the upgrades to the existing WWTF are anticipated to include an upsized tertiary pump station, rapid mix and flocculation basins, and tertiary disc filters but could also include alternative treatment technologies such as membrane bioreactor treatment trains as well. These improvements would require new structures. Tertiary treatment upgrades would be required to produce acceptable-quality tertiary effluent consistent with California Department of Health Services Title 22 pathogen-free reuse criteria.

Disinfection system improvements – The existing WWTF uses an ultraviolet (UV) disinfection system, which is a physical process that instantaneously neutralizes microorganisms as they pass by UV lamps submerged in the effluent. This UV disinfection system would need to be expanded incrementally by adding an additional UV disinfection facility to accommodate flows up to 27.2 Mgal/d.

Miscellaneous structures improvements – Miscellaneous structures improvements associated with the upgrades to the existing WWTF would include improvements to and/or upsizing of the operations/laboratory/administrative building, generator building, chemical storage facility, chemical building, plant water pump station, stormwater pump station, and stormwater detention basin. Additional lighting or electrical components could also be required for the upgrades to the WWTF in order to accommodate the upgrades to the facility. New concrete and gravel pathways would also likely be required for access to any new structures. Alternative energy sources such as solar or use of methane-powered electric generators could potentially be used or implemented as a part of the Program.

Biosolids handling facilities improvements – Improvements to the biosolids handling facilities would be required, including upgrades to the dissolved air flotation thickeners, digester control building, primary digesters, solids holding tank, gas holding system, waste gas flare, biosolids dewatering building, active solar dryers, centrate equalization tank, and centrate pump station. Additional biosolids thickening with an expanded dissolved air flotation thickeners, expanded anaerobic digestion facilities, expanded centrifuge dewatering, and expanded drying and stabilization to Class A or B biosolids using active solar dryers (or equivalent) would also be required.

The additional biosolids associated with the increased capacity could be applied to additional agricultural areas within two miles of the WWTF or trucked to the Synagro Central Valley Compost Facility (approximately 22 miles from the WWTF). Any application of these biosolids to offsite areas would be in compliance with the Merced County biosolids disposal ordinance, WDRs, and 40 Code of Federal Regulations Part 503. For the purposes of this analysis, it is assumed that there would be a total of 621 truck trips offsite (to the Synagro facility) per year under a worst-case scenario; however, the City would likely continue to land-apply the biosolids where feasible.

While the City needs to maintain flexibility in wastewater collection and effluent discharge, the City explored an option with Merced Irrigation District (MID) to allow for effluent discharges to supplement MID flows in South Merced near the WWTF while MID would provide irrigation water deliveries in North Merced to offset any potential groundwater depletion. The City has reached an agreement with MID on how increased effluent flows from the WWTF would be utilized. This supplemental effluent from the WWTF would allow for recharging of the area's groundwater resources and would also allow for irrigated parks and other City landscaping rather than using groundwater sources and would accomplish a similar outcome to developing a recycled water system without the associated costs and greater footprint.

Improvements to the outfall structure and irrigation system improvements would be required for the WWTF expansion. The upgrades to the WWTF would continue to discharge to Hartley Slough (which flows to Owens Creek and later flows to the Eastside Canal) and would also continue to convey treated

effluent to the Merced Wildlife Management Area south of the WWTF. Expansion of the existing 54-inch pipeline and outfall structure would be required in order to allow for additional capacity associated with reasonable build-out. Effluent discharge into Hartley Slough would continue to achieve an effluent quality (measured at the point of discharge before mixing with receiving waters occurs) of 10 milligrams per liter (mg/L) biological oxygen demand, 10 mg/L total dissolved solids, and 10 mg/L nitrate, consistent with permitting requirements. Effluent disposal options are dependent on flows, treatment standards, and permit requirements. Among other factors, specific discharge details would be determined as development and expansion occur.

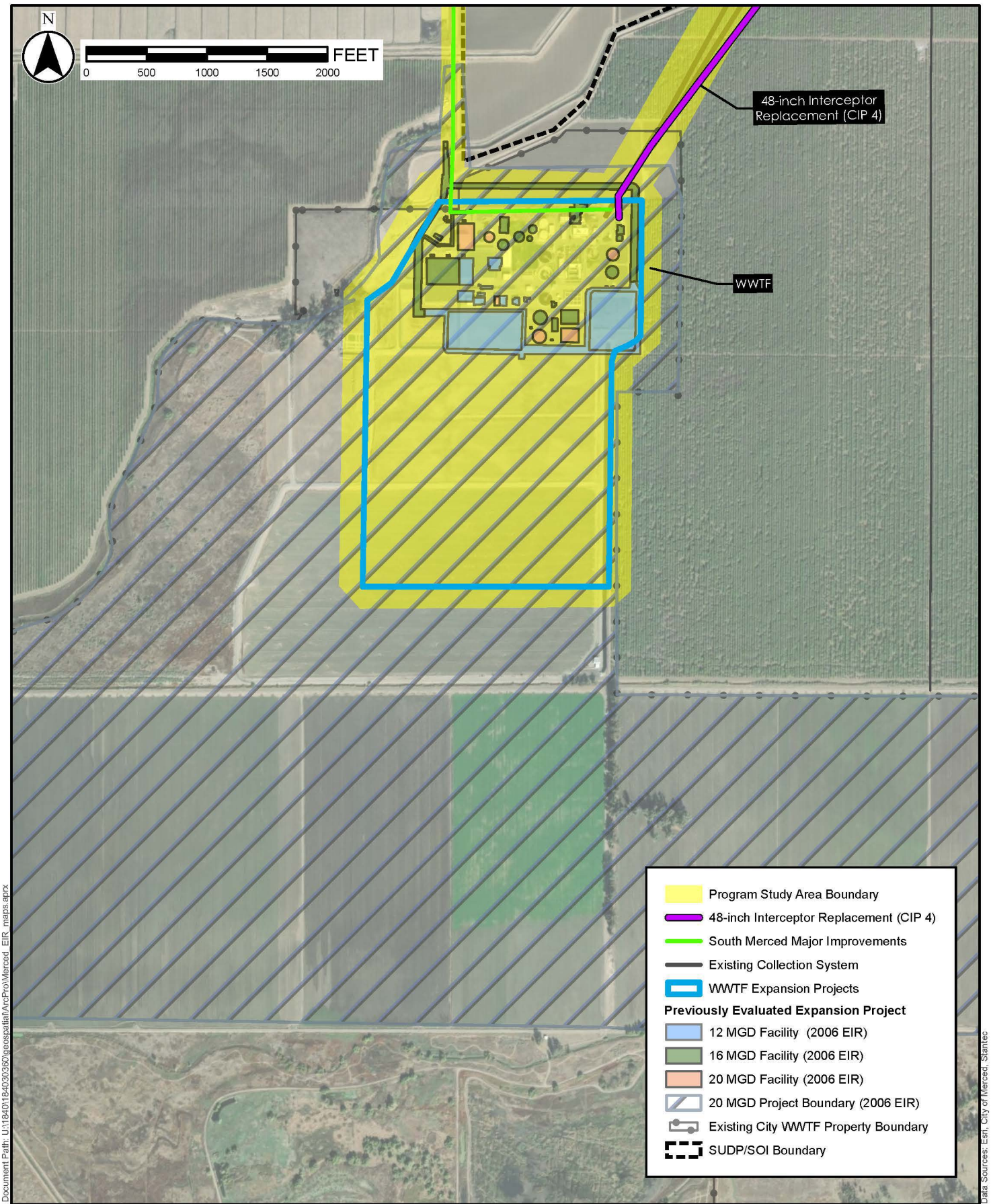

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Figure 2.4-12
WWTF Expansion Projects

2.5 PROGRAM CONSTRUCTION

2.5.1 Construction Activities

Implementation of the Program can generally be categorized into pipeline-related activities and non-linear building/site activities. The Program is described in **Section 2.3**; however, to avoid redundancy, this section discusses various construction activities that apply to both pipeline and non-linear building/sites. These pipeline and building/site activities require similar types of construction and phases that are representative of all anticipated activities under the Program (unless otherwise noted).

Key construction activities include site preparation and grading, pipeline and/or facility construction, dewatering, dust control, testing and start-up, and grading and site restoration. Specific equipment and construction assumptions for the Program were prepared to support the analysis in this RDEIR (particularly for Air Quality and Greenhouse Gas analyses). These assumptions and construction details are enumerated and are included in **Appendix B,** Air Quality and Greenhouse Gas Assumptions Memorandum of this document. Typical activities and construction requirements associated with each stage of construction are described below.

2.5.1.1 Access and Staging Areas

Staging and access associated with the majority of the in-road pipeline placement is anticipated to occur within or adjacent to the pipeline alignment (within the 200-foot construction buffer) and associated roadways. Additional staging areas would occur on City-owned property adjacent to the construction activities. It is anticipated that key staging areas would include the WWTF, property along trenchless drilling sites along the pipeline alignment, and City property, as shown on **Figure 2.5-1**.

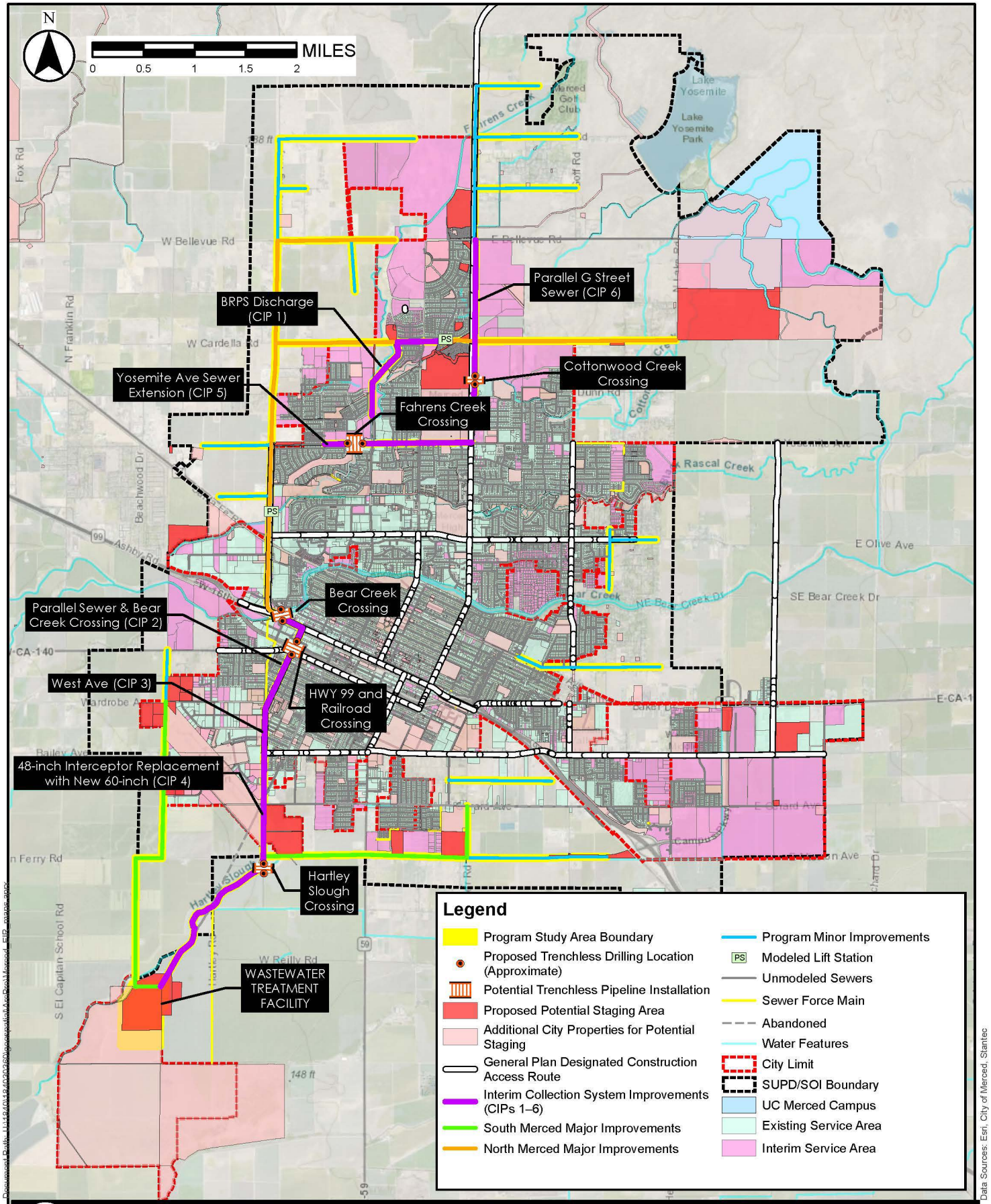

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Figure 2.5-1
Construction Access and Staging Areas

Mobilization, Site Preparation, and Grading

Initiation and mobilization of construction would include arrival of crews and equipment at identified staging and access areas as outlined below. Site preparation and grading would vary based on the underlying site conditions. For instance, paved areas may require removal of existing asphalt and unpaved areas would likely require vegetation removal (clearing and grubbing) to access below-ground infrastructure such as pipelines. Non-linear building/site construction activities may require grading and leveling to prepare the site for building and structure construction if proposed work areas are insufficiently level. Imported base material may be required to facilitate leveling. Preparations would be made for entry and exit holes for trenchless crossings under the railroad(s), stream(s), and highway facilities. Water application on disturbed unpaved areas during construction for dust control would be required pursuant to Regulation VII, Fugitive Dust Prohibitions (San Joaquin Valley Air Pollution Control District 2024), which requires the application of approximately 2,000 gallons of water per acre of exposed soil.

2.5.1.2 Construction Methods

Pipelines: Trenching, Excavation, and Placement

Pipeline placement is expected to occur at an average rate of 250 to 300 feet of pipeline per day within roadway segments, with some sections requiring longer construction durations and other sections occurring more rapidly. Placement of the pipeline would consist of open-cut trenching and trenchless pipe installation. Open-cut trenching installation involves site preparation and grading, preparation of the pipe (e.g., welding ,etc.), staging of the pipe adjacent to the trench alignment, digging and shoring the trench, placing pipe in the trench, backfill and compaction in accordance with design and roadway specifications, revegetation or paving, and installation of appurtenances such as air and vacuum release valves or blow-off valves.

Where possible, the pipelines would be placed within the roadway or City ROW to minimize impacts to undisturbed and agricultural lands. It is anticipated that trench widths would range from three to 15 feet to accommodate the trunk sewers but in some select instances may reach widths up to 20 feet (to accommodate pipe intersections, dissipaters, valves, joints, etc.). Depths of trenching are anticipated to generally be less than 10 feet deep, with maximum depths of 40 to 50 feet when required to cross existing utilities or to minimize high points and associated additional air valve installations. Exact trench widths and depths would vary depending on soil conditions and would be determined during the final design stages and subject to review and approval by City Engineer. Trenches would be backfilled at the end of each workday or would be temporarily closed by covering with steel trench plates if the site cannot be secured by other safety measures such as fencing. Construction equipment needed for pipeline installations generally includes backhoes, excavators, dump trucks, cranes, shoring equipment, steam rollers, and plate compactors. Based on preliminary desktop review and previous work within the City, it is not expected that blasting would be required for the Program.

A trenchless piping installation methodology (i.e., horizontal directional drilling [HDD], jack and boring, or microtunneling) would be used to avoid conflicts with potentially jurisdictional waters, MID canals, railroad ROW (Union Pacific Railroad [UPRR] and Burlington Northern Santa Fe [BNSF]), and highway ROW (State Route [SR] 99, SR 140, and SR 59). These technologies are less invasive and would allow construction to proceed under a particular feature with minimal disturbance. Each of these trenchless

technologies differs slightly in methodology for how the pipeline is installed. HDD or directional boring is a minimal-impact trenchless method of installing underground utilities such as pipe in a relatively shallow arc or radius along a prescribed underground path using a surface-launched drilling rig. Jack-and-bore is a method that drills a hole underground horizontally between two points (below-grade pits) without disturbing the surface between sending and receiving pits. Microtunneling is a digging process that uses a remote-controlled microtunnel boring machine combined with the pipe jack-and-bore method to directly install pipes underground in a single pass. The technology for tunneling would be selected during the design process based on cost, minimizing disturbance impact, and other factors. For impact analysis purposes, it is assumed that drill pits on both sides of the trenchless section would be needed during construction. The maximum depth of these pits would be approximately 40 feet. These methods would require a specialized drilling construction crew, drill equipment, settlement basins, etc.

Pump Station: Excavation and Construction

As part of the North Merced Major Sewer Improvements, the existing H59PS would be rehabilitated or replaced with a new pump station at the same location and same depth below ground. A new pump station would be housed in a single-story building(s) that would include features such as a pump room, an electric control room, and a room for disinfection facilities. The exterior of the pump station would be built in accordance with standard construction methods for roofed masonry buildings and would be designed to blend with the surrounding landscape.

Construction of the new H59PS would begin with demolition of the old pump station. Once the area is excavated, the crew would install a structural foundation consisting of concrete, construct the pump house, and install the pumps and motors. The pump station would be equipped with a portable emergency generator and manual transfer switches. Power to the pump station would be provided through underground service to minimize the possibility of damage during fires. Excavated soils would be reused onsite (for site leveling or stockpiling for future use) to the extent feasible and otherwise disposed of offsite. Concrete would be required for construction of pump station foundations and pads.

There are additional smaller footprint ancillary pump stations that may be constructed throughout the collection system. The construction methods for these pump stations would be similar in scope to the H59PS described above.

WWTF Expansion Projects

The WWTF Expansion Projects would require grading, excavation and soil removal, transporting and installing equipment, and constructing process units. Excavated material would mostly remain onsite and would be used for backfilling; however, when additional material would require transport on- or offsite or when equipment is being transported to and from the WWTF, construction traffic would use Gove Road, Dickenson Ferry Road, Thornton Road, and SRs 99 and 140 to haul these materials to the landfill or another suitable disposal location. Construction at the WWTF would occur with periodic activity peaks, requiring brief periods of substantial effort, followed by longer periods of reduced activities.

Dewatering

Based on the topography and groundwater table levels throughout the City, it is anticipated that dewatering would be required during trenching and excavation activities, particularly near creek crossings where trenchless crossings would occur. Groundwater pumps would be installed as needed during the

trenching and excavation stages, and groundwater would be discharged in accordance with statewide NPDES permit requirements (typically a low threat discharge dewatering permit). The construction contractor would be required to develop a Construction Dewatering Management Plan to ensure compliance with regulations of the CVRWQCB, California Department of Fish and Wildlife, and any other regulatory agency that has jurisdiction in the SUDP/SOI. All flushing water (used during the testing and start-up phase) would be treated and discharged into the wastewater system pursuant to NPDES requirements.

Excavated Soils Handling, Testing, and Disposal

Construction would generate excavated soils, which would be used for backfilling when feasible. Excavated soils would be sampled and tested, if required. If excavated soils are found to be inadequate for backfill, new backfill material would be imported. All excess excavated soils would be disposed of in accordance with applicable laws and are anticipated to be accepted at the local landfill (likely the Highway 59 landfill).

Start-up and Testing, Final Grading, and Site Restoration

Once the pipelines and facilities are constructed, a testing and start-up period would be required to check that the facilities are in proper working order, which would require water usage. Once the pipeline, pump stations, and other associated expansion components are installed and tested, the disturbed areas would be restored to pre-construction conditions in accordance with City standards. The in-road segments would be repaved, and any overland segments would be graded to match the existing topography and reseeded with vegetation where necessary.

2.5.2 Construction Schedule

Construction of the Program components would generally occur as development occurs in accordance with the 2030 General Plan. As described throughout this section, construction of the trunk sewers would be required before additional development within the SUDP/SOI is approved, whereas expansion of the WWTF would be done incrementally as demand warrants.

2.5.2.1 Pipelines

The construction of the CIPs 1-6 would occur first due to demand to serve developments surrounding the UC Merced campus area. Construction is anticipated to begin in 2026 and is projected to occur within a five-year period. Once initiated, it is anticipated that construction of each of the Interim Collection System Improvements (CIPs 1–6) would take approximately 18 months, or 395 working days, to construct the pipelines.

Although conservative estimates for air quality and other impact assessments assume that construction of reasonable build-out conditions will occur simultaneously, this scenario is highly improbable. Growth within the SUDP/SOI is expected to continue at a similar pace to what was analyzed in the 2022 WCSMP, suggesting that reasonable build-out will not occur until after 2030, and likely much later. Where conservative estimates are used for the basis of analysis, it is assumed that reasonable build-out would be reached by 2030.

2.5.2.2 Pump Stations

The H59PS improvements would be constructed after CIPs 1–6 are completed and likely after 2030. It is anticipated that the pump station may take closer to 18 months, or approximately 395 working days, to complete.

If required, construction of additional pump stations under the Program would be lesser in duration than the H59PS construction, as they would likely have shorter depths and would be much smaller. Other pump station construction could be staggered and is not anticipated to occur at the same time as another pump station. However, it is likely that new pump stations would be constructed as part of new pipeline, and those construction activities (construction of linear pipeline and pump station) would run simultaneously.

2.5.2.3 WWTF Expansions

The WWTF expansions would be completed as growth and demand warrant. It is anticipated that since the WWTF expansion to 20 Mgal/d (as previously analyzed and approved in the City's 2006 EIR) has not yet been constructed, that would be completed first (likely after 2030). When construction occurs, it is anticipated that a 3 to 4 Mgal/d expansion of the WWTF would take approximately 24 months, or 474 working days, to complete. Each subsequent expansion of the WWTF would take approximately the same amount of time unless the expansions were combined, in which case construction could be completed more quickly. This construction schedule provides flexibility in implementation of the 2022 WCSMP, with the earliest portions of the WWTF expansion being operational after 2030.

2.5.2.4 Other Construction Activities

Repairs and construction of ancillary infrastructure such as valves or effluent disposal equipment may also be required to implement the Program. Construction of these facilities would be determined by specific plans, but are estimated for the purposes of assessment to require three months of construction within the period of reasonable build-out.

2.5.2.5 Construction Hours

In general, construction would occur between 7 a.m. and 8 p.m., Monday through Friday; however, longer hours could occur in certain specific circumstances (i.e., when trenchless drilling operations need to be completed for stability reasons or when working in a narrow ROW).

2.5.3 Construction Equipment and Workers

Typical construction equipment associated with pipeline construction activities includes the use of excavators, backhoes, loaders, dump trucks, water trucks, concrete trucks, and drilling and boring equipment. Mobile construction equipment used for the Program would depend on the selected contractor's planned operations but may include the following equipment:

Excavators
Scrapers
Graders
Rollers
Asphalt trucks
Pickup trucks
Air compressors
Welding equipment
Pumps and piping
Generators
Backup lighting systems, communications, and safety equipment
Water trucks
Vehicle maintenance truck
Erosion control materials
Front end loaders
Highway trucks
Cranes
Miscellaneous equipment customary to the mechanical and electrical crafts, as well as vehicles used to deliver equipment and materials

Construction of the Program would require workers to perform various duties and would include truck drivers, heavy equipment operators, flaggers, etc. **Table 2.2** summarizes the number of workers needed for each construction activity.

Table 2.2: Anticipated Number of Construction Workers per CIP 1 –6

Construction Stage	Anticipated Number of Workers
Site Preparation/Grading	15
Pipeline and/or Facility Construction	50
Paving	10
Architectural Coating	5

2.5.4 Construction-Related Traffic

Construction activities would require material haul trips, excavated material trips, and employee trips over the duration of the Program. Temporary construction-related road closures may entail single lane or detours where necessary. Traffic control would be necessary throughout construction activities. Traffic control would typically require 5–10 workers to implement traffic control measures during active construction. Equipment required for traffic control would include changeable message signs, delineators, arrow boards, and K-Rails. The traffic plan for each CIP would be coordinated with the applicable jurisdictions including the City and the County of Merced. Specifics of the traffic plan are discussed in greater detail in **Section 3.15, Transportation**.

3.0 RESOURCE AREAS

3.1 AESTHETICS AND VISUAL RESOURCES

3.1.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
- In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, the potential of the project to conflict with applicable zoning and other regulations governing scenic quality.
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to aesthetics and visual resources that may result from implementation of the Program, identifying mitigation for significant impacts, where feasible.

3.1.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives relevant to the Program that are related to aesthetics and visual resources.

3.1.2.1 Federal and State

There are no federal or state scenic designations within the Program Study Area, and therefore no federal or state regulations apply.

3.1.2.2 Local

Merced Vision 2030 General Plan

The City's 2030 General Plan, adopted January 3, 2012 (City of Merced 2012), contains a number of policies that apply to aesthetic impacts in conjunction with the Program in accordance with the 2030 General Plan. The specific policies listed below contained in the Land Use, Urban Design and the Open Space, Conservation, and Recreation Elements contain goals and policies that directly or indirectly pertain to aesthetics, light, and glare:

Urban Expansion Policies:

UE-1.1 Designate areas for new urban development that recognize the physical characteristics and environmental constraints of the planning area.

UE-1.2 Foster compact and efficient development patterns to maintain a compact urban form.

UE-1.3 Control the annexation, timing, density, and location of new land uses within the City's urban expansion boundaries.

UE-1.4 Continue joint planning efforts on the UC Merced and University Community plans.

UE-1.5 Promote annexation of developed areas within the City's SUDP/SOI during the planning period.

UD-2.2 Maintain and enhance the unique community appearance of Merced.

OS-1.3 Promote the Protection and Enhancement of Designated Scenic Routes.

The 2030 General Plan further designates the following scenic corridors within the City's SUDP/SOI:

- North and South Bear Creek Drive within the City limits.
- N Street from 16th Street to the Merced County Courthouse.
- 21st Street from the Merced County Courthouse to Glen Avenue.
- M Street from Black Rascal Creek to Bellevue Road.
- West 28th Street from M Street to G Street.
- Lake Road from Yosemite Avenue to Lake Yosemite.
- R Street (extended) from Black Rascal Creek to Bellevue Road.
- Olive Avenue East of McKee Road.
- M Street from 18th Street to Bear Creek.
- Campus Parkway.
- Bellevue Road from Lake Road to G Street.

The 2030 General Plan Chapter 7 Open Space, Conservation & Recreation Implementing Action 1.3c also includes the following measures to preserve these designated scenic corridors:

- Utility lines should be placed underground wherever feasible.
- Signing should be carefully controlled to ensure that it does not detract from the scenic beauty of the corridor. Specific guidelines for signing along these corridors should be established.
- Limit the intrusion of future land uses which may detract from the scenic quality of the corridor.
- Unsightly mechanical and utility structures shall be screened from view by the use of planting, grading, and fencing.
- Heights and setbacks of buildings should be regulated to avoid obstructing important scenic views.

- Every effort should be made to preserve and properly maintain existing stands of trees and other plant materials of outstanding value.
- Structures on private and public properties visible from the corridor should be maintained in good condition (free of trash, weeds, etc.).
- Architectural and landscape design should result in an attractive appearance and a harmonious relationship with the surrounding environment.
- Additionally, the 2030 Draft General Plan EIR subsequently describes scenic vistas within the City, which include views of natural features such as topography, water courses, rock outcrops, natural vegetation, and man-made structures (City of Merced 2010).

3.1.3 Environmental Setting

Aesthetic resources are those natural resources, landforms, vegetation, and man-made structures in the region and local environment that generate sensory reactions and evaluations by viewers. Potential viewers in the Program Study Area include local residents, roadway users, recreationalists, and commercial users throughout the Program Study Area. These viewer groups are discussed in more detail below.

The Program Study Area is located within the Central Valley of California, just west of the Sierra Nevada Mountain Range near the geographic center of Merced County. The Program Study Area consists of gently rolling terrain, with flatter areas occurring near the southern boundaries. The Program Study Area does not contain any designated scenic vistas; however, the 2030 General Plan EIR does identify general scenic vistas such as water courses and natural vegetation and the 2030 General Plan designates scenic corridors within the City's SUDP/SOI as outlined in Section 3.1.2.2. Several creeks traverse the Program Study Area, including Bear Creek, Black Rascal Creek, Fahrens Creek, Parkinson Creek, and Cottonwood Creek.

Land uses within the Program Study Area consist of an urban environment surrounded by low-density residential development and agricultural areas. As detailed in the Section 2.0, Project Description, major highways that provide regional and local access within the Program Study Area include SRs (SR) 59, 99, and 140.

3.1.3.1 Scenic Views and Resources

Pursuant to the Merced Vision 2030 General Plan Draft EIR, visual resources are classified into two categories: scenic views and scenic resources. Scenic views are elements of the broader view shed such as mountain ranges, valleys, and ridgelines (such as the Sierra Nevada mountain range). They are usually middleground or background elements of a view shed that can be seen from a range of viewpoints, often along a roadway or other corridor. Scenic resources are specific features of a viewing area (or viewshed) such as trees, rock outcroppings, and historic buildings. They are features that act as the focal point of a view shed and are usually foreground elements.

An impact may arise if the Program alters the view of the middleground or background elements within the broader landscape, or if it removes visually significant features such as trees, rocks, or historic buildings in the foreground. Because aesthetic assessments can be subjective and challenging to evaluate, this EIR employs two generally objective criteria to determine the significance of these changes.

The first criterion examines the visibility of the altered landscape and its position relative to viewers–foreground changes are deemed most significant. The second criterion focuses on visual contrast, which assesses the extent of perceptible change and is categorized as strong, moderate, or weak. A strong change would be immediately noticeable and dominate the landscape, while a weak change would be hardly detectable.

The viewshed in the Program Study Area is primarily urban environment surrounded by low-density rural residential development and agricultural uses. The Program Study Area does not contain notable features that would typically fall under the heading of visual resources, such as unique geological features. The Program Study Area lies along the Central Valley floor with little vertical differentiation that might provide scenic quality (hillside areas, rock outcrops, etc.). The features of the project's visual setting that might shape an appreciation of its visual character are limited to typical urban elements and are subject to personal interpretation.

Aesthetic effects can be somewhat subjective, influenced by factors such as the viewer's location, exposure level, and their relationship to the project. For instance, a resident with a direct view of the Program Study Area from an adjacent property is likely to have a different perception of the development compared to a nonresident who only sees it briefly. Similarly, light and glare effects tend to be more disruptive for permanent residents than for transient travelers on a highway.

Light and glare effects must be evaluated from two viewpoints: 1) the viewpoint from the Program Study Area toward surrounding uses and 2) the viewpoint from surrounding uses toward the Program Study Area. The degree of impact is proportional to the perceived negative effect on surrounding land uses. If there is a continuous light or glare that is visible from nearby residences and if it creates a nuisance to residents, the impact is potentially significant. Light sources in the area are currently generated by vehicles on local roadways, and that of the urban environment of the City of Merced. Overall, light levels are at a medium intensity due to the urban agricultural interface of the plan area.

3.1.3.2 Viewer Groups

Residents

Residences occur throughout the Program Study Area, with the largest concentration of residences occurring near the center of the City (i.e., near Main Street). Residence types vary from single-family homes to apartment buildings. In general, residential views can be spilt into two categories: neighborhood views and rural (agricultural) views. Residents who live in single-family-type neighborhoods have views typical of a residential neighborhood including surrounding residences, varied native and ornamental vegetation, roadways with moving vehicular traffic, and the occasional maintenance activities associated with existing utilities such as sewer or power lines. Residences that occur on the outer portions of the Program Study Area have views more typical of an agricultural setting, with flat or gently sloping lands for growing crops, agricultural activities such as movement of tractors or other farm equipment, and general traffic from surrounding roadways. Exposure of the altered landscape is high for residences in both of these settings (neighborhood and rural) because their length of exposure is long, and their positions are fixed. Rural residences could have a slightly higher viewer sensitivity since their views are generally unobstructed by other buildings and the surrounding topography is typically flat, allowing for further viewing distances.

Recreationalists

Recreational visitors vary throughout the Program Study Area depending on location and type of recreational activity. There are several parks throughout the Program Study Area as well as bike paths, trails, tennis courts, ball fields, and general open space for public access. Additionally, Lake Yosemite, located just outside of the Program Study Area north of UC Merced, attracts a large number of recreational users throughout the year, particularly from UC Merced. Visitors from UC Merced typically travel by bike from the campus along Lake Road to the lake itself. The use of bikes and bicycle paths has been increasing since the UC Merced campus became operational, which has increased recreational use of local roadways both within the existing campus and the surrounding community (City of Merced 2010). In the future, as the campus grows in number of students, recreational use within the UC Merced campus and in the surrounding community is likely to increase.

Recreational views generally consist of native and ornamental vegetation and traffic on local roadways, and could include views of existing bike paths, other pedestrians and recreational users, residences, and the surrounding topography of the area where the recreational activity is taking place. Exposure level for recreational visitors varies from high to low depending on location of the recreational activity (i.e., in a natural setting versus a human-made area such as a bike path) and movement during recreational activity (i.e., just passing through an area on a bike versus a stationary activity such as picnicking at a local park).

Roadway Users

Motorists on roadways within the Program Study Area would have views typical of roadway traffic such as movement of other vehicles, passing signs, buildings, and vegetation, occasional construction work within roadways, and passing pedestrians in crosswalks and sidewalks. These views could range from full exposure to limited exposure depending on topography of the surrounding landscape and obstacles that could obstruct views. Motorists' exposure when assessing Program impacts would be considered low since their speed and movement allows for only short-duration views of stationary objects.

Commercial/Industrial Users

Commercial and industrial businesses are spread throughout the Program Study Area; however, the majority of commercial business activity is concentrated around the center portion of the City, along SR 99 and 59, and industrial businesses are more concentrated near the western portion of the City. Commercial and industrial users consist of the public who are generally only briefly in any one business for any period of time, and commercial and industrial business staff who would be considered a more stationary user since their positions are fixed throughout the day.

3.1.3.1 Visual Sensitivity

Viewer sensitivity levels within the Program Study Area would depend on the location of a particular viewer and how fixed their views are. Generally, fixed views that would be closer to construction activities would have a high viewer sensitivity, while temporary or passing views would have a lower viewer sensitivity.

3.1.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to aesthetics and visual resources. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.1.4.1 Methodology

Impacts on visual quality in minimally-developed areas, such as the Program Study Area, are typically assessed by evaluating the extent of visual changes introduced by a project, the visibility of these changes to nearby observers, and the sensitivity of these observers to landscape alterations. The assessment of visual changes generally involves three main factors: (1) the level of visual contrast created by the project components (including changes in form, line, color, texture, and scale), (2) the extent of view obstruction (such as loss of view and its duration), and (3) the degradation of specific scenic resources (e.g., removal of designated heritage trees).

Visual resources specialists reviewed the Program Study Area alongside applicable plans and policies, as well as maps of the area. Included in this were maps identifying scenic resources and Google Earth Street View, which allowed an initial understanding of the visibility of Program components from public roads within and adjacent to the Program Study Area. The analysis of aesthetic resources is based on field observations and review of background information including engineering reports and figures, aerial and ground level photographs, and pertinent Merced 2030 General Plan policies regarding scenic resources.

Impact Analysis

Impact AES-1: Potential to have a substantial adverse effect on a scenic vista.

Impact AES-1 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The 2030 Draft General Plan EIR defines scenic vistas as expansive views of highly valued landscapes from publicly accessible viewpoints. Scenic vistas include views of natural features such as topography, water courses, rock outcrops, and natural vegetation as well as man-made scenic structures (City of Merced 2010). Given relatively flat topography of the City and Program Study Area, there are no officially designated scenic vistas and the majority of vistas are local. Most areas of the Program Study Area have views of the Sierra Nevada and the Coast Range, when air quality permits. Program features are predominately underground, located on the outskirts of the City (generally away from visual receptors), and temporary presence of construction equipment is not expected to significantly impact the views of the few existing residents within viewing distance.

The 2030 General Plan EIR evaluated the change in visual character within the Program Study Area noting that the area will eventually change from open agricultural fields and pastureland to urban development (City of Merced 2010).The 2030 General Plan identifies scenic corridors (identified in

Section 3.1.2, Regulatory Framework) intended to preserve the scenic corridors and resources by promoting the protection and enhancement of scenic routes. **Table 3.1-1** outlines the intersection of the scenic corridor with proposed Program construction.

Table 3.1-1: Program Study Area Overlap with Scenic Corridors

Designated Scenic Corridor	Potential for Program Impacts
M Street from Black Rascal Creek to Bellevue Road	Within Existing North Merced Major and Program Minor Improvements area, potentially adjacent to Program development along open space adjacent to M Street. Intersection of M Street and Bellevue Road adjacent to West Cardella Trunk.
Lake Road from Yosemite Avenue to Lake Yosemite	Within North Merced Major and Program Minor Improvements area, potentially adjacent to Program development along open space at Intersection of Lake Road and E Cardella Road adjacent to East Cardella Trunk.
Olive Avenue East of McKee Road	Within North Merced Major and Program Minor Improvements area. Intersection of Olive Avenue and McKee Road adjacent to Olive McKee extension.
Bellevue Road from Lake Road to G Street	Within North Merced Major and Program Minor Improvements area. Intersection of E Bellevue Road and G Street adjacent to south start of G Street Extension.

Impacts to scenic corridors resulting from Program components would occur if construction activities were to take place over prolonged periods of time within these designated corridors. The Program's construction would overlap four designated scenic corridors:

- M Street from Black Rascal Creek to Bellevue Road,
- Lake Road from Yosemite Avenue to Lake Yosemite,
- Olive Road east of McKee Road, and
- Bellevue Road from Lake Road to G Street.

Although there is geographic overlap with the scenic corridors and Program features, trunk and collector sewers would be in the existing and planned roadways in all five of these corridors and would be predominately underground. While construction activities and vehicles may temporarily disrupt the scenic nature the overall nature and viewscape of the corridor would be preserved and no significant impact would occur. The WWTF sits on a secluded parcel removed from potential visual receptors and is not in an area with local scenic vistas or scenic corridors. Therefore, construction would not substantially affect scenic corridors in this area and no impact would occur. Therefore, impacts resulting from Program construction would be considered less-than-significant.

Operation

Impacts to scenic corridors resulting from Program components would occur if permanent above-ground features would obstruct views within these corridors (i.e., placement of pump stations), or if above-ground facilities were left unmaintained or in disrepair. It is possible that pump stations or other above-ground future Program components could be identified as necessary within these scenic corridors. These above-ground features are compliant with the City's 2030 General Plan guidelines. As described in Section 2.0, Project Description, pump stations and above-ground facilities would be enclosed in small buildings (less

than 2,000 square feet) or utility boxes (approximately one to five square feet) which would be screened from view by the use of planting, grading, and fencing if determined to be unsightly. Structures visible from the corridor (and throughout the Program) would be maintained in good condition (free of trash, weeds, etc.) and the architectural and landscape design would be selected in accordance with City design standards similar to existing pump stations and above-ground sewer facilities within the City to provide an attractive appearance and a harmonious relationship with the surrounding environment. As a result, above-ground Program features would be consistent with the 2030 General Plan guidelines and would result in a less-than-significant impact to scenic vistas or corridors. In addition, the operation of the WWTF expansion would not substantially affect scenic corridors in this area and no impact would occur.

Therefore, impacts resulting from Program operation would be considered less-than-significant.

Level of Significant Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Collection System Improvements (CIPs 1-6)

Construction

Installation of the Interim Collection System Improvements would occur largely on the outer portions of the Program Study Area and the City's SUDP/SOI limits in existing and planned roadways. Similar to the Program discussion above, scenic vistas within the Project corridors are localized with views of the Sierra Nevada mountains on clear days. Project construction could intermittently interfere with these localized vistas; however, localized vistas of the Sierra Nevada mountains on clear days are temporary. Additionally, the majority of viewers would be roadway users and would be moving past construction equipment where their views would momentarily be impacted, if at all. Thus, the would have a less-than-significant construction-related impact to scenic vistas. **Table 3.1-2** outlines the intersection of the scenic corridor with proposed Project construction.

Table 3.1-2: Project Study Area Overlap with Scenic Corridors

Designated Scenic Corridor	Potential for Program Impacts
M Street from Black Rascal Creek to Bellevue Road	Within CIP 5 Yosemite Sewer Extension & Creek Crossing.
R Street (Extended) from Black Rascal Creek to Bellevue Road	Within CIP 5 Yosemite Sewer Extension & Creek Crossing.
Bellevue Road from Lake Road to G Street	Intersection of E Bellevue Road and G Street adjacent to north end of CIP 6, Parallel G Street Sewer.

As noted in **Table 3-1.2**, designated scenic corridors only overlap CIP 5 and CIP 6. Project features in these areas would be almost entirely underground, consistent with the 2030 General Plan policy (Section 3.1.2.2). Construction in these areas would be short in duration and would not significantly alter the views within these designated corridors. Therefore, the Interim Collection System Improvements would have a less-than-significant construction-related impact to scenic vistas.

Operation

Once construction is completed, pipelines would be subsurface and no potential impact to scenic vistas or scenic corridors would occur. Therefore, there would be no operational impacts related to the Interim Collection System Improvements.

Level of Significant Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact AES-1 Findings

Impact AES-1 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact AES-1 Mitigation Required: None Required

Impact AES-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact AES-2: Potential to damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a scenic highway.

Impact AES-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

According to the California Department of Transportation (Caltrans) list of Eligible and Officially Designated Scenic Routes, there are no officially designated state scenic highways within the Program Study Area, and therefore implementation of the Program would have no potential to damage resources within a scenic highway (Caltrans 2018). The nearest designated scenic highway to the City is Highway 5, which is located approximately 30 miles to the west of the City (Caltrans 2018). As such, no impact would occur, and no MMs would be required.

Operation

The nearest designated scenic highway to the City is Highway 5, which is located approximately 30 miles to the west of the City (Caltrans 2018). As such, no impact would occur, and no MMs would be required.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Project Impacts: CIPs 1-6

Construction

According to the California Department of Transportation (Caltrans) list of Eligible and Officially Designated Scenic Routes, there are no officially designated state scenic highways within the Interim Collection System Improvements, and thus, implementation of the would have no potential to damage resources within a scenic highway (Caltrans 2018). The nearest designated scenic highway to the City is Highway 5, which is located approximately 30 miles to the west of the City (Caltrans 2018). As such, no impact would occur, and no MMs would be required.

Operation

There are no officially designated state scenic highways within the Interim Collection System Improvements and thus, implementation of the Program would have no potential to damage resources within a scenic highway (Caltrans 2018). The nearest designated scenic highway to the City is Highway 5, which is located approximately 30 miles to the west of the City (Caltrans 2018). As such, no impact would occur, and no MMs would be required.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Impact AES-2 Findings

Impact AES-2 Overall Level of Significance Prior to Mitigation: No Impact

Impact AES-2 Mitigation Required: None Required

Impact AES-2 Overall Level of Significance After Mitigation: No Impact

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Impact AES-3: In non-urbanized areas, potential to substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public Views are those that are experienced from a publicly accessible vantage point). If the Project is in an urbanized area, the potential of the project to conflict with applicable zoning and other regulations governing quality.

Impact AES-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

A project is considered to “substantially degrade” the visual character or quality of a site if it would have a strong negative influence on the public’s experience and appreciation of the visual environment. As such, visual changes are always considered in the context of a site’s or locale’s visual sensitivity. Visual changes caused by a project are evaluated in terms of their visual contrast with the area’s predominant landscape elements and features, their dominance in views relative to other existing features, and the degree to which they could block or obscure views of aesthetically pleasing landscape elements.

Construction

The construction impacts, as they relate to aesthetics, would involve temporary views of construction equipment (e.g., trucks, excavation equipment, protective fencing, construction workers) in and around the footprints of the pipelines, pump stations, and WWTF expansion, and any resulting disruption in the immediate visual environment due to the presence of such equipment. The presence of construction equipment by itself would not result in a significant effect as construction activities of various sorts (including trucks and tractors entering and exiting roadways) are common events, and the presence of construction equipment within the urban and rural areas within the Program Study Area is not unusual.

Construction of Program components would affect local views for residents (i.e., when they leave or enter their properties from public access points), recreationalists, motorists, and commercial users including temporary views of staging areas and construction equipment throughout the Program Study Area. Construction of Program components would include movement and storage of equipment and materials within staging areas, as well as the operation of worker vehicles and construction equipment on the nearby roads. Construction of the Program would include the activities described in Section 2.4 of the Project Description such as vegetation removal, excavation and trenching, pipeline installation, pump station installation, appurtenance installation, grading, backfilling, and site restoration. Temporary visual impacts would occur throughout construction of the Program, with the average project lasting less than two years. Any staging areas needed for the Program would be approved and cleared by the City before and after use as needed during construction. Additionally, non-linear building/site construction activities (i.e., staging areas, HP59PS, and the WWTF) have the potential to be fenced as needed and fencing would be consistent with the 2030 General Plan policy described in Impact AES-1 and in Section 3.1.2.2, Regulatory Setting. Construction dust and particulate matter that could be generated from construction of proposed Projects under the Program could be visible but for the regulatory limits on fugitive dust imposed by the local San Joaquin Valley Air Pollution Control District's Fugitive Dust Rule (as analyzed and described in Section 3.3, Air Quality), which would limit generation of dust and particulate matter from construction or stockpiling activities occurring at individual proposed Project sites. Therefore, impacts from staging areas, operation of construction equipment, and dust generated by construction of the Program would result in a less-than-significant impact to the existing visual character and quality of the area.

Typical views within the Program Study Area for sensitive receptors could be negatively affected by construction activities that would occur during implementation of the Program, particularly in the case of residential viewers who have fixed views from public vantage points (i.e., sidewalks and streets in front of houses) and could encounter construction activities as close as 25 feet from homes during pipeline placement. However, as discussed in Section 3.1.3, Environmental Setting, residential views include occasional construction work and traffic within the region under existing conditions, and views would be intermittent depending on location and obstructions blocking views. Further, construction activities would not be concentrated in any one location within the Program Study Area but would be spread out throughout the Program Study Area. Ultimately, no one neighborhood or residence would be impacted for an extended period of time. Recreational, motorist, and commercial/industrial views of construction activities would be less impacted by visual changes in the environment from construction due to movement throughout the Program Area and distance from construction activities. Therefore, construction impacts to residents, as well as recreation, motorists, and commercial and industrial viewers would be

less-than-significant, and the existing visual character and quality of the area would not be substantially affected for these viewer groups.

Once built there is the potential for landscape scarring if non-paved sites and paved sites are not returned or restored to existing conditions. If not restored the Program could have a lasting potentially significant impact on visual character that would be noticeable from multiple viewers and vantage points. Any sites disturbed during construction activities, including staging areas, would need to be restored to pre-construction conditions to avoid lasting visual impacts to the visual character. This site restoration would be implemented through MM AES-1, Restoration of Disturbed Areas, which would restore disturbed areas through regrading to allow for historic drainage, repaving of roadways, and seeding of vegetation where necessary to avoid long-term land scarring. This would reduce associated impacts to the long-term visual character of Project sites within the Program Study Area to a less-than-significant level.

Therefore, the overall construction-related impacts resulting from the Program to the existing visual character of the area would be less-than-significant with MM AES-1 incorporated.

Operation

Once constructed, the majority of Program components including new pipelines would be located underground and would not be visible to the public. Various appurtenances and pump stations (ranging in size from a few feet for control panels to 100-2,000 square feet of enclosed structures or fenced areas for pump stations) could be located above ground and could have adverse permanent visual impacts to the surrounding area if the architecture of these features is not designed to match the existing visual character of the area. Therefore, MM AES-2, Guidance for Design and Maintenance of Above-Ground Facilities, would be implemented requiring above-ground facilities to be designed to match the existing surroundings (i.e., choosing colors and finishes that would match the existing buildings and/or surrounding landscape). Implementation of this MM would result in above-ground structures that blend with the surrounding landscape and reduce long-term visual impacts associated with permanent above-ground features, resulting in a less-than-significant impact.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AES-1 and MM AES-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Completion of the Interim Collection System Improvements would result in similar impacts to the existing visual character of the Program Study Area as described for the overall Program above. CIP 1 and CIP 6 would occur in the less developed northern end the Program Study Area and the City (i.e., along G Street). These installations would impact fewer viewer groups due to the existing rural nature and limited number of sensitive receptors of these areas. CIP 2, 3, and 5 would occur within central Merced and the southern edge of the Program Study Area and the City. These installations may impact more viewer groups due to nearby residential neighborhoods and urban development. CIP 4 would occur in the less

developed, agricultural, southern edge of the Program Study Area and the City. However, since the CIPs would still involve construction activities that would traverse areas with some viewers (i.e., rural residences located on or near agricultural properties), a potentially significant impact related to degradation of the existing visual character could occur prior to mitigation. Therefore, implementation of MM AES-1 would be required for the CIPs to prevent long-term visual impacts associated with land scarring from staging areas and pipeline work not within existing or planned roadways. With implementation of MM AES-1, proposed Project sites would be returned to pre-construction conditions; therefore, would not result in any long-term land scarring or other visual impacts, resulting in a less-than-significant impact.

Operation

Various appurtenances (ranging in size from a few feet for control panels to 100-2,000 square feet of enclosed structures) could be located above ground and could have adverse permanent visual impacts to the surrounding area if the architecture of these features is not designed to match the existing visual character of the area. Therefore, MM AES-2, Guidance for Design and Maintenance of Above-Ground Facilities, would be implemented requiring above-ground facilities to be designed to match the existing surroundings (i.e., choosing colors and finishes that would match the existing buildings and/or surrounding landscape). Implementation of this MM would result in above-ground structures that blend with the surrounding landscape and reduce long-term visual impacts associated with permanent above-ground features, resulting in a less-than-significant impact.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AES-1 and MM AES-2
Level of Significance After Mitigation: Less-than-Significant

Impact AES-3 Findings

Impact AES-3 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact AES-3 Mitigation Required: MM AES-1 and MM AES-2

Impact AES-3 Overall Level of Significance After Mitigation: Less-than-Significant

Impact AES-4: Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Impact AES-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Temporary construction lighting associated with construction staging areas and nightshift work crews would have the potential to create a new source of light, which could temporarily affect views in the area. If not appropriately implemented, this temporary light source could result in lighting that could adversely

affect nighttime views in the area for nearby residences, commercial and industrial businesses, motorists, and recreational users, thus resulting in a potentially significant impact prior to mitigation. However, these temporary impacts from construction lighting would be reduced to a less-than-significant level with the implementation of MM AES-3, Use of Best Management Practices to Minimize Lighting Impacts from Construction and Operation, which would implement protective measures such as selecting warm-toned lights and facing light fixtures in a downward direction to minimize potential impacts from temporary lighting. These measures would reduce nighttime glare from leaving the site and adversely affecting nearby sensitive receptors. Therefore, the Program's potential to create a new source of light or glare during construction would be less-than-significant with the implementation of MM AES-3.

Operation

Permanent sources of lighting would be limited to new upgrades at the WWTF and for related maintenance or pump station buildings that could occur along pipeline alignments. Operational lighting at the WWTF would likely include new permanent lighting within the footprint of the existing WWTF and may result in a significant impact prior to mitigation if this new lighting is not consistent with the existing lighting at the WWTF or substantially affects nighttime views or operations for the nearby Merced Regional Airport. As such, this permanent lighting could result in a potentially significant impact prior to mitigation. MM AES-3 would be required, which would include measures to reduce permanent above-ground lighting by installing lights at the lowest allowable height; casting low-angle illumination while minimizing incidental light spill onto adjacent properties or open spaces; choosing light fixtures that direct light downward and that would shield direct lighting from sensitive receptors; using "shut off" controls such as sensors, timers, and motion detectors, etc. where appropriate; and installing light fixtures that have non-glare finishes that would not cause reflective daytime glare. In addition, if new permanent sources of light are situated near a residence or other sensitive receptor that could have prolonged views, this could result in a permanent significant impact prior to mitigation. As such, these new sources of permanent light would be required to comply with the restrictions identified in MM AES-3; therefore, operational impacts related to Program lighting would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AES-3
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction of the Interim Collection System Improvements would include the similar impacts as described for construction lighting for the Program impacts above. MM AES-3 includes construction-related lighting measures such as identifying when and where lighting is needed, confining and minimizing lighting to the extent necessary to meet safety purposes, selecting warm color temperature bulbs (less than 5,000K), limiting the height of fixtures to minimize the amount of light crossing property lines and overall light levels, and using temporary lighting shields during construction where construction lighting impacts to sensitive receptors cannot be avoided. These measures would ensure that sensitive

receptors within any of the Interim Collection System Improvements footprints are not adversely affected by any construction or operational lighting. Therefore, impacts related to substantial lighting and glare associated with the Interim Collection System Improvements would be less-than-significant with MM AES-3 incorporated.

Operation

Operation of the Interim Collection System Improvements would not include any permanent operational lighting because the sewer infrastructure would be underground. Therefore, impacts related to substantial lighting and glare associated with the Interim Collection System Improvements would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AES-3
Level of Significance After Mitigation: Less-than-Significant

Impact AES-4 Findings:

Impact AES-4 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact AES-4 Mitigation Required: MM AES-3

Impact AES-4 Overall Level of Significance After Mitigation: Less-than-Significant

3.1.5 Aesthetics and Visual Resources Mitigation

MMs AES-1: Restoration of Disturbed Areas

Roads, paths, staging areas, and areas along pipeline alignments that are affected by construction activities shall be restored to pre-construction conditions by the City's chosen contractor. Restoration may include repairing, repaving, re-graveling, or grading disturbed areas. Disturbed areas would be restored to pre-construction conditions in accordance with City standards. The in-road segments would be repaved, and any overland segments would be graded to match the existing topography and reseeded with vegetation where necessary... The City shall comply with its Trees, Shrubs, and Plants Ordinance or removal and replacement of any City trees (Merced Municipal Code 14.12). Additionally, construction sites shall be kept neat and free of trash and unnecessary debris throughout construction to prevent unsightly views.

MMs AES-1 Implementation

Responsible Party: The City of Merced and chosen contractor

Timing: During construction and prior to certification of completion of construction

Monitoring and Reporting Program: The design documents approved for construction shall be required to include notes requiring restoration standards in accordance within this MM, The Contractor shall be required to prepare and submit a rehabilitation strategy prepared in accordance with this MM for all staging areas that shall be submitted, approved, and kept on file by the City. The City shall verify implementation of the rehabilitation strategy.

Standards for Success: Long-term scarring of sites is avoided, and trees and other native vegetation are avoided where possible and replaced when needed in accordance the Merced Municipal Code 14.12.

Mitigation Measure AES-2: Guidance for Design and Maintenance of Above-Ground Facilities

As projects are identified and designed under the Program, City Guidance from the Merced Vision 2030 General Plan Chapter 7 Open Space, Conservation & Recreation Implementing Action 1.3c shall be implemented (City of Merced 2012) in the following way:

- Utility lines, including sewer and supporting electrical lines, should be placed underground wherever feasible.
- Unsightly mechanical and utility structures, such as pump stations and control boxes, shall be architecturally coated consistent with City design standards and/or screened from view by the use of planting, grading, and fencing.
- Buildings shall be designed to ensure heights and setbacks avoid obstructing important scenic views of nearby permanent visual receptors such as residences.
- When selecting sites and alignments stands of trees and other plant materials of outstanding value (natural or economic) shall be preserved and sites and alignments shall be selected with avoidance of tree and vegetation removal factored in.
- Structures on private and public properties should be maintained in good condition (free of trash, weeds, etc.).
- Architectural and landscape design should result in an attractive appearance and a harmonious relationship with the surrounding environment.
- Design above-ground structures to blend with the existing facilities and surrounding environment.
- Select colors and finishes that are the same as or complementary to the existing buildings, structures, and vegetation within the surrounding landscape.
- The design plans for the Program shall indicate these architectural features and will be approved by the City.

Mitigation Measure AES-2 Implementation

Responsible Party: The City of Merced and chosen contractor

Timing: The design documents approved for construction shall include appropriate finishes for any above-ground features in accordance with this MMs. These standards shall be carried through during construction.

Monitoring and Reporting Program: The construction drawings and plans issued for construction shall be required to indicate material finishes and color selections, and the City shall be required to verify that the selections have been made in conformance with this MMs. Following construction, City staff shall confirm that the Contractor has performed construction in conformance with the plans through visual verification.

Standards for Success: Visual character impacts are avoided or minimized, and permanent features blend with their exiting visual environment.

Mitigation Measure AES-3: Use of Best Management Practices to Minimize Lighting Impacts from Construction and Operation

The following best management practices (BMPs) shall be implemented and incorporated into design plans approved by the City Engineer to ensure minimal adverse impacts to nighttime views for adjacent sensitive receptors. These BMPs shall apply to the construction activities, staging areas implemented by the contractor during construction, and any permanent operational lighting. BMPs shall include but are not limited to the following:

Construction Lighting

- Identify when and where lighting is needed and confine and minimize lighting to the extent necessary to meet safety purposes.
- To the extent feasible, limit the height of fixtures to minimize the amount of light crossing property lines and overall light levels.
- Select warm color temperature bulbs (less than 5,000kW).
- Use temporary lighting shields during construction where construction lighting impacts to sensitive receptors cannot be avoided.

Operational Lighting

- Install lights at the lowest allowable height and cast low-angle illumination while minimizing incidental light spill onto adjacent properties or open spaces.
- Choose light fixtures that direct light downward and that shield direct lighting from sensitive receptors to the maximum extent feasible.
- Select warm color bulbs.
- Use "shut off" controls such as sensors, timers, and motion detectors, etc., where appropriate.
- Light fixtures shall have non-glare finishes that do not cause reflective daytime glare.

Mitigation Measure AES-3 Implementation

Responsible Party: The City of Merced.

Timing: All phases including design, construction, and operation.

Monitoring and Reporting Program: The design plans shall be approved by the City Engineer, incorporating the requirements of this mitigation measure. The City shall verify that the measure is appropriately reflected within the design plans. The City shall verify that the chosen contractor is implementing construction light reduction measures and that the design plans meet the operational light reduction measures in accordance with this MMs.

Standards for Success: Lighting impacts are reduced to a less-than-significant level for all sensitive receptors adjacent to Project features during both construction and operation.

3.2 AGRICULTURE AND FORESTRY RESOURCES

3.2.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g));
- Result in the loss of forest land or conversion of forest land to non-forest use; or
- 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.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to agriculture and forestry resources that may result from implementation of the Program, identifying mitigation for significant impacts, where feasible.

3.2.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives are relevant to the Program that are related to agriculture and forestry resources.

3.2.2.1 Federal

Farmland Protection Policy Act

The Farmland Protection Policy Act of 1981 (Sections 1539-1549 Public Law 97-98, Dec 22, 1981), requires the Secretary of Agriculture to establish and carry out a program to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to the extent practicable, will be compatible with state, units of local government, and private programs and policies to protect farmland." (7 United States Code [USC] 4201-4209 & 7 USC 658).

3.2.2.2 State

Williamson Act

The California Land Conservation Act (Williamson Act) of 1965 is the state's principal policy for the "preservation of a maximum amount of the limited supply of agricultural land in the state" (California Government Code [CGC] Section 51220[a]). The purpose of the Williamson Act is to preserve agricultural

and open space lands by discouraging premature and unnecessary conversion to urban uses. The Williamson Act enables private landowners to contract with counties and cities to voluntarily restrict their land to agricultural and compatible open space uses. In return for this guarantee by landowners, the government jurisdiction assesses taxes based on the agricultural value of the land rather than the market value, which typically results in a substantial reduction in property taxes.

CGC Section 51238 states that, unless otherwise decided by a local board or council, the erection, construction, alteration, or maintenance of electric and communication facilities, as well as other facilities, are determined to be compatible uses within any agricultural preserve. Also, Section 51238 states that a board of supervisors may impose conditions on lands or land uses to be placed within preserves to permit and encourage compatible uses in conformity with Section 51238.1. Further, CGC Section 51238.1 allows a board or council to allow as compatible any use that without conditions or mitigations would otherwise be considered incompatible; however, this may occur only if that use meets the following conditions:

- The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels on other contracted lands in agricultural preserves.
- The use will not significantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in agricultural preserves. Uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands, including activities such as harvesting, processing, or shipping.
- The use will not result in the significant removal of adjacent contracted land from agricultural or open space use.

3.2.2.3 California Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP), which monitors the conversion of the state's farmland to and from agricultural use, relies on information from the Natural Resources Conservation Service (NRCS) soils surveys, NRCS land inventory and monitoring criteria, and land use and water availability. Topography, climate, soil quality, and available irrigation water all factor into the FMMP Farmland classifications.

The FMMP was established by the California Department of Conservation (DOC), under the Division of Land Resource Protection. Important Farmland maps are compiled by the FMMP pursuant to section 65570 of the CGC. Under the FMMP, "important Farmland Categories" were established based on soil characteristics that have significant agricultural production values. Categories mapped by the FMMP are as follows:

- Prime Farmland. Prime Farmland is land that has been used for irrigated agricultural production and meets the physical and chemical criteria for Prime Farmland as determined by the United States Department of Agriculture (USDA), NRCS. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.

- Farmland of Statewide Importance. Farmland of Statewide Importance is similar to Prime Farmland but generally includes steeper slopes or less ability to store soil moisture. In order to be classified as Farmland of Statewide Importance, the land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- Unique Farmland. Unique Farmland is farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include non-irrigated orchards or vineyards. Land must have been cropped at some time during the 4 years prior to the mapping date.
- Farmland of Local Importance. Farmland of Local Importance is land important to the local economy as determined by the County Board of Supervisors and a local advisory committee. This land includes dryland grain producing lands and farmlands that are presently irrigated but do not meet the soil characteristics of Prime Farmland or Farmland of Statewide Importance.
- Grazing Land. Grazing Land is land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, UC Cooperative Extension, and other groups interested in the extent of grazing activities. The minimum mapping unit for Grazing Land is 40 acres.
- Urban and Built-up Land. Urban and Built-Up Land is land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
- Other Land. Other Land is land not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines and borrow pits; and water bodies smaller than 40 acres.
- Water. This category includes perennial water bodies with an extent of at least 40 acres.

3.2.2.4 California Open Space Subvention Act

The California Open Space Subvention Act (CGC Section 16143) states that land shall be deemed to be devoted to open space uses of statewide significance if it meets the following criteria:

A. Could be developed as prime agricultural land, or

B. Is open space land as defined in Section 65560 which constitutes a resource whose preservation is of more than local importance for ecological, economic, educational, or other purposes. The Secretary of the Resources Agency shall be the final judge of whether the land is in fact devoted to open space use of statewide significance.

3.2.2.5 California Public Resources Code

The following California PRC sections are set forth in the thresholds of significance for this section and discussed in the impact analysis below.

PRC Section 12220(g): “Forest land” is land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

PRC Section 4526: “Timberland” means land, other than land owned by the federal government, and land designated by the board as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees.

PRC Section 54404(g): “Timberland production zone” or “TPZ” means an area which has been zoned pursuant to Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, as defined in subdivision (h). With respect to the General Plans of cities and counties, “timberland preserve zone” means “timberland production zone”.

PRC Section 21060.1: “Agricultural land” means Prime Farmland, Farmland of Statewide Importance or Unique Farmland, as defined by the USDA land inventory and monitoring criteria, as modified for California.

PRC Section 51238: The following guidelines for Williamson Act contracted land and allowable uses is included in Section 51238:

> “(a)(1) Notwithstanding any determination of compatible uses by the County or City pursuant to this article, unless the board or council after notice and hearing makes a finding to the contrary, the erection, construction, alteration, or maintenance of gas, electric, water, communication, or agricultural laborer housing facilities are hereby determined to be compatible uses within any agricultural preserve.”

3.2.2.6 Local

Merced County Local Agency Formation Commission

Urban growth and expansion in California is regulated by the Merced County Local Agency Formation Commission (LAFCo), which serves as the local review body. Made up of elected officials from both the City and Merced County, LAFCo is responsible for reviewing and approving all changes to municipal boundaries, including annexations. LAFCo has established a set of Local Goals, Objectives, and Policies to address community concerns and priorities related to annexations and the preservation of agricultural land. The specific objectives and policies can be found in the Policy and Procedures Chapter II: Merced County LAFCo Policies, including the following relevant to the Program:

Objective I.A: Prime agricultural land is protected and conserved while ensuring there are adequate areas for efficient and orderly growth.

- **Policy 2** At the time of adoption of a SOI for a city or urban service district, efforts to direct growth away from large concentrations of prime agricultural land shall be demonstrated, recognizing that some conversion of prime lands may be inevitable.

Objective II.A: Create an urban land use pattern in the City that provides adequate areas for growth while ensuring the efficient delivery of services.

- **Policy 3** Cities should adopt phasing policies in their General Plans which identify priorities for growth and annexation which meet the joint objectives of extending urban services in an economic and efficient manner and avoiding the premature conversion of prime agricultural lands or other valuable open space resources.

Objective II.C: Create an urban land use pattern in unincorporated communities that provides adequate areas for growth while ensuring the efficient delivery of services.

- **Policy 6** An urban service district's SOI boundary should be large enough to accommodate approximately 20 years of projected growth as well as territory that represents special communities of interest for the district.

Objective II.D: The future expansion of an urban service district is reviewed comprehensively at the SOI amendment stage rather than during the review of individual annexation requests.

- **Policy 9** The following criteria will be applied to an urban service district requesting a SOI amendment when policies in the County General Plan and/or a Community Plan are found consistent with both the Cortese/Knox/Hertzberg Act and Merced County Local Agency Formation Commission (LAFCO) policies:
    - Does the County General Plan and/or Community Plan identify the urban service district's desired SOI boundary and all planned land uses in the expanded sphere as identified as the SUDP boundary?
    - Does the County General Plan and/or Community Plan contain policy regarding the phasing of urban expansion that is consistent with the policies of Merced County LAFCO and the Cortese/Knox/Hertzberg Act?
    - Are there local policies regarding the timing of conversion of agricultural and other open space lands and the avoidance of conversion of prime soils?
    - Does the County General Plan and/or Community Plan demonstrate the present and probable provision of public facilities and community services (including the sequence, timing and probable cost of providing such services) within the proposed SOI boundary?
    - Does the County General Plan and/or Community Plan identify the existence of any social or economic communities of interest within the planning area, such as the relationship between any adjacent or nearby cities or special districts which provide urban services, which may affect the boundaries of the proposed SOI?

Merced County Ordinance 1213

Merced County Ordinance 1213 is the County's right-to-farm ordinance. It requires that parcel maps of all parcels within 1,000-feet of an agricultural zone and dwelling units of more than 500 square feet have a notice advising of the potential inconveniences created by agricultural operations but that these

inconveniences are acceptable customs and standards of agricultural operations in the vicinity of the property. Additionally, the ordinance requires that building permit applicants acknowledge the ordinance before a permit can be issued.

Merced Vision 2030 General Plan

The City of Merced (City) Vision 2030 General Plan (2030 General Plan) Chapter 7: Open Space, Conservation, and Recreation, was adopted January 3, 2012 and updated June 2016 (City of Merced 2016). The City's 2030 Plan Chapter 2: Urban Expansion was adopted January 3, 2012 and amended most recently January 2024.These chapters contain several policies that directly or indirectly pertain to agriculture and forestry resources, including the following:

Goal Area OS-2: Open Space for the managed Production of Resources

- **Policy OS-2.1.** Protect agricultural areas outside of the City's SUDP/SOI from urban impacts.
- **Policy OS-2.2.** Relieve pressures on converting areas containing large concentrations of "prime" agricultural soils to urban uses by providing adequate urban development land within the Merced City SUDP/SOI.

Goal Area OS-5: Conservation of Resources

- Policy OS-5.2 Protect soil resources from the erosive forces of wind and water.

Goal Area UE-1: Preservation of Agriculturally Significant Areas

- Policy UE-1.1 Designate areas for new urban development that recognize the physical characteristics and environmental constraints of the planning area.
- Policy UE-1.2 Foster compact and efficient development patterns to maintain a compact urban form.
- Policy UE-1.3 Control the annexation, timing, density, and location of new land uses within the City's urban expansion boundaries.
- Policy UE-1.5 Promote annexation of developed areas within the City's SUDP/SOI during the planning period.

Goal Area UD-1: Transit Ready Development or Urban Villages

- Policy UD-1.1 Apply Transit-Ready Development or Urban Village design principles to a new development in the City's new growth areas.
- Policy UD-1.4 Promote and facilitate Urban Village residential area design principles.

Goal Area L-3: Urban Growth and Design Goals, Policies, and Actions

- Policy L-3.2 Encourage infill development and a compact urban form.

3.2.3 Environmental Setting

3.2.3.1 Regional Setting

According to the California Department of Food and Agriculture, Agricultural Statistics Review for 2021-2022, Merced County was ranked fifth in the state for total value of agricultural production in 2022 (California Department of Food and Agriculture 2023). The main agricultural commodities for total value of production include milk, almonds, chickens, and cattle, indicating that Merced County generally relies heavily on agricultural production operations and contains large portions of agricultural lands.

3.2.3.2 Local Setting

The Program Study Area consists largely of an urban setting at the City's core with surrounding agricultural lands. The historic center of the City was established on an alluvial fan and historic flood plain of Bear and Black Rascal Creeks, which consists largely of what would be classified as soils capable of supporting Prime farmlands. However, the northeast areas of the Program Study Area contain soils with poorer quality and are mostly used for livestock pasture and grazing, and soils south of the City's center tend to be classified as poorly drained with high concentrations of saline-alkali (City of Merced 2012a).

Based on the USDA's NRCS Web Soil Survey, there are 24 different soils series present within the Program Study Area (USDA 2024; NRCS 2024). A complete summary of the soil series that occur in the Program Study Area are outlined in **Table 3.2-1**.

The soils in this region generally consist of poorly sorted gravel, sand, silt, and clay and are acidic with low fertility. The soils have a moderate shrink-swell potential, with a granular, clayey, and relatively consolidated and cemented nature, and as such the soils in the Program Study Area are regarded as moderately expansive, with low to moderate erosion potential (City of Merced 2012b).

Table 3.2-1: Program Study Area Soils Summary

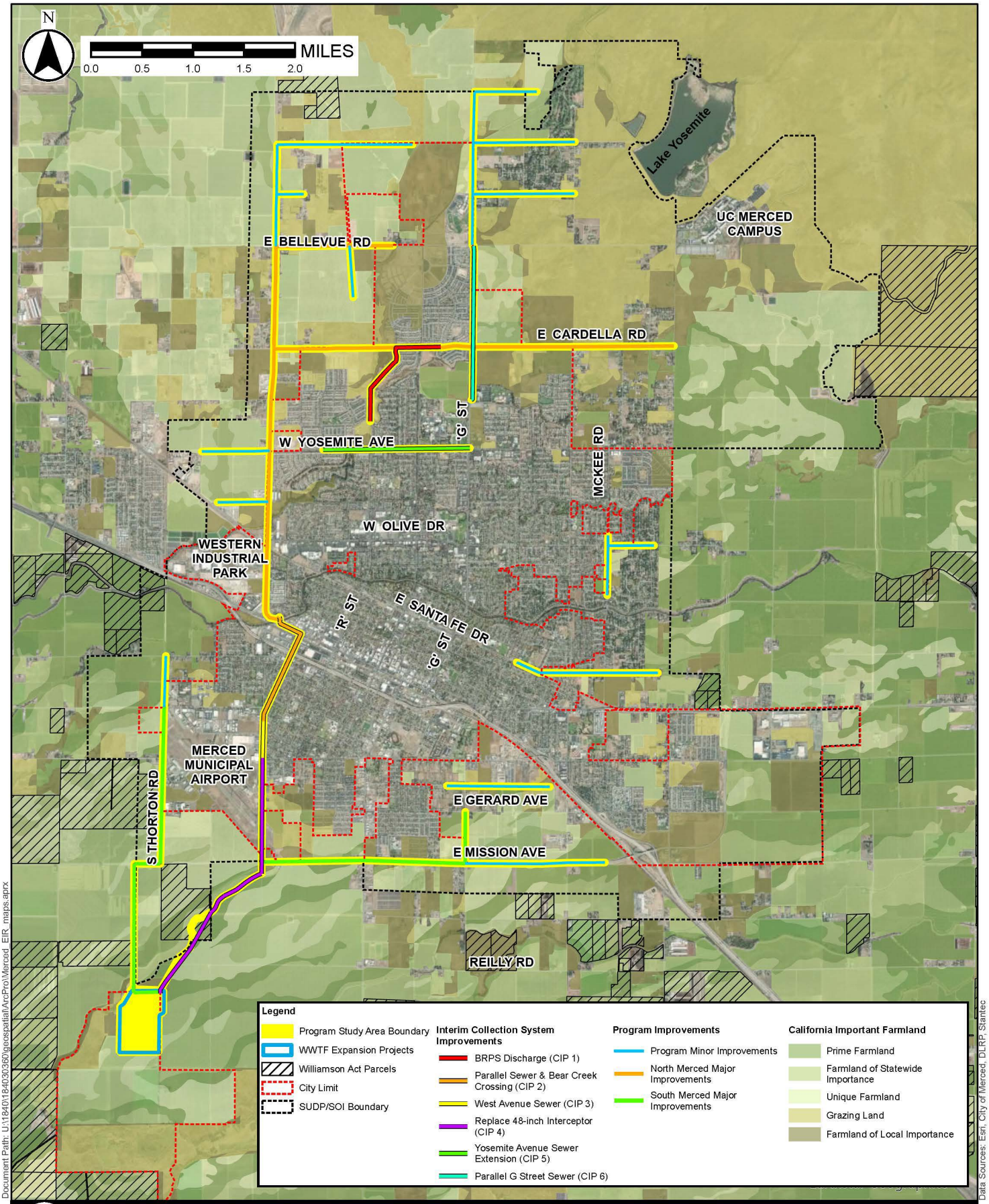
Soil Series Name	Typical Program Study Area Pedon	Slope (%)	Drainage	Permeability	Runoff
Alamo	Clay	0–1	Poor	Very slow	Ponded - Very slow
Anderson	Gravel	0–3	Excessive	Moderate – Rapid	Slow - Medium
Bear Creek	Clay, Loam	0–3	Poor - Moderate	-	Low - Very low
Burchell	Silt, Clay, Loam, Saline-Alkali	0–1	Poor	Slow – Moderately slow	Slow - Medium
Corning	Gravel, Loam, Sand	0–8	Well - Moderate	Very slow – Slow	Very high
Greenfield	Sand, Loam	0–3	Well	Moderate – Rapid	Slow - Medium
Honcut	Silt, Clay, Loam	0–1	Well	Moderate – Rapid	Slow - Medium
Hopeton	Gravel, Clay, Loam	0–8	-	-	-

Soil Series Name	Typical Program Study Area Pedon	Slope (%)	Drainage	Permeability	Runoff
Keyes	Gravel, Clay, Loam	0–8	Well - Moderate	Very slow	Slow - Medium
Landlow	Silt, Clay, Loam, Alkali	0–1	Poor	Slow	Slow
Lewis	Silt, Clay, Loam, Saline-Alkali	0–1	Well	Slow	Medium - High
Marguerite	Silt, Clay, Loam	0–1	-	-	-
Montpellier	Sand, Loam	0–8	Well - Moderate	Slow – Moderate	Slow - Medium
Pentz	Gravel, Clay, Loam	0–30	Well drained	-	-
Peters	Clay	0–8	Well drained	-	-
Porterville	Clay	0–3	Well drained	Slow	Very slow - Rapid
Raynor	Clay, Cobbly	0–8	-	-	-
Redding	Gravel, Loam	0–30	Well - Moderate	Very slow – Slow	Very low - High
Rocklin	Loam, Sand	0–8	Well drained	Very slow – Slow	Very slow - Medium
Ryer	Clay, Loam	0–8	Well drained	Slow	Very slow - Medium
San Joaquin	Loam, Sand	0–8	Well - Moderate	Very slow	Medium - Very high
Whitney	Sand, Loam	0–8	Good	Moderate – Rapid	Slow - Medium
Wyman	Clay, Loam	0–3	Well drained	Slow – Moderate	Slow - Medium
Yokohl	Clay, Loam	0–3	Well drained	Very slow – Slow	Very slow - Rapid

Note:
- = No data for soil series
Source: USDA 2024, NRCS 2024

According to the FMMP for the Program Study Area, the majority of the area contains lands classified as Urban and Built-Up Land, with surrounding Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Areas (**Figure 3.2-1**) (FMMP 2018). Additionally, the areas surrounding the Program Study Area also contain Williamson Act contracted lands (**Figure 3.2- 1**). These Williamson Act contracted lands including lands under both mixed enrollment agricultural lands and non-renewal lands. The mixed enrollment agricultural lands include enrolled lands containing a combination of Prime Farmland, Non-Prime Farmland, Open Space, and other contracted or enrolled lands not yet delineated by Merced County. Williamson Act contracted lands under non-enrollment include enrolled lands that a non-renewal has been filed pursuant to Government Code Section 51245, but the contract remains until the balance of the period remaining on the contract expire (DOC 2013). A few Williamson Act contracted lands occur directly within the Program Study Area, within the 200-foot buffer of the South Merced Major Improvements. Two parcels, Assessor Parcel Number (APN) 215-150-010 and 65-080-010, is enrolled in a Williamson Act contract, is designated Prime Farmland, and is adjacent to CIP 4.

No lands within the Program Study Area meet the definition of “Forest Land” as defined by PRC Section 12220(g) as supporting a minimum of 10 percent native tree cover under natural conditions.



Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.2-1
Important Farmland

3.2.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to agriculture and forestry resources. For the purposes of this analysis, relevant database information was reviewed to identify designated Farmland, including Prime Farmland, Unique Farmland, and Farmland of Statewide Importance within the Program Study Area. The Program Study Area's physical resources (e.g., vegetation, soil quality, water availability, and historic uses) were also reviewed for agricultural and forestry potential using a combination of data review, published reports, and professional experience. Prime Farmland, Unique Farmland, and Farmland of Statewide Importance are protected under PRC Section 21060.1. Projects that would result in the direct or indirect conversion of designated Farmland would have a significant impact on the environment. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.2.4.1 Methodology

The analysis of impacts on agriculture and forestry resources, resulting from implementation of the Program is based on review of data collected and results of the desktop evaluations performed using geographic information systems (GIS) analysis.

3.2.4.2 Impact Analysis

Impact AG-1 Potential to 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.

Impact AG-1 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

According to the DOC's FMMP, much of the Program Study Area is located within Urban and Built-Up Land. As shown on **Figure 3.2-1**, there are several areas within the Program Study Area (within the 200-foot construction buffer zone) that are designated as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland (FMMP 2018). However, Program construction activities would consist of placing pipelines within the existing or future ROW (i.e., roads and highways), which would minimize impacts to undisturbed and designated Farmland. Therefore, there is no potential for conversion of designated farmlands and construction impacts associated with the Program would be considered less-than-significant.

Operation

Permanent Program activities would be within the existing or future ROWs, not operating in place of agricultural operations on designated farmlands, which would minimize impacts to undisturbed and designated Farmland. Program features that would be located above ground, such as pump stations or associated appurtenances, are anticipated to be less than 2,000 square feet. This area is considered less

than 5 percent of any individual acre, which would be a fractional amount of any given designated Farmland parcel and would be a compatible use with designated farmlands per City of Merced Zoning Ordinance 20.18.020 (City of Merced 2016). The impact from operation of the Program as related to conversion of designated Farmland to non-agricultural use would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AG-1
Level of Significance After Mitigation: Less-Than-Significant

Project Impacts: CIPs 1-6

Construction

According to the DOC's FMMP, much of the Program Study Area is located within Urban and Built-Up Land, but as shown on **Figure 3.2-1**, there are several areas within the Program Study Area (within the 200-foot buffer zone) that are designated as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland (FMMP 2018).

Impacts to lands designated as Farmland for the CIPs 1-6 would be similar to that of the Program, as described above. Construction activities would be within the existing or future ROWs, which would minimize impacts to undisturbed and designated Farmland. Therefore, there would be a less-than-significant impact.

Operation

Permanent CIPs 1-6 activities would be within the existing or future ROWs, not operating in place of agricultural operations on designated farmlands, which would minimize impacts to undisturbed and designated Farmland. CIPs 1-6 features that would be located above ground, such as associated appurtenances, are anticipated to be less than 2,000 square feet. This area is considered less than 5 percent of any individual acre, which would be a fractional amount of any given designated Farmland parcel and would be a compatible use with designated farmlands per City of Merced Zoning Ordinance 20.18.020 (City of Merced 2016). The impact from operation of the CIPs 1-6 as related to conversion of designated Farmland to non-agricultural use would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AG-1
Level of Significance After Mitigation: Less-Than-Significant

Impact AG-1 Findings

Impact AG-1 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact AG-1 Mitigation Required: None Required

Impact AG-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact AG-2: Potential to conflict with existing zoning for agricultural use or Williamson Act contract.

Impact AG-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Two parcels, APN 215-150-010 and 65-080-010, are enrolled in a Williamson Act contract, designated Prime Farmland, and occur within the Program Study Area's 200-foot buffer of the South Merced Major Improvements. Construction would take place along Thorton Road, across the aqueduct from APN 215-150-010. Construction would be adjacent to APN 65-080-010. Similar to the analysis for Impact AG-1, implementation of the Program would involve placement of pipelines within existing or future ROWs throughout the Program Study Area and improvements at the WWTF adjacent to the ROWs. Construction of the Program may result in short-term temporary land use conflicts with existing agricultural operations around the Program Study Area. Therefore, MM AG-1 would be implemented to coordinate with local farming operations adjacent to the active Program construction areas and minimize conflict.

There are no parcels with Williamson Act contracts adjacent or a part of the WWTF Expansion Projects. The WWTF Expansion Projects would be converting a portion of the parcel south adjacent to the WWTF from agricultural use to a public facility (the WWTF expansion). However, the FMMP designates the land as Disturbed or Vacant Landa and it is not under a Williamson Act Contract even though it is zoned by the City as Agriculture. In addition, the impact of the WWTF Expansion Projects on the Williamson Act contracted lands approximately 1,500 feet north of the WWTF with the implementation of MM AG-1 and no expansion activities would take place directly adjacent to the lands or in the ROW adjacent to the lands. Therefore, impacts to existing agriculture use and Williamson Act lands within the Program Study Area by Program construction would be less-than-significant with MM AG-1 implemented.

Operation

Existing agriculture uses on parcels within the Program Study Area would not be impacted by the Program because the improvements are mostly underground and the above-ground improvements are mostly limited to small accessory structure under the size of 2,000 square feet, aside from the WWTF Expansion Projects. The WWTF Expansion Projects would occur within a parcel zoned as Agriculture (AG) but does not have active agricultural operations and is not under a Williamson Act contract. Therefore, operation of the Program would result in a conflict with agricultural use or in no impact to Williamson Act contracted lands.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AG-1
Level of Significance After Mitigation: Less-Than-Significant

Project Impacts: CIPs 1-6

Construction

Similar to the analysis for Impact AG-1, implementation of the CIPs 1-6 would involve placement of pipelines within existing or future ROWs throughout the Program Study Area. However, construction of the CIPs 1-6 may result in short-term temporary land use conflicts with existing agricultural operations around the Program Study Area. Therefore, MM AG-1 would be implemented to coordinate with local farming operations adjacent to the active CIPs 1-6 construction areas and minimize conflict, resulting in a less-than-significant impact.

Operation

Existing agriculture uses on parcels within the CIPs 1-6 would not be impacted by the CIPs 1-6 because the improvements are mostly underground in City ROWs and the above-ground improvements are mostly limited to small accessory structure under the size of 2,000 square feet. Therefore, operation of the Program would result in a conflict with agricultural use or in no impact to Williamson Act contracted lands.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AG-1
Level of Significance After Mitigation: Less-Than-Significant

Impact AG-2 Findings

Impact AG-2 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact AG-2 Mitigation Required: MM AG-1

Impact AG-2 Overall Level of Significance After Mitigation: Less-Than-Significant

Impact AG-3: Potential to conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).

Impact AG-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

The Program Study Area does not contain any forest lands as defined in PRC Section 12220(g) or any timberlands as defined by PRC Section 4526 or TPZ areas as defined by Government Code Section 51104(g). The Program Study Area consists of relatively flat, urban environments surrounded by agricultural lands that do not support forest land or timber production areas. Therefore, implementation and operation of the Program, including placement of pipelines, pump stations, and WWTF expansion components, would have no potential to conflict with any of these designations; therefore would have no impact.

Project Impacts: CIPs 1-6

Construction and Operation

The Program Study Area does not contain any forest lands as defined in PRC Section 12220(g) or any timberlands as defined by PRC Section 4526 or TPZ areas as defined by Government Code Section 51104(g). The Program Study Area consists of relatively flat, urban environments surrounded by agricultural lands that do not support forest land or timber production areas. Therefore, implementation and operation of the CIPs 1-6 would have no potential to conflict with any of these designations; therefore, would have no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Impact AG-3 Findings

Impact AG-3 Overall Level of Significance Prior to Mitigation: No Impact

Impact AG-3 Mitigation Required: None Required

Impact AG-3 Overall Level of Significance After Mitigation: No Impact

Impact AG-4 Potential to result in the loss of forest land or conversion of forest land to non-forest use.

Impact AG-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

The Program Study Area does not contain any forest lands as defined in PRC Section 12220(g) or any timberlands as defined by PRC Section 4526 or TPZ areas as defined by Government Code Section 51104(g). The Program Study Area consists of relatively flat, urban environments surrounded by agricultural lands that do not support forest land or timber production areas. Therefore, implementation and operation of the Program, including placement of pipelines, pump stations, and WWTF expansion components, would have no potential to result in the loss of forest land; therefore, would have no impact.

Project Impacts: CIPs 1-6

Construction and Operation

The Program Study Area does not contain any forest lands as defined in PRC Section 12220(g) or any timberlands as defined by PRC Section 4526 or TPZ areas as defined by Government Code Section 51104(g). The Program Study Area consists of relatively flat, urban environments surrounded by agricultural lands that do not support forest land or timber production areas. Therefore, implementation and operation of the CIPs 1-6 would have no potential to result in the loss of forest land; therefore, would have no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required

Level of Significance After Mitigation: No Impact

Impact AG-4 Findings

Impact AG-4 Overall Level of Significance Prior to Mitigation: No Impact

Impact AG-4 Mitigation Required: None Required

Impact AG-4 Overall Level of Significance After Mitigation: No Impact

Impact AG-5 Potential to involve other changes in the existing environment that, 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.

Impact AG-5 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

No other changes to the existing environment would occur during construction of the Program beyond what has been discussed under Impacts AG-1 through AG-4. Construction of the Program would not result in the additional conversion of farmland or forestland to non-agricultural use or non-forest use because construction would take place within the City's ROWs. Therefore, the impact would be less-than-significant.

Operation

The Program is planned to serve reasonable build-out within the 2030 General Plan's SUDP/SOI boundary, which encompasses the unincorporated areas surrounding the current City limits in which the City anticipates growth to occur. In the 2030 General Plan, existing farmland within the SUDP/SOI (and thus, Program Study Area) are already planned to be redesignated for residential, commercial and public land uses. In the 2030 General Plan EIR, impacts from that redesignation were already evaluated to be significant and unavoidable, even with the implementation of MMs, and goals, policies, and implementing actions of the 2030 General Plan (2021b). In the 2030 General Plan, no MMs were determined that would fully mitigate this impact; therefore, this impact remains significant, cumulatively considerable, and unavoidable. Since the Program will indirectly result in the conversion of farmland within the SUDP/SOI to urban uses over time, impacts to the potential conversion of farmland to non-agricultural use would be significant and unavoidable.

Project Impacts: CIPs 1-6

Construction

No other changes to the existing environment would occur during construction of the CIPs 1-6 beyond what has been discussed under Impacts AG-1 through AG-4. There would be no additional impact to farmland or forest land, and there would be no additional conversion of farmland or forestland to non-agricultural use or non-forest use. Therefore, the impact would be less-than-significant.

Operation

The CIPs 1-6 is planned to serve reasonable build-out within the 2030 General Plan's SUDP/SOI boundary, which encompasses the unincorporated areas surrounding the current City limits in which the City anticipates growth to occur. In the 2030 General Plan, existing farmland within the SUDP/SOI (and thus, Program Study Area) are already planned to be redesignated for residential, commercial and public land uses. In the 2030 General Plan EIR, impacts from that redesignation were already evaluated to be significant and unavoidable, even with the implementation of MMs, and goals, policies, and implementing actions of the 2030 General Plan (2021b). In the 2030 General Plan, no MMs were determined that would fully mitigate this impact; therefore, this impact remains significant, cumulatively considerable, and unavoidable. Since the CIPs 1-6 will indirectly result in the conversion of farmland within the SUDP/SOI to urban uses over time, impacts to the potential conversion of farmland to non-agricultural use would be significant and unavoidable.

Level of Significance Prior to Mitigation: Significant and Unavoidable
Mitigation Required: None Required
Level of Significance After Mitigation: Significant and Unavoidable

Impact AG-5 Findings

Impact AG-5 Overall Level of Significance Prior to Mitigation: Significant and Unavoidable

Impact AG-5 Mitigation Required: None Required

Impact AG-5 Overall Level of Significance After Mitigation: Significant and Unavoidable

3.2.5 Agricultural and Forestry Resources Mitigation

MM AG-1: The City shall develop a coordination plan to minimize potential conflicts with local agricultural operations during construction activities. This plan shall include the following components:

1. **Pre-Construction Outreach:** At least 30 days prior to the commencement of construction, the City shall contact local farmers within a half-mile radius of the Program Study Area to discuss any sensitive farming seasons and anticipated traffic schedules.
2. **Construction Scheduling:** The City shall adjust construction schedules to avoid conflicts with critical agricultural activities, particularly during peak planting and harvest periods identified by local farmers. This may include limiting construction hours or delaying certain activities during these times.
3. **Access Coordination:** The City shall ensure that construction-related traffic does not impede access to local farms. This includes planning to reduce construction traffic during peak agricultural hours and providing clear signage and communication with local farmers regarding construction activities.
4. **Ongoing Communication:** The City shall establish a communication protocol to keep local farmers informed about construction progress and any changes to the schedule that may affect their operations. This protocol shall include regular updates and a point of contact for farmers to raise concerns.

5. **Monitoring and Reporting:** The City shall monitor construction activities and their impact on local agricultural operations, providing a report at the end of the construction period to summarize coordination efforts and any issues that arose, along with resolutions implemented.

3.3 AIR QUALITY

3.3.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the impacts related to air quality that may result from implementation of the Program identifying mitigation for significant impacts, where feasible.

3.3.2 Regulatory Framework

This section discusses the federal, state, and local regulations related to air quality that may be relevant to the Program.

3.3.2.1 Federal

At the federal level, the U.S. Environmental Protection Agency (USEPA) has been charged with implementing national air quality programs. The USEPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA).

Clean Air Act and National Ambient Air Quality Standards

The FCAA, promulgated in 1963 and amended several times thereafter, including the 1990 Clean Air Act Amendments, establishes the framework for modern air pollution control. The FCAA directs the USEPA to establish national ambient air quality standards (NAAQS) for the following six criteria pollutants: ozone (O_3), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), sulfur dioxide (SO_2) and particulate matter (PM). The NAAQS are divided into primary and secondary standards; the primary standards are set to protect human health within an adequate margin of safety, and the secondary standards are set to protect environmental values, such as plant and animal life. **Table 3.3-1** summarizes the NAAQS and the California Ambient Air Quality Standards (CAAQS).

Table 3.3-1: National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
			Primary	Secondary
Ozone (O_3)	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	Same as Primary Standards
	1-hour	0.09 ppm (180 µg/m^3)	--	
Carbon monoxide (CO)	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	--
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	
Sulfur dioxide (SO_2)	Annual arithmetic mean	--	0.030 ppm (80 µg/m^3)	--
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (80 µg/m^3)	--
	3-hour	--	--	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	--	--
Respirable Particulate Matter Smaller than 10 Microns in Diameter (PM_{10})	Annual arithmetic mean	20 µg/m^3	--	Same as Primary Standards
	24-hour	50 µg/m^3	150 µg/m^3	
Respirable Particulate Matter Smaller than 2.5 Microns in Diameter ($PM_{2.5}$)[3]	Annual arithmetic mean	12 µg/m^3	9.0 µg/m^3	15 µg/m^3
	24-hour	No separate standard	35 µg/m^3	Same as Primary Standards
Sulfates	24-hour	25 µg/m^3	--	--
Lead (Pb)	30-day average	1.5 µg/m^3	--	--
	Calendar quarter	--	1.5 µg/m^3	Same as Primary Standard
	Rolling 3-month average	--	0.15 µg/m^3	
Hydrogen sulfide (H_2S)	1-hour	0.03 ppm (42 µg/m^3)	--	--
Vinyl chloride (chloroethene)	24-hour	0.01 ppm (26 µg/m^3)	--	--
Visibility-reducing particles	8-hour	In 1989, the Air Resources Board converted the general statewide 10-mile visibility standard to instrumental equivalents,	--	--

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
			Primary	Secondary
		which are extinction of 0.23 per kilometer		

Notes:
1. CO, SO_2 (1- and 24-hour), NO_2, O_3, PM_{10}, and visibility-reducing particles standards are not to be exceeded.
2. Not to be exceeded more than once a year except for annual standards.
3. On February 7, 2024, the USEPA issued a pre-publication version of the Final Rule to lower the primary annual NAAQS for $PM_{2.5}$ from 12.0 µg/m^3 to 9.0 µg/m^3 (USEPA 2024).
-- = no standard established
Sources: CARB 2016, USEPA 2024.

The FCAA requires states to submit a State Implementation Plan (SIP) for areas in nonattainment for NAAQS. The SIP, which is reviewed and approved by USEPA, must demonstrate how the NAAQS would be achieved. Failing to submit a plan or secure approval can lead to denial of federal funding and permits. In cases where the SIP fails to demonstrate achievement of the standards, USEPA is directed to prepare a federal implementation plan.

Non-Road Diesel Rule

- To reduce emissions from off-road diesel equipment, USEPA has established a series of increasingly strict emission standards for new off-road diesel vehicles and engines, including aircraft, heavy equipment, and locomotives. Any off-road construction equipment used for the Program would be required to comply with the applicable emissions standards..

3.3.2.2 State

The California Air Resources Board (CARB) is responsible for establishing and reviewing the state standards, compiling the California SIP and securing approval of that plan from USEPA, conducting research and planning, and identifying toxic air contaminates (TACs). CARB also regulates mobile sources of emissions in California, such as construction equipment, trucks, and automobiles, and oversees the activities of California's air quality management districts, which are organized at the County or regional level. Air quality management districts are primarily responsible for regulating stationary sources at industrial and commercial facilities within their geographic areas and for preparing the air quality plans that are required under the FCAA and California Clean Air Act (CCAA).

California Clean Air Act and California Ambient Air Quality Standards

In 1988, the State Legislature adopted the CCAA, which established a statewide air pollution control program. Unlike the FCAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Each air district's clean air plan is specifically designed to attain the standards and must be designed to achieve an annual five percent reduction in district-wide emissions of each nonattainment pollutant or its precursors. When an air district is unable to achieve a five percent annual reduction, the adoption of all feasible measures on an expeditious schedule is acceptable as an alternative strategy (Health and Safety Code Section 40914[b][2]). CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates, hydrogen sulfide (H_2S), vinyl chloride (C_2H_3Cl), and visibility-reducing particles.

The CARB and local air districts are responsible for achieving CAAQS, which are to be achieved through district-level air quality management plans that would be incorporated into the SIP. In California, the

USEPA has delegated authority to prepare SIPs to CARB, which in turn, has delegated that authority to individual air districts. The CARB traditionally has established state air quality standards, maintains oversight authority in air quality planning, develops programs for reducing emissions from motor vehicles, develops air emission inventories, collects air quality and meteorological data, and approves SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of indirect and area-wide sources of air pollutant emissions and gives local air pollution control districts explicit authority to regulate indirect sources of air pollution.

Toxic Air Contaminants

A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. The *California Almanac of Emissions and Air Quality* (CARB 2013) presents the relevant concentration and cancer risk data for the ten TACs that pose the most substantial health risk in California based on available data. These TACs are as follows: acetaldehyde, benzene, 1.3-butadiene, carbon tetrachloride, hexavalent chromium, paradichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel PM (DPM).

Some studies indicate that DPM poses the greatest health risk among the TACs listed above. A 10-year research program (CARB 1998) demonstrated that DPM from diesel-fueled engines is a human carcinogen, and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. In addition to increasing the risk of lung cancer, exposure to diesel exhaust can have other health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. Diesel exhaust is a major source of fine particulate pollution as well, and studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems.

DPM differs from other TACs in that it is not a single substance but a complex mixture of hundreds of substances. Although DPM is emitted by diesel-fueled, internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. However, unlike the other TACs no ambient monitoring data are available for DPM because no routine measurement method currently exists. The CARB has made preliminary concentration estimates based on a DPM exposure method. This method uses the CARB emissions inventory's PM less than 10 microns in diameter (PM_{10}) database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of DPM.

Within California, TACs are regulated primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics Hot Spots Information and Assessment Act of 1987). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB designates a substance as a TAC.

Sierra Club v. County of Fresno (Friant Ranch, L.P.)

In the Fifth District Court of Appeal case *Sierra Club v. County of Fresno* (Friant Ranch, L.P.), the court found the Friant Ranch project EIR deficient because it did not identify specific health-related effects resulting from the estimated amount of pollutants generated by the project. The ruling stated that the EIR should give a "sense of the nature and magnitude of the 'health and safety problems' caused by a project's air pollution. The EIR should translate the emission numbers into adverse impacts or to understand why such translation is not possible at this time (and what limited translation is, in fact, possible)."

Community Air Protection Program

In response to AB 617 (C. Garcia, Chapter 136, Statutes of 2017), CARB established the Community Air Protection Program. The Community Air Protection Program includes community air monitoring, and the community emissions reduction program's focus is to reduce exposure in communities most impacted by air pollution. The California Legislature has appropriated funding to support early actions to address localized air pollution through targeted incentive funding to deploy cleaner technologies in these communities and grants to support community participation in the AB 617 process. AB 617 also includes new requirements for accelerated retrofit of pollution controls on industrial sources, increased penalty fees, and greater transparency and availability of air quality and emissions data, which will help advance air pollution control efforts throughout the state.

3.3.2.3 Local

San Joaquin Valley Air Pollution Control District

The Program Study Area is located within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD), which regulates air pollutant emissions for all sources throughout the SJVAB other than motor vehicles. The SJVAPCD enforces regulations and administers permits governing stationary sources. The SJVAPCD has developed the Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI) to provide technical guidance for the review of air quality impacts as they relate to projects within the jurisdiction of the SJVAPCD (SJVAPCD 2015a).

Rules and Regulations

The SJVAPCD rules and regulations that may apply during build-out of the Program include, but are not limited to, the following:

Rule 2010 – Permits Required. The purpose of this rule is to require any person constructing, altering, replacing or operating any source operation which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate. This rule also explains the posting requirements for a Permit to Operate and the illegality of a person willfully altering, defacing, forging, counterfeiting or falsifying any Permit to Operate.

Rule 2201 – New and Modified Stationary Source Review Rule. The purpose of this rule is to provide for the following:

- The review of new and modified Stationary Sources of air pollution and to provide mechanisms including emission trade-offs by which Authorities to Construct such sources may be granted, without interfering with the attainment or maintenance of ambient air quality standards; and
- No net increase in emissions above specified thresholds from new and modified Stationary Sources of all nonattainment pollutants and their precursors.

Rule 4002 – National Emission Standards for Hazardous Air Pollutants. This rule incorporates the National Emission Standards for Hazardous Air Pollutants from Part 61, Chapter I, Subchapter C, Title 40, Code of Federal Regulations (CFR) and the National Emission Standards for Hazardous Air Pollutants for Source Categories from Part 63, Chapter I, Subchapter C, Title 40, CFR.

Rule 4101 – Visible Emissions. This rule prohibits the emissions of visible air contaminants to the atmosphere. The rule applies to any source operation which emits or may emit air contaminants.

Rule 4102 – Nuisance. The purpose of this rule is to protect the health and safety of the public and applies to any source operation that emits or may emit air contaminants or other materials.

Rule 4601 – Architectural Coatings. The purpose of this rule is to limit Reactive Organic Gases (ROG) emissions (also called Volatile Organic Compound [VOC] emissions) from architectural coatings. Emissions are reduced by limits on VOC content and providing requirements on coatings storage, cleanup, and labeling.

Rule 4623 – Storage of Organic Liquids. The purpose of this rule is to limit ROG emissions from the storage of organic liquids.

Rule 4624 – Transfer of Organic Liquids. The purpose of this rule is to limit ROG emissions from the transfer of organic liquids.

Rule 4641 – Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations. The purpose of this rule is to limit ROG emissions from asphalt paving and maintenance operations. If asphalt paving will be used, then the paving operations will be subject to Rule 4641.

Regulation VIII – Fugitive PM_{10} Prohibitions. Rules 8011 through 8081 are designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track-out, etc. Project construction contractors shall be required to comply with the following:

- Water previously exposed surfaces (soil) whenever visible dust is capable of drifting from the site or approaches 20 percent opacity.
- Water all unpaved haul roads a minimum of three-times/day or whenever visible dust from such roads is capable of drifting from the site or approaches 20 percent opacity.
- Reduce speed on unpaved roads to less than 15 miles per hour (mph).
- Install and maintain a track-out control device that meets the specifications of SJVAPCD Rule 8041 if the site exceeds 150 vehicle trips per day or more than 20 vehicle trips per day by vehicles with three or more axles.

- Stabilize all disturbed areas, including storage piles, which are not being actively utilized for production purposes using water, chemical stabilizers or by covering with a tarp or other suitable cover.
- Control fugitive dust emissions during land clearing, grubbing, scraping, excavation, leveling, grading, or cut and fill operations with application of water or by presoaking.
- When transporting materials offsite, maintain a freeboard limit of at least six inches and cover or effectively wet to limit visible dust emissions.
- Limit and remove the accumulation of mud and/or dirt from adjacent public roadways at the end of each workday (Use of dry rotary brushes is prohibited except when preceded or accompanied by sufficient wetting to limit visible dust emissions and use of blowers is expressly forbidden).
- Stabilize the surface of storage pile following the addition or removal of materials using water or chemical stabilizers/suppressants.
- Remove visible track-out from the site at the end of each workday.
- Cease grading or other activities that cause excessive (greater than 20 percent opacity) dust formation during periods of high winds (greater than 20 mph over a one-hour period).

Rule 9410 – Employee Based Trip Reduction. The purpose of this rule is to reduce vehicle miles traveled (VMT) from private vehicle used by employees to commute to and from their worksites to reduce emissions of NOx, ROG, and PM. This rule applies to employers within the San Joaquin Valley Air Basin (SJVAB) with at least 100 eligible employees at a worksite for at least 16 consecutive weeks.

Rule 9510 – Indirect Source Review. This rule reduces the impact of NOx and PM_{10} emissions from growth on the SJVAB. The rule places application and emission reduction requirements on development projects meeting applicability criteria to reduce emissions through onsite mitigation, offsite District-administered projects, or a combination of the two. Rule 9510 requires that these development projects mitigate exhaust emissions from construction equipment greater than 50 horsepower to 20 percent below statewide average NO_x emissions and 45 percent below statewide average PM_{10} exhaust emissions. This rule also requires applicants to reduce baseline emissions of NO_x and PM_{10} emissions associated with operations by 33.3 percent and 50 percent respectively over a period of 10 years.

Air Quality Plans

2007 PM_{10} Maintenance Plan. In October 2006, the USEPA determined that the SJVAB attained PM_{10} standards, based on ambient monitoring data from the years 2003 through 2005. In order to constitute redesignation to attainment, the SJVAPCD prepared the 2007 PM_{10} Maintenance Plan. The 2007 PM_{10} Maintenance Plan addresses both the 24-hour and the rescinded annual PM_{10} standards (CARB 2007).

2013 Revoked 1-Hour Ozone Plan. The SJVAPCD developed the 2013 Ozone Plan for USEPA's revoked 1-hour ozone standard. The SJVAPCD had previously prepared a 1-Hour Ozone Plan in 2004 that was approved by the USEPA. However, in 2010, the USEPA withdrew this approval as a result of litigation. The SJVAPCD's 2013 Plan for the Revoked 1-Hour Ozone Standard was approved by the Governing Board in September 2013 (SJVAPCD 2013).

2016 8-Hour Ozone Plan. In June 2016, the SJVAPCD's Governing Board approved the 2016 Plan for the 2008 8-Hour Ozone Standard (2016 Ozone Plan). The comprehensive strategy in this plan is

intended to reduce NOx emissions by over 60 percent between 2012 and 2031. This will require another 207.7 tons per day in NOx reductions from stationary and mobile sources throughout the San Joaquin Valley. The SJVAB faces significant and unique challenges in reducing ozone. Specifically, the geography and meteorology exacerbate the formation and retention of air pollution and the SJVAB has one of the fastest population growth rates in the state. The 2016 Ozone Plan accounts for these challenges and builds upon the SJVAPCD's approved 1-hour ozone and PM strategies to meet NAAQS. The 2016 Ozone Plan is expected to bring the SJVAB into federal attainment of USEPA's 2008 8-hour ozone standard as expeditiously as practicable, but no later than December 31, 2031 (SJVAPCD 2016).

2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards. The SJVAPCD adopted the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards on November 15, 2018. CARB adopted the 2018 Plan on January 24, 2019, and portions were approved by the USEPA on June 30, 2020. The plan addresses the federal 1997 annual $PM_{2.5}$ standard of 15 micrograms per cubic meter ($\mu g/m^3$) and 24-hour $PM_{2.5}$ standard of 65 $\mu g/m^3$; the 2006 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$; and the 2012 annual $PM_{2.5}$ standard of 12 ug/m^3. The 2018 Plan builds upon previous $PM_{2.5}$ Attainment Plans but identifies new actions to further reduce emissions. The attainment deadline for the 1997 $PM_{2.5}$ Standard is December 31, 2015, the 2006 $PM_{2.5}$ Standard is December 31, 2024 (with a 5-year extension request), and the 2012 $PM_{2.5}$ Standard is December 31, 2025 (SJVAPCD 2018).

2020 Reasonably Available Control Technology (RACT) Demonstration. Pursuant to Sections 182(b) and (f) of the FCAA, areas classified as moderate or higher for O_3 nonattainment are required to implement RACT requirements for sources that are subject to USEPA Control Techniques for major sources of ROG and NOx. RACT requirements ensure that significant sources of emissions in nonattainment areas are controlled to a reasonable extent. The SJVAPCD prepared the 2020 RACT Demonstration for the 2015 8-Hour Ozone Standard Demonstration (2020 RACT Demonstration) to build upon previous RACT reports and to provide a comprehensive evaluation of all NOx and VOC SJVAPCD rules to ensure that each rule meets or exceeds RACT requirements. The document fulfills FCAA requirements and demonstrates that all federal RACT requirements continue to be satisfied in the SJVAB (SJVAPCD 2020).

2022 8-Hour Ozone Plan. In December 2022, the SJVAPCD approved the 2022 Plan for the 2015 8- Hour Ozone Standard (2022 Ozone Plan). The 2022 Ozone Plan develops a strategy to attain the federal 2015 NAAQS of 70 parts per billion as quickly as possible, and no later than the 2037 attainment deadline (SJVAPCD 2022).

2023 Maintenance Plan and Redesignation Request for the Revoked 1-Hour Ozone Standard. In June 2023, the SJVAPCD adopted the 2023 Maintenance Plan. The SJVAB has been in attainment for the revoked 1-hour O_3 NAAQS since 2014, and the 2023 Maintenance Plan includes a demonstration that would ensure that the area remains in attainment through 2036 (SJVAPCD 2023).

Merced Vision 2030 General Plan

The City's Merced Vision 2030 General Plan (2030 General Plan), adopted January 3, 2012 (City of Merced 2012) contains policies that pertain to air quality, including the following:

Goal Area SD-1: Air Quality and Climate Change

Policy SD-1.1 Accurately determine and fairly mitigate the local and regional air quality impacts of projects proposed in the City.

Policy SD-1.6. Reduce emissions of PM_{10} and other particulates with local control potential.

3.3.3 Environmental Setting

3.3.3.1 Regional Topography, Meteorology, and Climate

The Program Study Area is located in the SJVAB, which occupies the southern half of the Central Valley and comprises eight counties: San Joaquin, Stanislaus, Fresno, Merced, Madera, Kings, Tulare, and portions of Kern County. The SJVAB is about 250 miles long and 35 miles wide (on average) and is bordered by the Coast Range Mountains on the west, the Sierra Nevada mountains on the east, and the Tehachapi Mountains to the south. On the valley floor, the SJVAB is open only to the north, which heavily influences prevailing winds.

Although marine air generally flows into the SJVAB from the San Francisco Bay Area through the Carquinez Strait (a gap in the Coast Range Mountains) and low mountain passes such as Altamont Pass and Pacheco Pass, the mountain ranges restrict air movement through the SJVAB. Additionally, most of the surrounding mountains are above the normal height of summer inversion layers (1,500 to 3,000 feet). These topographic features result in weak airflow and poor dispersion of pollutants, and as a result, the SJVAB is highly susceptible to pollutant accumulation.

The average daily maximum and minimum summer temperatures (i.e., July) in Merced, California, are 96 degrees Fahrenheit (°F) and 62 °F, respectively, and the average daily maximum and minimum winter (i.e., January) temperatures are 54 °F and 37 °F, respectively. Average annual precipitation is 13.04 inches (U.S. Climate Data 2024).

3.3.3.2 Air Pollutants of Concern

NAAQS and the CAAQS are established for six criteria pollutants: O_3, CO, Pb, NO_2, SO_2, and PM. The following section discusses the criteria pollutants, as well as additional air pollutants of concern.

Criteria Pollutants

Ozone

Ozone is a respiratory irritant that can cause severe ear, nose, and throat irritation and increase susceptibility to respiratory infections. It is also an oxidant that can cause extensive damage to plants through leaf discoloration and cell damage. It can cause substantial damage to other materials as well, such as synthetic rubber and textiles.

O_3 is a secondary pollutant not emitted directly into the air but is formed by a photochemical reaction in the atmosphere. O_3 precursors, reactive organic gases (ROGs) and NO_X, react in the atmosphere in the presence of sunlight to form O_3 and can be formed many miles from the source of emissions. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, O_3 is

primarily a summer air pollution problem. ROG and NO_X are mainly emitted by mobile sources and stationary combustion equipment.

O_3 can damage the respiratory tract, causing inflammation and irritation, and it can induce symptoms, such as coughing, chest tightness, shortness of breath, and worsening of asthmatic symptoms. O_3 in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Exposure to high concentrations of O_3 (above the current ambient air quality standard) leads to lung inflammation, lung tissue damage, and a reduction in the amount of air inhaled into the lungs. Health effects include potential increased susceptibility to respiratory infections and reduced ability to exercise.

Hydrocarbons are organic gases that are made up of hydrogen and carbon atoms. There are several subsets of organic gases, including ROGs and VOCs. ROGs are defined by state rules and regulations, and VOCs are defined by federal rules and regulations. For the purposes of this assessment, hydrocarbons are classified and referred to as ROGs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels or as a product of chemical processes. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants. Other common sources are petroleum fuels, solvents, dry-cleaning solutions, and paint (through evaporation).

The health effects of hydrocarbons result from the formation of O_3. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen though displacement. Carcinogenic forms of hydrocarbons are considered TACs. There are no separate health standards for ROGs, although some are also toxic; for example, benzene is both a ROG and a carcinogen.

Nitrogen Oxides

Nitrogen oxides are a family of highly reactive gases that are a primary precursor to the formation of ground level ozone and react in the atmosphere to form acid rain. NO_2, often used interchangeably with NO_X, is a brownish, highly reactive gas that is present in all urban environments. The major human sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily NO, which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with O_3, the NO_2 concentration in a particular geographical area may not be representative of local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects primarily depends on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, such as coughing, difficulty breathing, vomiting, headaches, and eye irritation during or shortly after exposure. After a period of approximately 4 to 12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, coughing, cyanosis, chest pain, and rapid heartbeat. Severe symptomatic NO_2 intoxication after acute exposure has been linked to prolonged respiratory impairment, with such symptoms as emphysema, bronchitis, and aggravating existing heart disease.

Carbon Monoxide

CO is a colorless and odorless gas that interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. In urban areas, motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains emit CO. Automobile exhaust is responsible for most of the CO in urban areas. CO is a nonreactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follows the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. These locally concentrated peaks in CO are referred to as CO "hotspots." Because motor vehicles are the dominant source of CO emissions, CO hotspots are normally located near roads and freeways with high traffic volume.

When inhaled, CO enters the bloodstream and binds more readily to hemoglobin, the oxygen-carrying protein in blood, than oxygen, thereby reducing the oxygen-carrying capacity of blood and reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected, but only at higher levels of exposure. Exposure to CO can cause chest pain, headaches, and reduced mental alertness. At high concentrations, CO can cause heart difficulties in people with chronic diseases and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and, with prolonged enclosed exposure, death.

Particulate Matter

PM pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. PM also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. PM less than 10 microns in diameter, about 1/7th the thickness of a human hair, is referred to as PM_{10}. PM that is 2.5 microns or less in diameter, roughly 1/28th the diameter of a human hair, is referred to as $PM_{2.5}$. Major sources of PM_{10} include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. $PM_{2.5}$ results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, PM_{10} and $PM_{2.5}$ can be formed in the atmosphere from gases such as SO_2, NO_X, and VOCs.

PM_{10} and $PM_{2.5}$ pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM_{10} and $PM_{2.5}$ can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as Pb, sulfate (SO_4), and nitrates, can cause lung damage directly. These substances can be absorbed into the bloodstream and cause damage elsewhere in the body; they can also transport absorbed gases such as chlorides or ammonium into the lungs and cause injury. Whereas $PM_{2.5}$ and PM_{10} tend to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so fine that these particles can

penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle and contribute to haze and reduce regional visibility.

Sulfur Oxides

Sulfur oxides are any of several compounds of sulfur and oxygen, of which the most relevant to air quality is SO_2. SO_2 is a respiratory irritant that causes the bronchioles to constrict with inhalation at five parts per million or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis. SO_2 is produced by coal and oil combustion and such stationary sources as steel mills, refineries, and pulp and paper mills.

Lead

Pb is a natural metal constituent of air, water, and the biosphere. Pb was used several decades ago to increase the octane rating in automotive fuel; therefore, gasoline-powered automobile engines were a major source of airborne Pb. Since the use of leaded fuel has been phased out, the ambient concentrations of Pb have dropped dramatically. Short-term exposure to high levels of Pb can cause vomiting, diarrhea, convulsions, coma, or even death. However, even small amounts of Pb can be harmful, especially to infants, young children, and pregnant women. Pb exposure is most serious for young children because they absorb Pb more easily than adults and are more susceptible to its harmful effects. Even low-level exposure may harm the intellectual development, behavior, size, and hearing of infants. During pregnancy, especially in the last trimester, Pb can affect the fetus. Female workers exposed to high levels of Pb have more miscarriages and stillbirths.

Symptoms of long-term exposure to lower Pb levels may be less noticeable but are still serious. Anemia is common, and damage to the nervous system may cause impaired mental function. Other symptoms are appetite loss, abdominal pain, constipation, fatigue, sleeplessness, irritability, and headache. Continued excessive exposure, as in an industrial setting, can affect the kidneys.

Toxic Air Contaminants

Although NAAQS and CAAQS exist for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or other acute (short-term) or chronic (long-term) health problems. For TACs that are known or suspected carcinogens, CARB has consistently found that there are no levels or thresholds below which exposure is risk free. Individual TACs vary greatly in the risks that they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health effects, a similar factor, called a Hazard Index, is used to evaluate risk. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment (OEHHA). Examples of TAC sources include industrial processes, dry cleaners, gasoline stations, paint and solvent operations, and fossil fuel combustion sources.

Diesel Particulate Matter

In 1998, CARB identified DPM as a TAC (CARB 1998). On a statewide basis, the average potential cancer risk associated with DPM is more than 500 potential cases per million people. OEHHA estimated the potential cancer risk from a 70-year exposure to DPM at a concentration of one µg/m^3 ranges from 130 to 2,400 excess cancer cases per million people. A scientific review panel concluded that an appropriate point estimate of unit risk for a 70-year exposure to DPM is 300 excess cancer cases per million people (CARB 2000).

DPM of greatest health concern are those in the categories of fine (PM_{10}) and ultra-fine ($PM_{2.5}$). These fine and ultra-fine particles may be composed of elemental carbon with adsorbed compounds, such as organic compounds, SO_4, nitrate, metals, and other trace elements. The fine and ultra-fine particles are respirable, which means that they can avoid many of the human respiratory system defense mechanisms and enter deeply into the lungs.

Valley Fever

San Joaquin Valley Fever (formally known as coccidioidomycosis) is an infectious disease caused by the fungus *Coccidioides immitis*. San Joaquin Valley Fever is also known as Valley Fever, Desert Fever, or cocci. Infection is caused by inhalation of *Coccidioides immitis* spores that have become airborne when dry, dusty soil or dirt is disturbed by natural processes such as wind or earthquakes, or by human-induced ground-disturbing activities such as construction, farming, etc. Farmers, construction workers, and others who engage in soil-disturbing activities are at highest risk for Valley Fever.

About 10,000 cases in the United States are reported each year, mostly from Arizona and California. Valley Fever can be misdiagnosed because its symptoms are like those of other illnesses. For most people, the symptoms of Valley Fever will go away within a few months without any treatment. Some people may develop a more severe infection, especially those with compromised immune systems (Centers for Disease Control and Prevention 2020).

Approximately 65 percent of cases of Valley Fever in California are reported in people who live in the Central Valley and Central Coast regions. In California, the number of reported Valley Fever cases has greatly increased in recent years. Since 2000, the number of reported cases from increased from 1,000 to more than 9,000 cases reported in 2019 (California Department of Public Health 2021). In 2021, 117 cases of Valley Fever were recorded within San Joaquin County (California Department of Public Health 2023).

Asbestos

Naturally occurring asbestos is found in serpentine soils in the foothills of California and can become ingested during earth-moving activities such as grading. The Naturally Occurring Asbestos Hazards Map was reviewed to determine if the Program would involve construction in areas of relative likelihood for the presence of naturally occurring asbestos (USGS 2011). The Program Study Area is not located in an area mapped as having, or otherwise known to have, ultramafic rock. serpentine, or naturally occurring asbestos. The nearest mapped unit is approximately 35 miles southwest of the Program Study Area (USGS 2011).

In addition to naturally occurring asbestos, many building materials, including pipelines, have the potential to contain asbestos and other hazardous materials that could cause damage to the environment and to people if disturbed. If material containing asbestos is disturbed, tiny fibers can become airborne, which could cause respiratory damage leading to lung disease or other pulmonary complications. Historically, asbestos cement pipe, or more specifically the brand "Transite" for pipes, was used in the mid-1900s in potable water distribution systems, rather than in wastewater distribution systems (Safe Drinking Water Foundation 2024). However, demolition of old wastewater distribution systems could still have a risk of containing asbestos cement pipe, which could pose a health risk if particles become airborne.

3.3.3.3 Existing Air Quality Conditions

The SJVAPCD operates a regional monitoring network that measures the ambient concentrations of criteria pollutants. Existing and probable future general levels of air quality in the SJVAB can generally be inferred from ambient air quality measurements conducted by SJVAPCD at its monitoring stations. The major criteria pollutants of concern in the Central Valley (i.e., O_3, PM_{10}, $PM_{2.5}$, CO, NO_2, and SO_2) are monitored at a number of locations. Background ambient concentrations of pollutants are determined by average pollutant emissions, wind patterns, and meteorological conditions in a given area. As a result, background concentrations can vary among different locations within the Program Study Area. However, areas located close together and exposed to similar wind conditions can be expected to have similar background pollutant concentrations. The closest SJVAPCD monitoring stations to the Program Study Area are the Merced-M Street Station and the Merced-Coffee Station, which collectively monitor O_3, NO_2, $PM_{2.5}$, and PM_{10}.

Attainment Status

Local monitoring data is used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are defined as follows.

- Nonattainment: assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance: assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- Attainment: assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- Unclassified: assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question.

The current attainment designations for the SJVAB are shown in **Table 3.3-2**. The SJVAB is designated as nonattainment for federal O_3 and $PM_{2.5}$ as well as state O_3, PM_{10}, and $PM_{2.5}$ (SJVAPCD 2024).

Table 3.3-2: San Joaquin Valley Air Basin Attainment Status

Pollutant	Designation/Classification	
	Federal Standards[a]	State Standards[b]
Ozone – One hour	No Federal Standard[f]	Nonattainment/Severe
Ozone – Eight Hour	Nonattainment/Extreme[e]	Nonattainment
PM_{10}	Attainment[c]	Nonattainment

Pollutant	Designation/Classification	
	Federal Standards[a]	State Standards[b]
$PM_{2.5}$	Nonattainment[d]	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Notes:
[a] See 40 CFR Part 81
[b] See CCR Title 17 Sections 60200-60210
[c] On September 25, 2008, USEPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan.
[d] The valley is designated nonattainment for the 1997 $PM_{2.5}$ NAAQS. USEPA designated the valley as nonattainment for the 2006 $PM_{2.5}$ NAAQS on November 13, 2009 (effective December 14, 2009).
[e] Though the valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, USEPA approved valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).
[f] Effective June 15, 2005, the USEPA revoked the federal 1-hour ozone standard, including associated designations and classifications. USEPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.
Source: SJVAPCD 2024.

3.3.3.4 Odors

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., emotional reaction) to physiological (e.g., nausea). With respect to odors, the human nose is the sole sensing device. The ability to detect odors is subjective and varies considerably among the population. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another.

Noxious odors associated with wastewater systems are generally created when the dissolved oxygen content of the wastewater decreases (becomes anoxic). When the wastewater becomes anoxic there are no oxygen molecules to oxidize the sulfates in the wastewater, which means the sulfates instead combine with hydrogen to form hydrogen sulfide (H_2S) (or that odor that smells like rotten eggs). Typically, hydrogen sulfides (and other mercaptans[20]) are formed during low flow conditions or when the water in the sewer is flowing so slowly that it is not being aerated and goes anoxic. These odor-generating compounds then tend to settle with the sewage solids on the bottom of the wastewater system as flows decrease. When the flows increase the solids are stirred up releasing the odor-causing compounds into the air where they find their way up through manholes or other places where the gases can be released to the atmosphere. When designing wastewater systems (collection and treatment), engineers consider

[20] Mercaptans are a class of organic compounds consisting of carbon, hydrogen, and sulfur, and are known for having a potent odor.

odor control into design which either creates a closed system where air cannot escape or provides treatment such as odor scrubbers which filter the air before it is released from the system.

3.3.3.5 Sensitive Receptors

Sensitive land uses to air quality impacts are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors include residences, hospitals, and schools.

Sensitive receptors within the Program Study Area include residences throughout the SUDP/SOI, recreationalists, within recreational facilities (i.e., along bike paths or within a designated park), and commercial users throughout the SUDP/SOI. However, most development where substantial concentrations of people are located are typically within the developed areas of the City with scattered rural, residential, and industrial type receptors dominating the SUDP/SOI. There are sensitive receptors within two miles of the WWTF along Gove Road, S Grur Road, Roduner Road, and Highway 59, but the area is generally put to agricultural use, with very limited sensitive receptors.

As reasonable build-out occurs, it is anticipated that additional receptors would be added to the undeveloped areas of the Program Study Area; however, it is likely Program components would be installed before that development occurs. Additionally, there are numerous hospitals, schools, and parks within the Program Study Area and the developed areas described adjacent to the Program, all of which contain sensitive receptors.

3.3.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts related to air quality. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.3.4.1 Methodology

Implementation of the Program would result in both short- and long-term emissions of criteria air pollutants. Construction emissions would include exhaust from the operation of conventional construction equipment and vehicles, from fugitive dust as a result of grading and equipment, and from vehicle travel on unpaved surfaces. The SJVAPCD GAMAQI (Section 3.3.2, Regulatory Framework) contains thresholds of significance for ROG, NOx, CO, sulfur oxides (SO_X), PM_{10}, and $PM_{2.5}$ and other air quality impacts such as odors. Program-generated construction and operational emissions of criteria air pollutants, precursors, and odors were assessed in accordance with SJVAPCD recommended methods and thresholds. The relevant thresholds of significance are shown in **Table 3.3-3.** If emissions exceed the SJVAPCD significance thresholds, MMs would be required for the impacts to be considered less-than-significant.

Table 3.3-3: Air Quality Thresholds of Significance for Criteria Air Pollutants

Pollutant/Precursor	Tons per Year	
	Construction Emissions	Operational Emissions
ROG	10	10
NO_X	10	10
CO	100	100
SO_X	27	27
PM_{10}	15	15
$PM_{2.5}$	15	15

Source: SJVAPCD 2015a.

The SJVAPCD has published guidance on determining the significance of localized impacts to state and federal ambient air quality standards in its GAMAQI. State and federal ambient air quality standards have been established to protect public health and welfare from the adverse impacts of air pollution. A project would be considered to have a significant impact if its emissions are predicted to cause or contribute to a violation of any CAAQS or NAAQS or other standards related to air hazards or odors. The SJVAPCD applies a threshold of 100 pounds per day of any criteria pollutant as a screening threshold. If a project does not exceed 100 pounds per day of any criteria pollutant, then it can be assumed that it would not cause a violation of an ambient air quality standard. If a project exceeds 100 pounds per day, then additional refined modeling would be necessary to determine if the emissions would cause an exceedance of the CAAQS or NAAQS.

The SJVAPCD also provides the following thresholds of significance for TAC emissions from operation of both permitted and non-permitted sources:

- Carcinogens: Maximally Exposed Individual risk equals or exceeds 20 in a million; or
- Non-Carcinogens: Acute and Chronic Hazard Index equals or exceeds 1 for the Maximally Exposed Individual.

Construction and operational emissions were estimated using the California Emissions Estimator Model (Version 2022.1.1.26) (CalEEMod). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutants associated with both construction and operation of a variety of land use projects. The model quantifies direct emissions from construction and operations (including vehicle use), as well as indirect emissions, such as greenhouse gas emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use.

The model was developed in collaboration with the air districts in California. Default data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California air districts to account for local requirements and conditions. The model is an accurate and comprehensive tool for quantifying air quality impacts from land use projects throughout California. The model can be used for a variety of situations where an air quality analysis is necessary or desirable, such as CEQA documents.

A general evaluation of anticipated impacts associated with implementation of the Program is based on the quantification and evaluation of the components identified under the Program in the Section 2.0, Project Description: CIPs 1-6; North Merced Major Improvements; South Merced Major Improvements;

Minor Program Improvements; and the WWTF Expansion Projects that would have the capacity to treat up to 27.2 million gallons per day (Mgal/d) anticipated to be constructed in 3- to 4-Mgal/d increments (and thus modeled for construction of a 3- to 4-Mgal/d increase). Each model considered Program impact areas, construction equipment usage, and timing of construction. Model results were used to capture and evaluate the relevant air quality related information for each Program component. (Air Quality and Greenhouse Gas Assumptions Memorandum is provided in Appendix B1).

3.3.4.2 Impact Analysis

Impact AIR-1: Potential to conflict with or obstruct implementation of the applicable air quality plan.

Impact AIR-1 Analysis

Combined Program and Project Impact: North and South Major Improvements, Program Minor Improvements, and WWTF Expansion Projects, and CIPs 1-6

Construction and Operation

The CEQA Guidelines indicate that a significant impact would occur if the Program would conflict with or obstruct implementation of the applicable Air Quality Plan (AQP) (Section 3.3.2, Regulatory Framework). On demonstrating consistency with the AQP, GAMAQI states that "projects that fall below the thresholds of significance for criteria pollutants would be determined to 'Not conflict or obstruct implementation of the District's air quality plan'" (SJVAPCD 2015a). Program criteria pollutant emissions are compared to the SJVACD's thresholds of significance in Impact AIR-2. As shown therein, the modeled emissions would fall below the applicable threshold of significance; therefore, would not conflict or obstruct implementation of the AQP.

Additionally, this document proposes the following criteria for determining consistency with the current AQPs:

Will the project result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQPs? This measure is determined by comparison to the regional and localized thresholds identified by the SJVAPCD for regional and local air pollutants.

Will the project comply with applicable control measures in the AQPs? The primary control measures applicable to development projects is Regulation VIII – Fugitive PM_{10} Prohibitions and Rule 9510 Indirect Source Review.

Contribution to Air Quality Violations

A measure for determining whether the Program is consistent with the AQPs is whether it would result in an increase in the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQPs. Regional air quality impacts and attainment of standards are the result of the cumulative impacts of all emission sources within the air basin.

Individual projects are generally not large enough to measurably contribute to an existing violation of air quality standards. Therefore, the cumulative impact of a project is based on its cumulative contribution. Because of the region's nonattainment status for O_3, $PM_{2.5}$, and PM_{10}, if Program-generated emissions of either of the O_3 precursor pollutants (ROG and NO_X), PM_{10}, or $PM_{2.5}$ would exceed the SJVAPCD's significance thresholds, they would be considered to contribute to violations of the applicable standards and would conflict with the attainment plans.

As discussed in Impact AIR-2, emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with the construction and operation of the Program would not exceed the SJVAPCD's significance thresholds; therefore, the Program would not contribute to air quality violations.

Compliance with Applicable Control Measures

The AQP contains a number of control measures, which are requirements that are enforceable through the adoption of rules and regulations. A description of rules and regulations that apply to the Program and Projects is provided below.

- **SJVAPCD Rule 9510** – The proposed Projects and future projects under the Program would comply with the Rule 9510 ISR by implementing control measures to achieve emission reductions, implementation of onsite measures, or payment of offsite mitigation fees.
- **Regulation VIII Fugitive PM_{10} Prohibitions** – Fugitive PM_{10} Prohibitions would be required for the proposed Projects and future projects under the Program that are greater than 10 acres. Projects greater than 10 acres are required to file a Dust Control Plan that contains dust control practices sufficient to comply with Regulation VIII. The proposed Projects and projects greater than 10 acres would be required to prepare a Dust Control Plan to comply with Regulation VIII.
- **Rule 4641 Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operation** – Paving and maintenance operations of the proposed Projects and future projects under the Program would be required to reach a reduction in VOC emissions during paving.
- **Rule 4601 Architectural Coatings** – Architectural coatings associated with the proposed Projects and future projects under the Program would be limited to the selection of architectural coatings with low VOC content consistent with the paints and coatings sold in the San Joaquin Valley.

The Program and Projects would comply with all applicable SJVAPCD rules and regulations; therefore, the Program and Projects would comply with this criterion.

Compliance with the 2030 General Plan

When the City's 2030 General Plan was adopted in 2012, it found it was inconsistent with the SJVAPCD AQP because the emissions at build-out exceeded the criteria pollutant emission thresholds (Impact Number 3.3-2 of the 2030 General Plan Draft EIR, Merced 2010). At the time, the City found the impact to be significant and unavoidable and adopted a statement of overriding considerations (SOC) for the conflict. Since that time, the AQPs have been updated and have accounted for the reasonable build-out growth projections within the 2030 General Plan. This means that the Program's accommodation of the 2030 General Plan growth is now consistent with the goals and plans established in the SJVAPCD's adopted AQPs, including the 2022 8-Hour Ozone Plan, 2023 Ozone Maintenance Plan, and the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards.

Projects that are consistent with the 2030 General Plan policies and comply with the MMs included in the 2030 General Plan are able to rely upon the SOC finding to address their cumulative air quality impacts and may have a lesser impact themselves since they are consistent with the AQP. The 2030 General Plan EIR indicates that implementation of the General Plan policies and implementation actions would reduce impacts to the extent feasible. The proposed Projects and future projects under the Program are determined to be consistent with applicable General Plan policies and implementation actions as described in **Table 3.3-4.**

Table 3.3-4: Consistency with Applicable 2030 General Plan Policies

General Plan Policy	Program/Projects Consistency
Policy SD-1.1 Accurately determine and fairly mitigate the local and regional air quality impacts of projects proposed in the City.	**Consistent.** The Program and proposed Projects' emissions estimates have been quantified to determine the relative air quality impacts and MMs have been incorporated to reduce potential impacts to a less-than-significant level, see **Tables 3.3-6, 3.3-7,** and **3.3-8.**
Policy SD-1.6. Reduce emissions of PM_{10} and other particulates with local control potential.	**Consistent.** The City requires compliance with Regulation VIII to reduce PM_{10} emissions. The Program and proposed Project would comply with this measure.

Note:
PM_{10} = particulate matter less than 10 microns in diameter

The air quality MMs and standard conditions from the 2030 General Plan EIR and a discussion of Program and Projects compliance with each measure are provided in **Table 3.3-5.**

Table 3.3-5: Consistency with Applicable 2030 General Plan EIR Mitigation Measures

General Plan EIR Mitigation Measure	Program/Projects Consistency
MMs #3.3-1a: For any phase of construction in which an area greater than 22 acres, in accordance with Regulation VIII of the SJVAPCD, will be disturbed on any one day, the project developer(s) shall implement the following measures: Basic fugitive dust control measures are required for all construction sites by SJVAPCD Regulation VIII. Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent. Traffic speeds on unpaved roads shall be no greater than 15 mph. Install wind breaks at windward side(s) of construction areas.	**Consistent**. The Program and proposed Projects would comply with this MMs through preparation of dust control plans/dust control notifications as needed to comply with Regulation VIII.

General Plan EIR Mitigation Measure	Program/Projects Consistency
MMs #3.3-1b: To reduce emissions and thus reduce cumulative impacts, the City of Merced shall consider adoption of an ordinance requiring the following measures to be implemented in conjunction with construction projects within the City: The idling time of all construction equipment used in the plan area shall not exceed ten minutes when practicable. The hours of operation of heavy-duty equipment shall be minimized when practicable. All equipment shall be properly tuned and maintained in accord with manufacturer's specifications when practicable. When feasible, alternative fueled or electrical construction equipment shall be used at the project site. The minimum practical engine size for construction equipment shall be used when practicable. When feasible, electric carts or other smaller equipment shall be used at the project site. Gasoline-powered equipment shall be equipped with catalytic converters when practicable.	**Not Applicable.** This is a City-wide measure; however, the Program and proposed Projects would implement many of the measures being considered for a City ordinance as part of MMs AIR-3.

As shown in **Tables 3.3-4** and **3.3-5,** the Program and proposed Projects would be consistent with the 2030 General Plan. Therefore, the Program and proposed Projects would not conflict with the applicable AQPs. The impact would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: No mitigation is required.
Level of Significance After Mitigation: Less-than-Significant

Impact AIR-1 Findings

Impact AIR-1 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact AIR-1 Mitigation Required: No mitigation is required.

Impact AIR-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact AIR-2: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard.

Impact AIR-2 Analysis

To result in a less-than-significant impact, the following criteria must be true:

- Regional analysis: emissions of nonattainment pollutants must be below the SJVAPCDs regional significance thresholds. This is an approach recommended by the SJVAPCD in its GAMAQI.
- Summary of projections: the project must be consistent with current air quality attainment plans including control measures and regulations. This is an approach consistent with Section 15130(b) of the CEQA Guidelines.

- Project health impacts: the project must result in less-than-significant cumulative health effects from the nonattainment pollutants. This approach correlates the significance of the regional analysis with health effects, consistent with the court decision in *Sierra Club v. County of Fresno* (Friant Ranch, L.P.).
- Contribution to cumulative health impacts: the project must result in a less-than-cumulatively considerable contribution to any significant health effects associated with the study region.

Program-level Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Regional Analysis

Construction

Air pollutant emissions have both regional and localized effects, as described in Section 3.3.3, Environmental Setting. The SJVAPCD's annual emission significance thresholds used for the Program define the substantial contribution for construction emissions is shown in **Table 3.3-3**. If emissions exceed the thresholds of significance, then a significant impact may occur. Construction emissions were modeled for the Program using CalEEMod and reasonable assumptions were extrapolated out for other Program activities based on the assumption that the future Program activities would have smaller footprints than the proposed Projects and would take place in subsequent years (**Table 3.3-7**). For assumptions used in estimating emissions please refer to Appendix B1.

As shown in **Table 3.3-6**, short-term construction emissions would not exceed the applicable significance thresholds for any criteria pollutants either individually or combined.

Table 3.3-6: Unmitigated Program Construction Emissions per Year

		Pollutant (tons/year)					
Year	**Program Component**	**ROG**	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2026	WWTF Expansion Projects	0.08	0.65	0.78	0.00	0.19	0.08
	Annual Total	0.08	0.65	0.78	0.00	0.19	0.08
2027	North Merced Major Improvements	0.09	0.86	1.00	0.00	0.29	0.14
	South Merced Major Improvements	0.09	0.79	0.98	0.00	0.28	0.14
	WWTF Expansion Projects	0.05	0.39	0.53	0.00	0.05	0.02
	Annual Total	0.23	2.04	2.51	0.01	0.63	0.30
2028	North Merced Major Improvements	0.11	0.98	1.34	0.00	0.13	0.05
	South Merced Major Improvements	0.11	0.98	1.34	0.00	0.13	0.05
	Annual Total	0.23	1.95	2.68	0.01	0.25	0.09
2029	North Merced Major Improvements	0.08	0.68	0.95	0.00	0.08	0.03
	South Merced Major Improvements	0.01	0.05	0.07	0.00	0.00	0.00

		Pollutant (tons/year)					
Year	Program Component	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Annual Total	0.09	0.72	1.02	0.00	0.09	0.03
SJVAPCD Thresholds of Significance		10	10	100	27	15	15
Exceeds Thresholds for Any Year?		No	No	No	No	No	No

Notes:
Detailed emissions reports found in Appendix B2, B3, B4, and B5

As part of the Program Minor Improvements, construction of additional trunk and collector sewer pipelines to new development within the Program Study Area would occur for the duration of the Program build-out. Emissions associated with development within the 2030 General Plan were accounted for in the 2030 General Plan Draft EIR. Construction equipment usage over the short-term construction period (several days to several months) makes these Program components minimal with respect to construction emissions; conservatively estimated to represent 10 percent of the Program construction emissions. **Table 3.3-7** provides a summary of potential construction emissions from these Program components.

Table 3.3-7: Unmitigated Program Construction Emissions – Maximum Year

Component	Pollutants (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Maximum Year Construction Emissions Associated with Program Components (2027)	0.23	2.04	2.51	0.01	0.63	0.30
Program Minor Improvements	0.02	0.20	0.25	0.00	0.06	0.03
Annual Total	0.26	2.24	2.76	0.01	0.69	0.33
SJVAPCD Significance Thresholds	10	10	100	27	15	15
Exceed Threshold	No	No	No	No	No	No

Notes:
CO = carbon monoxide
NOX = nitrogen oxide
PM2.5 = particulate matter less than 2.5 microns in diameter
PM10 = particulate matter less than 2.5 microns in diameter
ROG = reactive organic gas
SJVAPCD = San Joaquin Valley Air Pollution Control District

As shown in **Table 3.3-7**, future Program components implemented under reasonable build-out conditions would not exceed the applicable thresholds of significance. Additionally, due to construction timing, costs, and feasibility, implementation of the entire Program would not occur at once, but even if they were, the combined emissions would not result in a significant impact related to construction emissions.

Operation

The SJVAPCD's annual emission significance thresholds used for the Program define the substantial contribution for operational emissions is shown in **Table 3.3-3**. If emissions exceed the thresholds of significance, then a significant impact may occur.

Program operational emissions are expected to be similar to existing operations, largely consisting of mobile source related emissions (i.e., worker commute trips, periodic facility maintenance visits, and potentially the addition of biosolids haul trips). Operational trips associated with the WWTF Expansion

Projects would differ slightly from wastewater conveyance/pipeline expansion projects, as the additional WWTF facilities would increase biosolids generation and would require additional annual truck trips associated with biosolids handling and disposal. It is anticipated that current practices of land-applying biosolids to agricultural areas within the WWTF footprint would continue, and increased generation of biosolids would not require a substantial increase in the number of haul trips since they would continue to be applied to agriculture lands at the WWTF and surrounding City agricultural properties. However, there is the potential that land application may not be a viable option for biosolids disposal in the future, in which case, biosolids would require transport to an offsite disposal site approximately 22 miles away from the WWTF. These additional truck trips would equate to approximately 621 truck trips per year, or two truck trips per day. The addition of two truck trips per day would not result in a substantial increase in emissions above the existing conditions within the Program Study Area (with trucks entering and existing the facility for daily workers arriving at the WWTF, maintenance, and other daily operations at the WWTF involving diesel vehicles). The operation of the wastewater collection system would include operation of pump stations, much like the current operations. Pump stations within the system are designed with backup generator to provide system redundancy in the event of unplanned electrical outages and require periodic testing for maintenance purposes. These backup generators only run as needed. As an SJVAPCD-permitted low use engine, the hours of the generator would be within the limited maximum of 100 hours for the year.

Table 3.3-8 presents the summary of the estimated total operational emissions of the Program. As shown in the table, the operational emissions would be well below the applicable threshold of significance.

Table 3.3-8: Unmitigated Program Operational Emissions Estimates

Program Component	Pollutants (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Mobile Sources	<0.005	0.05	0.01	<0.005	<0.005	<0.005
Stationary Sources (Generator)	0.10	0.28	0.25	<0.005	0.01	0.01
Total	<0.105	0.33	0.26	<0.010	<0.015	<0.015
SJVAPCD Significance Thresholds	10	10	100	27	15	15
Exceeds Threshold?	No	No	No	No	No	No

Notes:
The SJVAPCD considers stationary sources separately for significance determination.

Summary of Projections

Construction and Operation

In accordance with CEQA Guidelines 15130(b), the analysis of cumulative impacts is based on a summary of projections associated with reasonable build-out of the SUDP/SOI as presented in the City's 2030 General Plan (and further analyzed in Chapter 5.0). The SJVAPCD attainment plans are based on a summary of projections that accounts for projected growth throughout the SJVAB, and the controls needed to achieve the ambient air quality standards. The SJVAB is in nonattainment or maintenance status for O_3 and PM (PM_{10} and $PM_{2.5}$), which means that concentrations of those pollutants currently exceed the ambient air quality standards, or that the standards have recently been attained in the case of

pollutants with maintenance status. When concentrations of O_3, PM_{10}, or $PM_{2.5}$ exceed the ambient air quality standard, then those who are sensitive to air pollution, such as children, the elderly, and the infirm, could experience health effects such as decrease of pulmonary function and localized lung edema in humans and animals; increased mortality risk; and risk to public health implied by altered connective tissue metabolism, altered pulmonary morphology in animals after long-term exposures, and pulmonary function decrements in chronically exposed humans.

Under the CEQA Guidelines, cumulative impacts may be analyzed using other plans that evaluate relevant cumulative effects. The geographic scope for cumulative criteria pollution from air quality impacts is the SJVAB because that is the area in which the air pollutants generated by the sources within the SJVAB circulate and are often trapped. The SJVAPCD is required to prepare and maintain air quality attainment plans and an SIP to document the strategies and measures to be undertaken to reach attainment of ambient air quality standards. While the SJVAPCD does not have authority over land use decisions, it is recognized that changes in land use and circulation planning would help the SJVAB achieve clean air mandates. The SJVAPCD evaluated emissions from land uses and transportation in the entire SJVAB when it developed its attainment plans. Emission inventories used to predict attainment of NAAQS must be based on the latest planning assumptions for mobile sources.

In accordance with CEQA Guidelines Section 15064, Subdivision (h)(3), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously approved plan or mitigation program. As discussed in Impact AIR-1, the Program is consistent with all applicable control measures established in the AQPs. Moreover, as shown in **Tables 3.3-6, 3.3-7,** and **3.3-8**, Program build-out would fall below SJVAPCD project-level thresholds. The Program would comply with any SJVAPCD rules and regulations that may pertain to implementation of the AQPs. Therefore, impacts would be less-than-significant with regard to compliance with applicable rules and regulations.

Program Health Impacts

Construction and Operation

Consistent with the *Sierra Club v. County of Fresno* (Friant Ranch) (Section 3.3.2, Regulatory Framework), the standard measure of the severity of impact is the concentration of pollutants in the atmosphere compared to the ambient air quality standard for the pollutant for a specified period. The severity of the impact increases with the concentration of the pollutant and the amount of time that people are exposed to the pollutant. The pollutants of concern in the Friant Ranch ruling were regional criteria pollutants O_3 and PM_{10}. It is important to note that the potential for localized impacts can be addressed through dispersion modeling. The SJVAPCD includes screening criteria that, if exceeded, would require dispersion modeling to determine whether project emissions would result in a significant health impact. For this Program, no significant localized health impacts would occur. Regional pollutants require more complex modeling as described below.

O_3 concentrations are estimated using regional photochemical models because O_3 formation is subject to temperature, inversion strength, sunlight, emissions transport over long distances, dispersion, and the regional nature of the precursor emissions. The emissions from individual projects are too small to produce a measurable change in O_3 concentrations; it is the cumulative contribution of emissions from existing and new development that is accounted for in the photochemical model. O_3 concentrations vary

widely throughout the day and year even with the same rate of daily emissions. The SJVAPCD indicated in an Amicus Brief on Friant Ranch that running the photochemical model with just Friant Ranch emissions (109.5 tons per year of NO_X) is not likely to yield valid information given the relative scale involved (SJVAPCD 2015b). The NO_X inventory for the San Joaquin Valley was estimated to be is 232.4 tons per day in 2017, or 84,826 tons per year. Under these conditions the Friant Ranch project would represent a 0.13 percent increase in NO_X emissions. A project emitting at the SJVAPCD CEQA threshold of 10 tons per year would result in a 0.01 percent increase in basin-wide NO_X emissions.

Emissions throughout the San Joaquin Valley are projected to markedly decline in the coming decade. The SJVAPCD 2022 Ozone Plan predicts that NO_X emissions will decline to 87.3 tons per day by 2037 (SJVAPCD 2022). This means that O_3 health impacts to residents of the San Joaquin Valley would be lower than currently experienced, and most areas of the San Joaquin Valley would have attained O_3 air quality standards. The plan accounts for growth in population at rates projected by the State of California for the San Joaquin Valley, so only cumulative projects that would exceed regional growth projections would potentially delay attainment and prolong the time and the number of people that would experience health impacts. It is unlikely that anyone would experience greater impacts from regional emissions than currently occur. The federal transportation conformity regulation provides a means of ensuring that growth in emissions does not exceed emission budgets for each county. Regional Transportation Plans and Regional Transportation Improvement Plans must provide a conformity analysis based on the latest planning assumptions that demonstrates that budgets would not be exceeded. If budgets are exceeded, the San Joaquin Valley may be subject to FCAA sanctions until the deficiency is addressed. Thus, the Program's contributions were accounted for in regional planning considering reasonable build-out of the SUDP/SOI and, thus, would not significantly contribute to increased health risks.

Particulate emission impacts can be localized and regional. Particulates can be directly emitted and can be formed in the atmosphere with chemical reactions. Small directly emitted particles, such as diesel emissions of DPM and other combustion emissions, can remain in the atmosphere for a long time and can be transported over long distances. Large particles, such as fugitive dust, tend to be deposited a short distance from where they are emitted but can also travel long distances during periods of high winds. Particulates can be washed out of the atmosphere by rain and deposited on surfaces. Secondary particulates formed in the atmosphere such as ammonium nitrate require NO_X and ammonia, and they require low inversion levels and certain ranges of temperature and humidity to result in substantial concentrations. These complications make modeling Program particulate emissions only feasible for directly emitted particles at receptor locations close to the proposed sites. Regional particulate concentrations are modeled using a gridded inventory (emissions in tons per day are placed a 4-kilometer, three-dimensional grid to spatially allocate the emissions geographically and vertically in the atmosphere) and an atmospheric chemistry component to simulate the chemical reactions. The model uses relative reduction factors to determine the amount of reductions of each PM component that would be needed to attain the air quality standards on the days with the conditions most favorable to high particulate concentrations. A small project would not produce sufficient emissions to determine a project's individual contribution to the particulate concentration. Likewise, implementation of projects under the Program would be considered small projects and would not produce emissions substantial enough to be able to determine the project's individual contribution to the particulate concentration.

Contribution to Cumulative Health Impacts

Construction and Operation

The SJVAB is in nonattainment for O_3, PM_{10} (state only), and $PM_{2.5}$, which means that the background levels of those pollutants are at times higher than the ambient air quality standards. The air quality standards were set to protect public health, including the health of sensitive individuals, such as children, the elderly, and the infirm. Therefore, when the concentration of those pollutants exceeds air quality standards, it is likely that some sensitive individuals in the population would experience health effects. However, the health effects are a factor of the dose-response curve. Concentration of the pollutant in the air (dose), the length of time exposed, and the response of the individual are factors involved in the severity and nature of health impacts. If a significant health impact results from Program emissions, it does not mean that 100 percent of the population would experience health effects.

Since the SJVAB is designated nonattainment for O_3, PM_{10} (state only), and $PM_{2.5}$, it is considered to have an existing significant cumulative health impact without the Program. When this occurs, the analysis considers whether the Program's contribution to the existing violation of air quality standards is cumulatively considerable. The SJVAPCD regional thresholds for NO_X, ROG, PM_{10}, or $PM_{2.5}$ are applied as cumulative contribution thresholds. Projects that exceed the regional thresholds would have a cumulatively considerable health impact. As shown in **Tables 3.3-6, 3.3-7**, and **3.3-8**, the regional analysis of construction and operational emissions indicates that the Program and would not exceed the SJVAPCD's significance thresholds and would be consistent with the applicable AQP.

The SJVAPCD AQPs predict that nonattainment pollutant emissions would continue to decline each year as regulations adopted to reduce these emissions are implemented, accounting for growth projected for the region. Therefore, the cumulative health impact would also decline even with the Program's emission contribution, and the impact would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: No mitigation is required
Level of Significance After Mitigation: Less-than-Significant

Project-level Impacts: CIPs 1-6

Regional Analysis

Construction

Construction emissions were modeled for the CIPs 1-6 using CalEEMod under the conservative assumption that all six CIPs would occur at the same time. For assumptions used in estimating emissions, please refer to Appendix B1.

Table 3.3-9 shows that short-term construction emissions would not exceed the applicable significance thresholds for any criteria pollutants.

Table 3.3-9: Unmitigated CIPs 1-6 Construction Emissions Estimates

		Pollutant (tons/year)					
Year	Project Component	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2026	CIPs 1-6	0.22	1.99	2.47	0.00	0.47	0.24
2027	CIPs 1-6	0.08	0.68	0.95	0.00	0.06	0.03
SJVAPCD Thresholds of Significance		10	10	100	27	15	15
Exceeds Thresholds for Any Year?		No	No	No	No	No	No

Operation

Operations associated with the CIPs 1-6 are not expected to generate criteria pollutant emissions that differ substantially from existing conditions, and the impact would be less-than-significant.

Summary of Projections

Construction and Operation

As discussed in Impact AIR-1, the CIPs 1-6 are consistent with all applicable control measures established in the AQPs. Moreover, as shown in **Table 3.3-9**, construction of the CIPs 1-6 would generate emissions that fall below SJVAPCD project-level thresholds, and operations of CIPs 1-6 would not result in emissions that differ substantially from existing conditions. The CIPs 1-6 would comply with any SJVAPCD rules and regulations that may pertain to implementation of the AQPs. Therefore, impacts would be less-than-significant with regard to compliance with applicable rules and regulations.

Project Health Impacts

Construction and Operation

This discussion focuses on whether emissions of O_3 and PM_{10} associated with the CIPs 1-6 may result in regional health impacts. As noted previously, a project emitting at the SJVAPCD CEQA threshold of 10 tons per year would result in a 0.01 percent increase in basin-wide NO_X emissions. As demonstrated in **Table 3.3-9**, construction of the CIPs 1-6 would emit well below the SJVAPCD threshold of 10 tons per year of NOx; as a result, it is not expected that a less than-0.01 percent increase in basin-wide NOx would result in any meaningful change in regional health outcomes. Similarly, a relatively small project, such as the CIPs 1-6, would not produce sufficient PM emissions to determine a project's individual contribution to regional particulate concentrations. Furthermore, the CIPs 1-6 are consistent with the City's General Plan and, as a result, have been accounted for in regional growth projections and planning efforts.

Contribution to Cumulative Health Impacts

Construction and Operation

Because the SJVAB is already designated nonattainment for O_3, PM_{10} (state only), and $PM_{2.5}$, it is considered to have an existing significant cumulative health impact even without the CIPs 1-6. When this occurs, the analysis considers whether the Project's contribution to the existing violation of air quality standards is cumulatively considerable. The SJVAPCD regional thresholds for NO_X, ROG, PM_{10}, or $PM_{2.5}$ are applied as cumulative contribution thresholds. Projects that exceed the regional thresholds would

have a cumulatively considerable health impact. As shown in **Table 3.3-9**, the regional analysis of construction emissions indicates that the proposed Projects would not exceed the SJVAPCD's significance thresholds and would be consistent with the applicable AQP.

The SJVAPCD AQPs predict that nonattainment pollutant emissions would continue to decline each year as regulations adopted to reduce these emissions are implemented, accounting for growth projected for the region. Therefore, the cumulative health impact would also decline even with the Project's emission contribution, and the impact would be less-than-significant.

Based on the analysis above, construction and operations of the Program would not result in a cumulatively considerable net increase of any criteria pollutant for which the region is nonattainment, and a less-than-significant impact would occur.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: No mitigation is required
Level of Significance After Mitigation: Less-than-Significant

Impact AIR-2 Findings

Impact AIR-2 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact AIR-2 Mitigation Required: No mitigation is required

Impact AIR-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact AIR-3: Potential to expose sensitive receptors to substantial pollutant concentrations.

Impact AIR-3 Analysis

Program-level Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction activities involve the operation of heavy equipment and activities that would temporarily produce additional dust and air emissions. Sensitive receptors within the Program Study Area include those described in Section 3.3.3.5, Sensitive Receptors, and may include possibly the occasional recreationalist using the surrounding roadways. These sensitive receptors could be affected by construction-generated air emissions depending on location and distance and duration of construction activities. Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and duration of exposure to air pollutants. As previously stated, children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, childcare centers, playgrounds, retirement homes, convalescent homes, hospitals, and medical clinics.

Fugitive Dust

Fugitive dust is typically generated during earth-moving activities such as grading and excavation. Trenching activities associated Program components, including placement of pipelines and excavation for the pump station or WWTF Expansion Projects, would be among the earth-moving activities that could generate fugitive dust emissions. Fugitive dust can cause health concerns when airborne due to potential inhalation, and the proximity to residences along the new sewer alignments combined with the flat topography of the area could allow dust from construction to affect sensitive receptors. The Program would comply with the SJVAPCD's Regulation VIII, which would require implementation of fugitive dust controls such as watering exposed soils and soils being transported offsite, as well as watering and maintaining speed limits on dirt roads. Compliance with Regulation VIII would dampen and secure loose soils that turn into fugitive dust when caught in the wind, effectively limiting emissions of fugitive dust from construction activities associated with the Program. Upon the completion of construction, the ground surface would be returned to pre-project conditions, and the potential for fugitive dust emissions would be minimal.

Localized Pollutant Analysis

Emissions occurring at or near a specific site have the potential to create localized impacts, also referred to as an air pollutant hotspots. Localized emissions are considered significant if, when combined with background emissions, they would result in exceedance of any health-based air quality standard. The impact from localized pollutants is based on the impact to the nearest sensitive receptor. The SJVAPCD's GAMAQI includes screening thresholds for identifying projects that would need detailed analysis for localized impacts. Projects with onsite emission increases from construction activities or operational activities that exceed the 100 pounds per day screening level of any criteria pollutant after compliance with Rule 9510 and implementation of all enforceable MMs would require preparation of an ambient air quality analysis. The criteria pollutants of concern for localized impact in the SJVAB are PM_{10}, $PM_{2.5}$, NO_X, and CO.

An ambient air quality analysis screening was prepared for the Program consistent with SJVAPCD guidance. The daily emissions are shown in **Table 3.3-10.** As shown in the table, construction of the Program would not exceed the SJVAPCD screening thresholds, and as such, a violation of an ambient air quality analysis would not occur, and the impact would be less-than-significant.

Table 3.3-10: Program Daily Air Pollutant Emissions During Construction

Year	Program Component	Pollutant (lbs/day)				
		ROG	NO_X	CO	SO_X	PM_{10}
2026	WWTF Expansion Projects	0.72	5.95	7.18	2.43	1.14
	Annual Total	0.72	5.95	7.18	2.43	1.14
2027	North Merced Major Improvements	2.06	19.85	21.86	8.73	4.35
	South Merced Major Improvements	2.03	17.79	21.42	8.19	4.18
	WWTF Expansion Projects	0.52	4.19	6.46	0.93	0.31
	Annual Total	4.62	41.82	49.74	17.85	8.83

Year	Program Component	Pollutant (lbs/day)				
		ROG	NO_X	CO	SO_X	PM_{10}
2028	North Merced Major Improvements	0.90	7.36	10.77	0.97	0.36
	South Merced Major Improvements	0.90	7.36	10.77	0.97	0.36
	Annual Total	1.80	14.72	21.53	1.94	0.72
2029	North Merced Major Improvements	0.87	7.15	10.53	0.95	0.35
	South Merced Major Improvements	0.84	7.29	10.02	0.95	0.35
	Annual Total	1.71	14.44	20.54	1.91	0.70
SJVAPCD Screening Threshold		100	100	100	100	100
Exceeds Thresholds for Any Year?		No	No	No	No	No

Valley Fever

Construction of the Program has the potential to generate substantial amounts of fugitive dust that may suspend *Coccidioides* spores and expose sensitive receptors. The Program Study Area is located in an area with elevated Valley Fever activity (California Department of Public Health 2021).

Given the endemic nature of the disease and the amount of earth-moving activities in the Program Study Area related to agriculture activities, as well as grading and excavation for new residential, commercial, and industrial development, it is not possible to attribute a specific case of Valley Fever to a specific earth-moving activity. Ground-disturbing activities represent a continual source of spores that contribute to the number of Valley Fever cases reported each year. Construction activities associated with the Program would have additional localized ground-disturbing activities to those that occur continually within the Program Study Area, posing similar risks. This could be a potentially significant impact.

Fugitive dust control measures required by Regulation VIII, such as wetting the soil, would reduce fugitive dust minimizing exposure of *Coccidioides* spores to workers and receptors. It is important to educate construction personnel and provide awareness of potential exposure, symptoms, and control measures. MM AIR-1, Pre-Construction Worker Environmental Awareness Program (Air Quality), would be implemented to properly train construction workers about the symptoms of Valley Fever and to show steps that should be taken to prevent exposure and its spread while on the work site. MM AIR-1 would be required to educate construction personnel of exposure, symptoms, and avoidance measures for earth-moving activities that would occur during implementation of the Program. Therefore, with the implementation of MM AIR-1, impacts related to Valley Fever from the Program would be less-than-significant.

Asbestos

As described in Section 3.3.3.2, Air Pollutants of Concern, the Program Study Area is not located in an area known to have ultramafic rock, serpentine, or naturally occurring asbestos. The nearest mapped unit is approximately 35 miles southwest of the Program Study Area (USGS 2011). Therefore, the statewide Asbestos Airborne Toxic Control Measures would not apply unless ultramafic rock or serpentine is discovered during grading or excavation of any of the Program.

In the unexpected event that ultramafic rock or serpentine is discovered during construction, a potentially significant impact could occur. Additionally, although not anticipated, asbestos cement pipelines could also be discovered during demolition of any of the old wastewater collection system, particularly in the older portions of the Program Study Area. The SJVAPCD must be notified no later than the following business day, and Program implementation must comply with MM AIR-2, which includes compliance with the State of California Airborne Toxic Control Measures for Construction, Grading, Quarrying, and Surface Mining Operations. Therefore, MM AIR-2 would also be implemented in these areas and would require a qualified geologist or geotechnical engineer to review historical documents and perform database searches to discover the likelihood of Program construction activities encountering, or requiring removal of, asbestos-containing materials. If the professional geologist or geotechnical engineer determines that no further analysis is warranted, then construction may proceed; however, if they determine that further investigation would be required, then geologic testing for asbestos would be performed in accordance with MM AIR-2 and regulatory requirements. It is important that construction personnel are provided awareness of potential exposure and control measures are educate them, increase the effectiveness of MM AIR-1 application, and minimize risk of exposure. MM AIR-1, Pre-Construction Worker Environmental Awareness Program (Air Quality), would be implemented to properly train construction workers about the long-term impacts associated with asbestos exposure and ways to prevent such exposure.

These MMs would be required for implementation of any of the Program components that would require earth movement to ensure that initial exposure would be reduced and long-term health impacts from exposure to asbestos would be avoided. Therefore, impacts associated with asbestos from construction of the Program would be less-than-significant with mitigation incorporated.

Toxic Air Contaminants

TAC emissions can result in health risks associated with exposure to DPMs from diesel vehicles and generators. CARB has identified DPM from diesel-fueled engines as a TAC, which is typically concentrated around high-volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic, which have the highest associated health risks. Health risks from TACs are a function of both the concentration of emissions and the duration of exposure.

Construction activities have the potential to generate DPM emissions from the use of off-road and heavy-duty diesel equipment used for site grading, paving, and other activities that are required during construction. Generally, construction of each Program component would be temporary, intermittent, and would occur over a relatively short duration in comparison to the operational lifetime of the wastewater collection system, limiting the potential long-term exposure of receptors to DPM or other TACs. In addition, only select portions of the Program Study Area would be disturbed at any one time, also limiting the potential long-term or repetitive exposure of sensitive receptors. Operation of construction equipment is also regulated by federal, state, and local regulations, including SJVAPCD rules and regulations, which limit the emissions of DPM and TACs in general. However, because the Program has the potential to release TACs, a potentially significant impact could occur without mitigation. As such, MM AIR-3 would be required and would implement numerous BMPs reducing potential emissions of DPM and TACs, such as limiting engine idling times, identifying low-emitting equipment, and minimizing equipment use, which would reduce impacts to a less-than-significant level.

Construction of the new sewer infrastructure would occur linearly across the City of Merced, which would disperse the concentration of any potential emissions, limiting exposure of a sensitive receptor in a specific location for a short period of time (estimated to be a couple weeks maximum in any given location along the pipelines). Notably, the OEHHA provided a recommendation in its 2015 Hotspot Program Guidance not to model construction health risks for construction lasting less than two months. Construction of stationary sites, such as pump stations, lasting for a more than two-year period could adversely affect nearby receptors. However, MM AIR-3 would require the use of cleaner than average construction equipment at sites requiring longer than two months (like the pump station), which would minimize exposure to DPM and would result in a less-than-significant impact. Therefore, because the construction activities would be temporary, would not be concentrated in any one location, would comply with SJVAPCD rules and regulations as well as federal and state regulations, and would implement MM AIR-3, there would be a less-than-significant impact of exposing sensitive receptors to TACs with mitigation incorporated.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. Implementation of the Program could temporarily increase traffic volumes on streets within the Program Study Area; therefore, could increase local CO concentrations. Concentrations of CO approaching the ambient air quality standards are only expected where background traffic volumes and congestion levels are high, which is not anticipated within the footprints of Program components. While construction-related traffic on the local roadways within the Program Study Area would occur during active construction, the net increase of construction workers' vehicle trips to the existing daily traffic volumes in the local roadways would be relatively small and would not result in substantial localized CO emissions. Additionally, the construction-related vehicle trips would only occur during active construction periods and would cease once construction activities have been completed. Since construction-related traffic from workers and trucks would be minimal and would not substantially increase CO concentrations in the Program Plan Area, and because the CO concentrations associated with the Program would be below SJVAPCD thresholds, localized CO emissions impacts to sensitive receptors would be less-than-significant.

The placement of pipelines and associated appurtenances for the new trunk sewer infrastructure would largely occur linearly and would not be concentrated in any one location for more than a week. The net increase of construction workers vehicle trips to the existing daily traffic volumes in the local roadways would be relatively small and would not result in substantial CO emissions, as shown on **Table 3.3-6.** Therefore, since construction-related traffic from workers and trucks would be minimal and would not substantially increase CO concentrations in the vicinity of the new trunk sewer infrastructure area, localized CO emissions impacts to sensitive receptors would be less-than-significant.

Localized concentrations of CO associated with the expansion of the WWTF would only have the potential to occur during active construction. As shown in **Table 3.3-6,** CO concentrations for construction of the WWTF would be below the SJVAPCD thresholds of significance. Therefore, construction emissions for localized CO would be considered a less-than-significant impact.

Operation

Fugitive Dust & Valley Fever

Upon the completion of construction, the ground surface would be returned to pre-project conditions, and the potential for fugitive dust emissions and thus, Valley Fever, would be minimal.

Localized Pollutant Analysis

Operational emissions of localized pollutants are shown in **Table 3.-3-11**. As shown in the table, the operational emissions would not exceed the SJVAPCD screening thresholds. Localized air quality impacts would be less-than-significant.

Table 3.3-11: Unmitigated Proposed Program Operational Emissions Estimates

Component	Pollutants (lbs/day)				
	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$
Mobile Sources	0.003	0.26	0.04	0.07	0.02
Stationary Sources (Generator)	7.88	22.02	20.09	1.16	1.16
SJVAPCD Screening Thresholds	100	100	100	100	100
Exceeds Threshold?	No	No	No	No	No

Notes:
The SJVAPCD considers stationary sources separately for significance determination.

Asbestos

The potential for exposure to asbestos does not exist during operations of the Program.

Toxic Air Contaminants

TAC emissions can result in health risks associated with exposure to DPMs from operational emissions of substances such as chloroform, formaldehyde, benzene, ammonia, and metals. Operational TACs typical of WWTFs can include, but are not limited to, chloroform from the chlorine disinfection system; DPM from diesel backup generators and biosolid haul trucks (if required); and VOCs (such as formaldehyde, benzene, ammonia, and metals) from the flare, digester gas boilers, and the headworks. The 2006 Wastewater Treatment Plant Expansion Project DEIR (2006 WWTF DEIR) for the 20 Mgal/d WWTF Expansion Projects assessed incremental risk of TACs to obtain an estimated total incremental carcinogenic health risk (City of Merced 2006). Using the toxic potency unit risk factor as established by OEHHA, the 2006 WWTF DEIR determined the maximum carcinogenic risk of the 20 Mgal/d expansion over a 70-year lifetime of exposure to be less than seven cancer cases in a million (City of Merced 2006). This level of risk is less that the SJVAPCD's significance threshold of 20 cancer cases per million for a 70-year exposure, and potential impacts resulting from the expansion were anticipated to be less-than-significant. Since 2006, the WWTF has been undergoing upgrades to modernize and retrofit treatment processes and equipment as identified in the 2006 WWTF DEIR, such as replacing the chlorine disinfection system with an ultraviolet light disinfection system to eliminate chloroform emissions; updating of the candle flare with a sulfur treatment system and match stack controls for greater VOC control efficiency; and construction of an enclosure for the new headworks for decreased release of VOCs with the greatest risk of TAC generation (City of Merced 2006). The WWTF Expansion Projects included as part of the Program could introduce new equipment or processes with the potential to exceed the

SJVAPCD's significance threshold or the incremental risk of TAC emissions resulting in a potentially significant impact if not properly controlled and designed. In order to ensure that similar VOC-reduction design features are included in the WWTF Expansion Projects, and to reduce the impact to less-than-significant, MM AIR-4, Design Considerations for future WWTF improvements, would be required. MM AIR-4 would ensure that future design uses Best Available Control Technologies and improvements described above to limit additional TAC emissions to less-than-significant levels.

Other operational exposure to TACs could occur from DPM at the pump stations and WWTF associated with backup diesel generators and biosolids haul trips (if needed). DPM emissions from backup diesel generators are not anticipated to generate significant DPM emissions due to the backup nature and limited, intermittent, and short-duration uses. Similar to the DPM construction discussion above, the likelihood that any one sensitive receptor would be exposed to high concentrations of DPM for any extended period of time resulting from these haul trips would be low due to the low concentration of vehicles and limited duration of vehicles in any given location. Additionally, as described in the 2006 WWTF DEIR, improved regulations anticipated 85 percent reductions in DPM emissions associated with diesel engines (City of Merced 2006), which would further limit potential impacts required from any necessary additional trips. Therefore, operational TAC emissions would be less-than-significant.

With the implementation of MM AIR-4, operation of the Program components and future activities under the Program would result in a less-than-significant impact from generation of TACs with mitigation incorporated.

Localized CO Emissions

Operational trips would result in a negligible increase in CO concentrations because these trips would only occur periodically (10 to 20 trips annually) in standard City staff vehicles. Operations at the WWTF would be similar to existing conditions, with trucks entering and exiting the WWTF property daily. These operational trips would not constitute a substantial increase in localized CO emissions; therefore, would result in a less-than-significant impact.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AIR-1, MM AIR-2, MM AIR-3, and MM AIR-4 (Program Only)
Level of Significance After Mitigation: Less-than-Significant with Mitigation

Project-level Impacts: CIPs 1-6

Construction

Fugitive Dust

Fugitive dust is typically generated during earth-moving activities such as grading and excavation. Trenching activities associated with CIPs 1-6 would likely generate fugitive dust. However, the Program would comply with the SJVAPCD's Regulation VIII, which would require implementation of fugitive dust controls such as watering exposed soils and soils being transported offsite, as well as watering and maintaining speed limits on dirt roads. Compliance with Regulation VIII would dampen and secure loose soils that turn into fugitive dust when caught in the wind, effectively limiting emissions of fugitive dust from construction activities associated with the Project. Upon the completion of construction, the ground

surface would be returned to pre-project conditions, and the potential for fugitive dust emissions would be minimal.

Localized Pollutant Analysis

Projects with onsite emission increases from construction activities that exceed the 100 pounds per day screening level of any criteria pollutant would require preparation of an ambient air quality analysis. The daily emissions are shown in **Table 3.3-12**. As shown in the table, construction of the Program would not exceed the SJVAPCD screening thresholds, and as such, a violation of an ambient air quality analysis would not occur, and the impact would be less-than-significant.

Table 3.3-12: Project Daily Air Pollutant Emissions During Construction

Year	Project Component	Pollutant (lbs/day)				
		ROG	NO_X	CO	SO_X	PM_{10}
2026	CIPs 1-6	2.13	19.02	21.80	8.35	4.27
2027	CIPs 1-6	1.48	12.69	17.94	1.19	0.56
SJVAPCD Screening Threshold		100	100	100	100	100
Exceeds Thresholds for Any Year?		No	No	No	No	No

Valley Fever

The City of Merced is located in an area with elevated risk for Valley Fever exposure, and construction activities associated with the CIPs 1-6 has the potential to expose sensitive receptors to *Coccidioides* spores. Therefore, as with the Program, MM AIR-1, Pre-Construction Worker Environmental Awareness Program (Air Quality), is required to train construction workers about the symptoms of Valley Fever and to show steps that should be taken to prevent exposure and its spread while on the work site. With the implementation of MM AIR-1, impacts related to Valley Fever from the Program would be less-than-significant.

Asbestos

In the unexpected event that ultramafic rock or serpentine or asbestos cement pipes are discovered during construction, a potentially significant impact could occur. Therefore, as with the Program, MM AIR- 2, Implement Asbestos Protection Measures, is required. Additionally, MM AIR-1, Pre-Construction Worker Environmental Awareness Program (Air Quality), would be implemented to properly train construction workers about the long-term impacts associated with asbestos exposure and ways to prevent such exposure. With the implementation of MM AIR-1 and AIR-2, impacts related to asbestos from the Project would be less-than-significant.

Toxic Air Contaminants

During construction, the use of off-road and heavy-duty diesel equipment is known to generate DPM emissions. Construction of each CIP would be temporary, intermittent, and would occur over a relatively short duration in comparison to the operational lifetime of the wastewater collection system, limiting the potential long-term exposure of receptors to DPM or other TACs. In addition, only select portions of the Study Area would be disturbed at any one time, also limiting the potential long-term or repetitive exposure of sensitive receptors. For example, improvements to sewer segments would occur linearly across

portions of the City, which would disperse the concentration of any potential emissions, limiting exposure of a sensitive receptor in a specific location for a short period of time (estimated to be a couple weeks maximum in any given location along the pipelines). Nevertheless, because the Project has the potential to release TACs during construction, MM-3, Minimize Construction Emissions, is required to reduce impacts to a less-than-significant level.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. During construction, worker and vendor commutes may temporarily increase traffic volumes in the Project area, but not to an extent that would result in new CO hotspots.

Operation

Fugitive Dust & Valley Fever

Upon the completion of construction the ground surface would be returned to pre-project conditions, and the potential for fugitive dust emissions and thus Valley Fever would be minimal.

Localized Pollutant Analysis

Operation of the CIPs 1-6 would not result in criteria pollutant emissions that differ substantially from existing conditions. Localized air quality impacts would be less-than-significant.

Asbestos

The potential for exposure to asbestos does not exist during operations of the Project.

Toxic Air Contaminants

Operations of the CIPs 1-6 is not expected to result in any TAC emissions that differ from existing conditions.

Localized CO Emissions

Operations of the CIPs 1-6 is not expected to result in traffic levels that differ from existing conditions.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AIR-1, MM AIR-2, and MM AIR-3
Level of Significance After Mitigation: Less-than-Significant with Mitigation

Impact AIR-3 Findings

Impact AIR-3 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact AIR-3 Mitigation Required: MM AIR-1, MM AIR-2, MM AIR-3, MM AIR-4 (Program Only)

Impact AIR-3 Overall Level of Significance After Mitigation: Less-than-Significant with Mitigation

Impact AIR-4: Potential to result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Impact AIR-4 Analysis

While offensive odors rarely cause any physical harm, they can still be unpleasant, leading to distress among the public and often generating citizen complaints to local governments and the SJVAPCD. The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source, the design and ability for noxious odors to be generated in the first place, the wind speed and direction, and the sensitivity of the receptor. According to the CARB's Air Quality and Land Use Handbook, some of the most common sources of odor complaints received by local air districts are, among others, sewage treatment plants, waste transfer stations, and biomass operations (CARB 2005).

Program-level Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Diesel fumes from construction equipment are often found to be objectionable; however, operation of diesel equipment at any specific site included in the overall Program would be short-term and intermittent, and construction is temporary. Operation of diesel equipment would comply with federal, state, and local regulations, including compliance with all applicable SJVAPCD rules and regulations as part of the construction specifications, which would limit construction-related odorous emissions. Further, construction-related fumes would be spread out over different areas of construction sites, such as the pipeline alignment, and would largely occur in areas away from dense concentrations of sensitive receptors (i.e., near agricultural properties and currently undeveloped lands in north and South Merced). For pipeline improvements, due to the rate of pipeline placement, sensitive receptors along the new sewer pipelines would not be subject to objectionable odors from construction for more than a week. Sensitive receptors are not located within the general vicinity of the WWTF; therefore, odors generated from construction activities at the WWTF site would not have the potential to adversely affect nearby receptors. Therefore, construction-related odor impacts from construction of the Program would be less-than-significant.

Operation

As mentioned in Section 3.3.3.4, operations of conveyance and treatment of wastewater systems can result in objectionable odors due to anoxic conditions creating hydrogen sulfides and other mercaptans. The SJVAPCD includes screening levels, which are provided in the GAMAQI, for potential odor sources that would be located within two miles of sensitive receptors (SJVAPCD 2015a). The closest receptor to the WWTF is less than two miles away and, thus, the screening level does not apply to the WWTF Expansion Projects included under the Program.

Odors associated with the operations of the pipelines at manholes, pump stations, and appurtenances (air release valves) could potentially emit adverse odors that could affect existing or future sensitive receptors along the proposed Program components and work areas. However, design controls for the wastewater conveyance system eliminate much of the potential for substantial exposure. Air release

valves and other pressure-release features, which would release air from the wastewater pipes, are anticipated to prevent air binding in the pipes and to protect the pipes from collapse as well as generation of noxious odors. The air valves would be outfitted with odor control features, like carbon canisters or odor scrubbers, that would be replaced on a bi-annual basis to prevent the escape of hydrogen sulfide at air valve locations, which would limit odor emissions. Odor control measures would be maintained (estimated to be replaced pursuant to specifications approximately bi-annually) and would also be consistent with the current operations of the wastewater conveyance system.

Much of the Program would be designed to be scalable, adding capacity only as needed, which would prevent anaerobic conditions within the wet well that would result in the emission of hydrogen sulfides and other mercaptans. Similarly, future trunk sewer and collector pipelines would be designed in a way to maintain appropriate flows and limit the potential for creation of hydrogen sulfides and other mercaptans that could potentially emit odors through manholes. Therefore, with standard odor control and design techniques implemented for sewer systems, and with regular maintenance of any of these odor control facilities, impacts related to odor from the pipeline operations would be less-than-significant.

At the WWTF, the distance and topography from sensitive receptors coupled with current design features have successfully contained odors, and no formal odor complaints have been received as of 2024. Although the WWTF is located within two miles of sensitive receptors, the WWTF would continue to factor odor control into design and include further odor control reduction methods as it is expanded. Odor controls such as improved ventilation and filtering technologies and closed-loop filtration systems would further buffer potential odors around the site. The WWTF Expansion Projects would be consistent with the current operations and would not exacerbate odors for any nearby sensitive receptors. Additionally, the operations of the WWTF currently apply biosolids to the agricultural land adjacent to the WWTF property. No odor complaints have been received regarding the application of these biosolids due to the digested nature of these materials. If application of additional biosolids would occur at the WWTF, these additional biosolids would be digested in a similar manner and would not increase the odors at the WWTF. Therefore, odor impacts from the upgrades to the WWTF would be considered less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project-level Impacts: CIPs 1-6

Construction

As noted above, although diesel fumes from construction equipment may be considered objectionable, operation of diesel equipment associated with the CIPs 1-6 would be short-term and intermittent, and construction is temporary. The use of construction equipment would comply with all applicable federal, state, and SJVAPCD regulations. Additionally, due to the rate of pipeline placement, sensitive receptors along CIPs 1-6 would only be subject to potential diesel odors from construction for a few days. Overall, construction-related odor impacts from construction of the CIPs 1-6 would be less-than-significant.

Operation

Following construction, operations of CIPs 1-6 are not expected to result in increased generation of odors as compared to existing conditions because all sewer pipelines are undergrounded. As noted above, the

potential exists for odors to escape through at manholes, pump stations, and appurtenances; however, standard odor control and design techniques and regular maintenance will limit the potential for noxious odors. Although several sewer conveyance lines would be expanded as part of the CIPs 1-6, such expansions would not result in increased exposure of wastewater to outside air or the increased generation of odors. The impact would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact AIR-4 Findings

Impact AIR-4 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact AIR-4 Mitigation Required: None Required

Impact AIR-4 Overall Level of Significance After Mitigation: Less-than-Significant

3.3.5 Air Quality Mitigation Measures

Mitigation Measure AIR-1: Pre-Construction Worker Environmental Awareness Program (Air Quality)

The purpose of a Worker Environmental Awareness Program (WEAP) is to educate personnel (i.e., construction workers) about the existing onsite and surrounding resources and the measures required to protect these resources as well as avoidance and potential hazards within these sites. The WEAP shall include materials and information on air quality protection measures and applicable precautions personnel should take to reduce potential impacts.

The WEAP presentation shall be given to all personnel who would participate in ground disturbance or operate equipment or who would have the ability to minimize dust and exhaust emissions. The WEAP presentation shall be given prior to the start of construction and as necessary throughout the life of the Program as new personnel arrive onsite. The City and the contractor are responsible for ensuring that all onsite personnel attend the WEAP presentation, receive a summary handout, and sign a training attendance acknowledgement form to indicate that the contents of the presentation are understood and to provide proof of attendance. Each participant of the WEAP presentation shall be responsible for maintaining their copy of the WEAP reference materials and for making sure that other onsite personnel are complying with the recommended precautions. The contractor shall keep the WEAP sign-in sheet onsite and submit copies of the sign-in sheet to the City's Project Manager, who shall keep it on file at City offices.

For the air quality portion of the WEAP presentation, the following information and implementation steps shall be prepared, presented, and executed prior to and during construction or earth-moving activities to prevent exposure and raise awareness of potential air quality and hazard impacts:

- Inform personnel about potential hazards within the Program Study Area, including but not limited to both naturally occurring and asbestos-containing materials present within soils as well as Valley Fever spores and the likelihood of presence within specific project sites. Information given should include the following:
    - Providing context as to where these hazards could occur during construction.

- Outlining ways to prevent exposure (outlined below).
- Informing personnel that the appropriate respiratory equipment can be provided upon request to further prevent exposure to dust particles.
- Informing personnel about the symptoms of exposure to potential hazards, including to asbestos and Valley Fever exposure. Symptoms of Valley Fever exposure could include but are not limited to fever, cough, chills, and night sweats which appear one to three weeks after exposure. Symptoms of asbestos exposure (i.e., Asbestosis) occur over a much longer period of time (10 to 40 years after exposure) and could include but are not limited to shortness of breath, tightness in chest, chest pain, and appetite loss.
- Informing personnel about appropriate actions to take if symptoms of exposure occur including regular doctor checkups (i.e., for personnel working regularly within the construction or industrial settings where exposure to asbestos is high) and seeking emergency medical care if symptoms for Valley Fever persist or get worse.

Mitigation Measure AIR-1 Implementation

Responsible Party: The City and contractor

Timing: Prior to construction and throughout construction activities as new personnel arrive on the specific project site

Monitoring and Reporting Program: Development of a WEAP presentation and handout packet in accordance with this MMs and any other resource-specific WEAP requirements. A sign-in sheet completed for all workers on the construction site shall be kept on file at the specific project sites, and copies shall be submitted to the City's Project Manager to be kept on file at City offices.

Standards for Success: Limit exposure of personnel to potential air quality hazards during construction through prescribed safety precautions. If exposure cannot be avoided, education of personnel for immediate recognition of health symptoms to act quickly and seek appropriate medical or emergency care to limit long-term harm.

Mitigation Measure AIR-2: Implement Asbestos Protection Measures

The City or chosen contractor shall retain a professional geologist or geotechnical engineer who shall perform historic database searches for both naturally occurring asbestos and likelihood of asbestos-containing materials in the Program Study Area. If the professional geologist or geotechnical engineer determines further site-specific analysis is warranted, they shall conduct additional geologic evaluations of specific project sites to determine the presence or absence of naturally occurring asbestos or asbestos-containing materials onsite. These evaluations shall include the specific Project sites (i.e., the pipeline alignments and pump station locations) and any additional staging areas that will be used. These evaluations shall be completed and submitted to the SJVAPCD at least 60 days prior to the start of construction. If naturally occurring asbestos or asbestos-containing materials are discovered onsite, the following measures shall be implemented:

- The City or chosen contractor shall prepare an Asbestos Dust Migration Plan pursuant to CCR Title 17 Section 9035, Asbestos Toxic Control Measures for Construction, Grading, Quarrying,

and Surface Mining Operations, and shall obtain approval by the SJVAPCD. The Plan shall include all measures required by the State of California and the SJVAPCD.

- If asbestos is found in concentrations greater than 5 percent, the material shall not be used as surface material as stated in CCR Title 17 Section 93106, Asbestos Airborne Toxic Control Measure-Asbestos-Containing Serpentine. The material with naturally occurring asbestos can be reused at the site for subgrade material covered by other non-asbestos-containing material.

Mitigation Measure AIR-2 Implementation

Responsible Party: The City and contractor

Timing: The construction emissions minimization measures shall be included in all construction contracts, and individual contractors shall agree to the required measures and reporting requirements in order to obtain payment for services.

Monitoring and Reporting Program: The individual construction contractors shall prepare monitoring reports at the end of each construction phase and provide monitoring reports to the City within 10 business days of completion of each phase.

Standards for Success: Construction exhaust emissions impacts are reduced to a less-than-significant level.

Mitigation Measure AIR-3: Minimize Construction Emissions

The City shall require that construction contracts for the Program include the following measures to reduce construction emissions:

- Contractor reporting requirements:
    - Contractors shall provide an equipment inventory, which shall include estimates of the construction timeline by phase with descriptions of each piece of off-road equipment required for each phase.
    - Contractors shall use cleaner than average off-road equipment (generally Tier 2 or higher) that will achieve a minimum of 20 percent reduction in nitrogen oxides and 45 percent reduction in exhaust of PM less than 10 microns in diameter.
    - Contractors shall provide reporting for each construction phase within 10 business days of completion of each phase. The report shall include the equipment type, engine model year, equipment horsepower, total hours of operation, fuel type, any control devices, and the quantity of equipment. The report shall be submitted to the City of Merced and may be used for the City's compliance with SJVAPCD Rule 9510.
    - Fuel efficiency requirements:
    - Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than three minutes (five minute limit is required by the state airborne toxics control measure [Title 13, CCR sections 2449(d)(3) and 2485]). Provide clear signage that posts this requirement for workers at the entrances to the site.

    - Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.
    - Train equipment operators in proper use of equipment.
    - Use the proper size of equipment for the job.
    - Use equipment with new technologies (repowered engines, electric drive trains).
    - Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.
- Where construction is anticipated to occur for a period longer than two months and is located within 1,000 feet of sensitive receptors, the following clean construction equipment measure shall apply:
    - Use Tier 2 or higher engines and the most effective Verified Diesel Emission Control Strategies (Tier 4 engines automatically meet this requirement) for the engine type as certified by the CARB for equipment 100 horsepower or greater and used more than 20 hours for the duration of construction.

Mitigation Measure AIR-3 Implementation

Responsible Party: The City and contractor

Timing: The construction emissions minimization measures shall be included in all construction contracts, and individual contractors shall agree to the required measures and reporting requirements to obtain payment for services.

Monitoring and Reporting Program: The individual construction contractors shall prepare monitoring reports at the end of each construction phase and shall provide monitoring reports to the City within 10 business days of completion of each phase.

Standards for Success: Limit emissions of DPM from construction.

Mitigation Measure AIR-4: Design Considerations for Future WWTF Improvements

Future expansions at the WWTF shall be designed to incorporate TAC-reducing technologies to reduce emissions from TAC sources such as chloroform and VOCs. This could include the use of Best Available Control Technologies at the time of design or shall incorporate the following to reduce operational TAC emissions at the WWTF:

- Adding candle flares with an enclosed flare that would result in a taller emission source with a greater VOC control efficiency.
- Incorporating an ultraviolet light disinfection system for any future expansions in place of existing chlorine disinfection systems that would eliminate chloroform emissions.
- Enclose headworks to decrease the release of VOCs.

Mitigation Measure AIR-4 Implementation

Responsible Party: The City

Timing: Incorporation of TAC reduction features shall occur during the design phase of each WWTF expansion project. Implementation of the TAC reduction features shall occur during design of the WWTF Expansion Projects.

Monitoring and Reporting Program: The City shall ensure that the appropriate design features are implemented during the design phase of the WWTF Expansion Projects.

Standards for Success: TAC emissions impacts from the WWTF Expansion Projects shall be reduced below the SJVAPCD's most recent TAC thresholds.

3.4 BIOLOGICAL RESOURCES

3.4.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- 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 (CDFW) or United States Fish and Wildlife Service (USFWS);
- Have a substantial adverse effect on any riparian habitat or other sensitive natural communities identified in local or regional plans, policies, and regulations or by the CDFW or USFWS;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or potential to conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or potential to conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state HCP;
- Have a substantial adverse effect on state- or federally protected wetlands (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means; or
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

The remainder of this section describes the regulatory and environmental baseline setting to support the evaluation of the potential impacts and describes the potential impacts on the existing biological resources that may result from implementation of the Program including mitigation for significant impacts, where feasible.

3.4.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives applicable to biological resources potentially affected by the Program.

3.4.2.1 Federal

Endangered Species Act of 1973

The federal Endangered Species Act (FESA) was passed by Congress in 1973 to protect and recover imperiled species and the habitat upon which they depend. The FESA is administered by USFWS and the National Oceanic and Atmospheric Administration, which includes the National Marine Fisheries Service (NMFS). Under the FESA, protected species are either listed as “endangered,” in danger of extinction throughout all or a significant region of the species range; or as “threatened,” likely to become endangered within the foreseeable future (16 USC Section 1531 et seq.). The FESA also designates

"candidate" species as those plants and animals that USFWS has sufficient data regarding their biological status to propose them to be listed under the FESA. Candidate species do not receive statutory protection under the FESA, but cooperative conservation activities are encouraged (16 USC Section 1531 et seq., USFWS 2024a).

The FESA mandates the protection of federally listed species and the habitats on which they depend (50 [CFR] 17.12 for listed plants, 50 CFR 17.11 for listed animals, and various notices in the Federal Register for proposed species). Specifically, USFWS and NMFS can designate critical habitats (i.e., Designated Critical Habitat [DCH]) that are to be protected from disturbances, essential to conservation, and/or are representative of the historical geographical and ecological distributions of a federally protected species. DCH only affects federal agency actions and federally funded and permitted activities. DCH does not affect activities by private landowners if there is no federal "nexus" (i.e., a link such as federal funding or federally issued permit) to activities by a federal agency (16 USC Section 1531 et seq., USFWS 2024b).

Pursuant to the FESA, USFWS and NMFS have authority over projects that may affect the continued existence of a federally listed threatened or endangered species. Section 9 of the FESA and federal regulations prohibit the "take" of federally listed species. "Take" is defined as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." In addition, USFWS requires that federal agencies avoid "destruction" and "adverse modification" to any DCH for a species when "prudent and determinable" (USFWS 2024b).

Consultation with the USFWS under Section 7 of the FESA would be necessary if a federal action (such as a federal permit or federal funding) is part of the proposed action and the project is likely to adversely affect federal species or DCH. For projects with no federal nexus, the project proponent may choose to consult with USFWS and obtain incidental "take" authorization under Section 10 of the FESA and possible preparation of an HCP if the project is likely to result in death or injury to a listed species (USFWS defines likely as "reasonably certain to occur"), or if the project would modify critical habitat, and all three of the following conditions are met: (1) The habitat modification must be significant; (2) The modification must impair an essential behavior (such as feeding, breeding, or sheltering); and (3) The behavior impairment must result in the likelihood of an actual injury or death. No Incidental Take Permit (ITP) is required under the FESA for activities that involve habitat modification alone unless all three of these conditions are met (USFWS 2024c).

Migratory Bird Treaty Act of 1918 and the Bald and Golden Eagle Protection Act

The Migratory Bird Treaty Act (MBTA) (16 USC Section 703-711) and the Bald and Golden Eagle Protection Act (BGEPA) (16 USC Section 668) protect specific species of birds and prohibit intentional take (i.e., harm or harassment) when the purpose of an activity is to take migratory birds, the eggs, or nests (USFWS 2024d). The MBTA protects migratory birds from take through the setting of hunting limits and seasons and protecting occupied nests and eggs. BGEPA prohibits the take or commerce of any part of the bald or golden eagle (USFWS 2024e). The USFWS administers both acts and reviews actions that may affect the species protected.

Clean Water Act Section 401

The U.S. Environmental Protection Agency (USEPA) regulates surface water quality in waters of the United States (WOTUS) under Section 401 of the federal Clean Water Act (CWA). CWA Section 401,

Water Quality Certification, provides states and authorized tribes with an effective tool to help protect the physical, chemical, and biological integrity of water quality by providing them an opportunity to address the aquatic resource impacts of federally issued permits and licenses (33 USC Section 1341). CWA Section 401 states that no federal permit or license can be issued if a proposed action may result in a discharge to WOTUS, unless the USEPA, relevant tribe, or the state certifies that the discharge is consistent with standards and other water quality goals or waives certification (33 USC Section 1341). Section 401 of the CWA is required for any project that produces a federal action with construction that could have an impact on surface water quality. In California, jurisdictional authority has been delegated to the Regional Water Quality Control Board (RWQCB) (USEPA 2023a). If a project does not require a federal license or permit but does involve activities that may result in a discharge of harmful substances to waters of the state (WOTS), the RWQCB has the option to regulate such activities under its state authority in the form of WDRs or Certification of WDRs (California Water Code Section 13000 et seq., SWRCB 2024a).

Clean Water Act Section 404

The U.S. Army Corps of Engineers (USACE) and USEPA regulate the discharge of dredge or fill material into WOTUS under Section 404 of the CWA. The term “fill” is broadly defined in the CWA, and WOTUS include wetlands, lakes, rivers, streams, and their tributaries. Wetlands are defined for regulatory purposes as areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated solid conditions (33 CFR 328.3; 40 CFR 230.3). If a project discharges any fill materials into WOTUS, including wetlands, before and after the project actions, then a permit must be obtained from the USACE (USEPA 2024).

3.4.2.2 State

California Endangered Species Act

The CDFW has jurisdiction over species listed as threatened or endangered under section 2080 of the California Fish and Game Code (FGC). The California Endangered Species Act (CESA), enacted in 1970, prohibits take of state-listed threatened and endangered species. CESA differs from the FESA in that it does not include habitat destruction in its definition of take. The FGC defines take as, “[to] hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (FGC Section 86).

With projects where state-listed species are or have the potential to be present, CDFW consults for a project or associated actions to not have a negative effect on state-listed species. During consultation, CDFW determines whether take would occur and identifies “reasonable and prudent alternatives” for the project to have adequate conservation of special status species. CDFW can authorize take of a state-listed species under Sections 2080.1 and 2081(b) of the FGC in those cases where it is demonstrated that the impacts are minimized and mitigated. Take authorized under Section 2081(b) must be minimized and fully mitigated. An ITP is required to authorize take of a state-listed species that would occur either during construction or over the life of the project. CDFW also maintains lists for candidate species to be listed under CESA. California candidate species are afforded the same level of protection as threatened or endangered species listed under CESA (CDFW 2024a). California also designates species of special concern (SSC), which are species of limited distribution; declining populations; diminishing habitat; or

unusual scientific, recreational, or educational values. These species do not have the same legal protection as state-listed species but may be added to official lists in the future (CDFW 2024b).

In the 1960s, prior to the enactment of the CESA, California created a designation to provide protection to rare species. This designation remains today and is referred to as “Fully Protected” species, which “may not be taken or possessed at any time” (CDFW 2024c).

The Native Plant Protection Act: California FGC Section 1900 et seq.

The Native Plant Protection Act (NPPA) (FGC Section 1900 et seq.) was enacted in 1977 and is administered by CDFW. The NPPA prohibits take of endangered, threatened, or rare plant species native to California, with the exception of special criteria identified in the FGC. A “native plant” means a plant growing in a wild uncultivated state which is normally found native to the plant life of the state. Under the FGC, species become endangered, threatened, or rare when the plants’ prospects of survival and reproduction are in immediate jeopardy for one or more causes (FGC Section 1900 et seq). “Rare” species can be defined as species that are broadly distributed but never abundant where found, narrowly distributed or clumped yet abundant where found, and narrowly distributed or clumped and not abundant where found. If potential impacts are identified for a proposed Project activity, then consultation with CDFW, permitting, and other mitigation may be required. Endangered, threatened, and rare plant species can be identified through the California Native Plant Society’s (CNPS) California Rare Plant Rank (CRPR) (CNPS 2024a).

Nesting Migratory Birds and Raptors: California FGC Sections 3503, 3503.5, and 3800

Sections 3503, 3503.5, and 3800 of the FGC prohibit the take, possession, or destruction of birds, their nests, or eggs. Implementation of the take provisions requires that Project-related disturbance at active nesting territories be reduced or eliminated during critical phases of the nesting cycle. Disturbances that cause nest abandonment, loss of reproductive effort (e.g., killing or abandonment of eggs or young), or the loss of habitat upon which the birds depend is considered taking and is potentially punishable by fines and/or imprisonment (FGC Sections 3503-3503.5).

Lake and Streambed Alteration Agreement: California FGC Sections 1600-1616

To protect, manage, and conserve rivers, streams, lakes, wetlands, etc., CDFW has jurisdictional authority under FGC Sections 1600-1616 to regulate all work under the jurisdiction of the state. Such work includes those actions that would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed. In practice, CDFW marks its jurisdictional limit at the top of the stream or lake bank, or the outer edge of the riparian vegetation (where present) and extends its jurisdiction to the edge of the 100-year floodplain (FGC Sections 1600-1616). CDFW authorizes activity within its jurisdictional authority by entering into a Lake and Streambed Alteration Agreement (LSAA) with an applicant and can impose conditions on the agreement to result in no net loss of wetland values or acreage would be incurred. The LSAA is not a permit, but a mutual agreement between CDFW and the applicant (CDFW 2024d).

California Environmental Quality Act: CEQA Guidelines Section 15380

The CEQA Guidelines provide protection for federal- and state-listed species, as well as species not listed federally or by the state that may be considered rare, threated, or endangered, if the species can be

shown to meet specific criteria outlined in CEQA Guidelines Section 15380(b). Species that meet these criteria can include “candidate species,” species “proposed for listing,” and Species of Conservation Concern. Plants appearing on CRPR are considered to meet CEQA’s Section 15380 criteria. Impacts on these plants would therefore be considered significant and would require mitigation (CDFW 2024e).

Section 15380 was included to address a potential situation in which a public agency is to review a project that may have a significant effect on a “candidate species,” for example, which has not yet been listed by the USFWS or CDFW. Therefore, CEQA enables an agency to protect a special status species from significant project impacts until the respective government agencies have had an opportunity to list the species as protected, if warranted (CDFW 2024e).

Porter-Cologne Water Quality Control Act

WOTS are regulated by the RWQCB under the State Water Quality Certification Program. The State Water Quality Certification Program regulates discharges of dredged and fill material to WOTUS through the CWA Section 401 process (as described in Section 3.4.2.1, Federal) but also regulates WOTS defined as required by the Porter-Cologne Water Quality Control Act. WOTS are defined as “any surface water or groundwater, including saline waters, within the boundaries of the State.” The RWQCB protects all waters in its regulatory scope but has special responsibility for isolated wetlands and headwaters that may not be regulated by other programs, such as Section 404 or 401 of the CWA. Projects that require a Section 404 CWA permit, or fall under other federal jurisdiction, and have the potential to impact WOTS are required to comply with the terms of the Section 401 Water Quality Certification Program. If a project does not require a federal license or permit but does involve activities that may result in a discharge of harmful substances to WOTS, the RWQCB has the option to regulate such activities under its state authority in the form of WDRs or Certification of WDRs (California Water Code Section 13000 et seq.; SWRCB 2024b).

California Oak Woodlands Conservation Act: California FGC Sections 1360-1372, Public Resource Code 21083.4

The California Oak Woodland Conservation Act (COWCA) defines an oak as “any species in the genus *Quercus*” and an oak woodland as “an oak stand with greater than ten percent canopy cover, or that may have historically supported greater than ten percent canopy cover” (FGC Sections 1360-1372). The COWCA is designed to “support and encourage voluntary, long-term private stewardship and conservation of California’s oak woodlands by offering landowners financial incentives to protect and promote biologically functional oak woodlands over time” (FGC Sections 1360-1372), as mandated by the Wildlife Conservation Board (WCB). WCB has established grant programs, such as the California Oak Woodlands Conservation Program, that are designed to protect and restore oak woodlands using conservation easements, cost sharing and long-term agreements, technical assistance, and public education and outreach (WCB 2024).

CEQA PRC Section 21083.4 requires counties to determine whether projects within their jurisdiction may result in significant impacts on the environment due to the conversion of oak woodlands and requires that counties adopt specified mitigation measures for significant impacts to oak woodlands. The requirement applies to non-commercial native oak trees with a inch or greater diameter at breast height (DBH), approximately 4.5 feet above ground level. Oaks less than five inches DBH would still be subject to any conservation measures contained in applicable local ordinances or General Plans.

3.4.2.3 Local

Merced Vision 2030 General Plan

The 2030 General Plan contains several policies that directly or indirectly pertain to biological resources within the Program Study Area, including the following:

Goal Area OS-1: Open Space for the Preservation of Natural Resources

- **Policy OS-1.1.** Identify and mitigate impacts to wildlife habitats which support rare, endangered, or threatened species.
- **Policy OS-1.2.** Preserve and enhance creeks in their natural state throughout the planning area.
- **Policy OS-1.4.** Improve and expand the City's urban forest.

3.4.3 Environmental Setting

A combination of desktop analysis and reconnaissance-level field studies were performed to identify existing biological resources in the Program Study Area, including existing biological resources within the footprints of the Program to support the assessment of potential Program impacts. Sensitive biological resources, such as special status plant and wildlife species; sensitive natural communities; jurisdictional wetlands including vernal pools, streams, and drainages; and wildlife corridors, were identified by desktop analysis within the Program Study Area and by site spot-check reconnaissance-level field survey. The methodology for establishing the setting and the results of the setting review is included below.

3.4.3.1 Methodology

Defining Special Status Species

Special status species are defined as follows:

- Species listed, formally proposed, or designated as candidates for listing as threatened or endangered under the FESA (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals, and various notices in the Federal Register for proposed species);
- Species that are listed, formally proposed, or designated as candidates for listing by California as threatened or endangered under the CESA (14 CC] 670.5);
- Plants listed as rare under the California NPPA of 1977 (FGC Section 1900 et seq.);
- Plants considered by the CNPS to be Rank 1- a) "plants presumed extirpated in California and either rare or extinct elsewhere", or b) "rare, threatened, or endangered in California and elsewhere";
- Plants considered by CNPS to be a Rank 2- a) Plants presumed extirpated in California, but common elsewhere, or b) "rare, threatened, or endangered in California and common elsewhere";
- Bird species designated by USFWS as Birds of Conservation Concern or protected under the MBTA;
- Wildlife species designated as SSC or Fully Protected by CDFW;

- Plant and wildlife species that are designated as “special animals” or “those of greatest conservation need”, by CDFW through the California Natural Diversity Database (CNDDB); and
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the CEQA Guidelines.

Establishing the Biological Setting

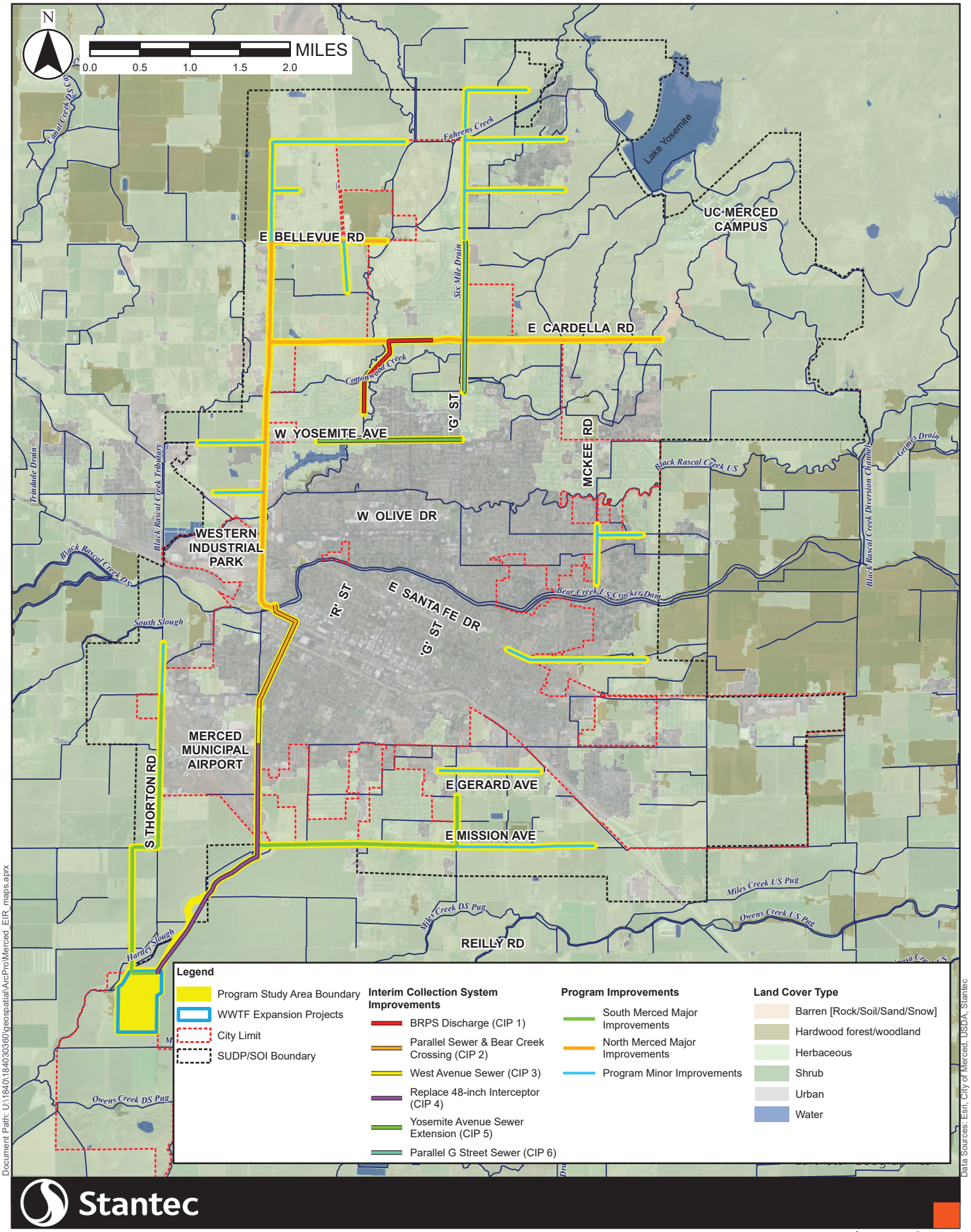
The following resources were used to identify special status plant species, wildlife species, and associated habitats that occur or have the potential to occur within a biological study area (BSA) defined as a five mile search area surrounding the Program Study Area and the nine U.S. Geological Survey (USGS) 7.5-minute quadrangles (quads) that are within and surround the Program Study Area including *Winton*, *Yosemite Lake*, *Haystack Mountain*, *Arena*, *Atwater, Merced, Planada, Turner Ranch, Sandy Mush, El Nido*, and *Plainsburg* (USGS nine-quad area):

- Fire and Resource Assessment Program (FRAP) land cover classification data to assess the amount and extent of California’s forests and rangelands within the BSA (CAL FIRE 2024);
- Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) classification system of existing vegetation to preliminarily identify vegetation types within the Program Study Area (USDA 2024b);
- CNDDB records search of special status species observations within the BSA (CDFW 2024f);
- CNPS online Inventory of Rare and Endangered Plants of California within the USGS nine-quad area (CNPS 2024b);
- USFWS list of federally proposed, candidate, threatened, and endangered species within the BSA (USFWS 2024f);
- USFWS Critical Habitat data for federally threatened and endangered species within the BSA (USFWS 2024g);
- The National Wetland Inventory (NWI) to identify potential wetlands, potential WOTUS, and associated habitats, that may occur within the Program Study Area (USFWS 2024h);
- Soil data, including hydric soil assessments for wetland habitat, was assessed and mapped using the USDA Web Soil Survey of the Program Study Area (USDA 2024a);
- Merced 2030 Vision Plan Chapter 7 Open Space, Conservation, and Recreation Table 7.2 Merced Area Potential Special Status Plant and Animal Species; and
- Field visits: February 11, 2019, and May 23–24, 2024 reconnaissance-level biological resources field surveys of target locations within the Program Study Area and CIPs 1-6.

Desktop Review

The sources identified above were then used to establish pertinent environmental setting details relevant to assessing potential impacts associated with implementation of the Program. The desktop information was reviewed to develop a broad understanding of the vegetation types and potential special status species within the BSA. Specifically, to classify the vegetation communities in the BSA, the CALVEG and FRAP systems were used to establish broad vegetation communities and landcover. The results are shown on **Figure 3.4-1.** The broad classifications were then refined with Program Study Area queries of

known communities and special status species databases as well as previous publicly available environmental documentation relevant to the area (City of Merced 2010; City of Merced 2012).



Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.4-1
CalVeg Land Cover

General Spot-Check Reconnaissance-Level Biological Resources Field Survey

The broad desktop review of the BSA was then refined to the Program Study Area and verified by reconnaissance-level field surveys conducted February 11, 2019, and May 13–24, 2024. The field surveys were conducted by a qualified botanist and wildlife biologist who performed a reconnaissance-level spot-check of the biological resources in the proposed work areas associated with CIPs 1-6 (including an approximate 50-foot buffer) and made general observations of the Program Study Area. The survey focused on locations with the Program Study Area where Program components are expected to intersect with sensitive areas, such as stream crossings, special status species habitat, wildlife corridors, and other areas where a potentially significant effect on biological resources could occur. Field surveys confirmed, further characterized, and evaluated the vegetation communities and habitats occurring within the Program Study Area assessing the potential for these areas to support the identified special status plant and wildlife species, habitats, or communities.

Assessing Special Status Species Presence

Following field surveys, the potential for each special species to occur within the Program Study Area was assessed. The “potential tooccur” ratings were defined by the following classifications:

- **High:** The Program Study Area provides ideal habitat conditions for the special status species and/or includes known populations of the species. Or species were observed during site surveys.
- **Moderate:** The Program Study Area provides suitable habitat for the special status species.
- **Low:** The Program Study Area provides limited habitat for the special status species.
- **Very Low to Nonexistent:** The Program Study Area provides limited to no suitable habitat for the special status species and/or is outside the species known range (geographically and/or based on elevation).

3.4.3.2 Results

The desktop review of the Program Study Area within the BSA and the field review of the Program Study Area are documented in this section. This information forms the basis of the environmental setting and provides the information that is necessary to reasonably assess potential impacts to biological resources within the Program Study Area. (Appendix C).

Land Cover, Habitat, and Vegetation Community Assessment

The Program Study Area lies within the Central Valley and the California Floristic Province, which is characterized by a Mediterranean climate, with cool, wet winters and hot, dry summers. Elevations within this area range from 153 feet above mean sea level (amsl) near the City’s WWTF to 208 feet amsl near the junction of SR (SR) 140 and Kibby Road. The Program Study Area can be classified as a mix of rural residential disturbed areas with predominantly agricultural and disturbed or ruderal land covers made up of non-native herbaceous vegetation communities (USDA 2024b; CAL FIRE 2024; City of Merced 2006; City of Merced 2012; February 11, 2019, and May 23–24, 2024 field surveys). When not situated along paved roads, the Program components are located within a mix of predominantly agricultural and non-native grassland land covers and lands classified as rural residential – disturbed – ruderal (CalVEG 2024). These land cover types, vegetation communities, associated hydrologic features, sensitive

habitats, special status species, and wildlife movement corridors that may be subject to impacts are discussed under the subheadings below.

Agricultural

Agricultural lands are prevalent throughout the Program Study Area outside the City limits. Agricultural land is found along the rural roadways and adjacent to rural residential areas within the Program Study Area. Agricultural land cover types typically include lands where farming and other agricultural practices take place. These practices may include orchards, pastures, vineyards, rice fields, row crops, and other unidentified croplands. Agricultural practices observed throughout the Program Study Area include flood-irrigation, cultivation, and spraying, followed by harvesting and discing. After discing, some fields may remain fallow for periods of time, allowing for the establishment of annual and biennial native and non-native annual grasses and broad-leaved plants. Common agricultural commodities that are produced within the Program Study Area include dairy, almonds, poultry, beef, sweet potatoes, tomatoes, corn silage, grapes for wine, alfalfa, and nurseries.

Rural Residential – Disturbed Lands – Ruderal

The second most predominant land cover type in the Program Study Area is rural residential – disturbed – ruderal, which is defined as lands influenced by human activity and disturbance, rural and urban residences, and commercial and industrial areas (CALVEG 2024). Developed land covers include commercial, residential, public and industrial buildings, roadways, schools, utilities, and parking lots. There are also several undeveloped lots and open spaces throughout the Program Study Area. In the Program work areas, much of the landscape is disturbed, and where vegetation occurs, non-native species as well as naturalized ornamental species and escaped garden cultivars are dominant. Ornamental plantings are largely made up of introduced woody trees, shrubs, and herbaceous species used in general residential, business, and roadside landscaping. Commonly observed species at the time of surveys included almond, cherry, and plum species (*Prunus* spp.); bull thistle (*Cirsium vulgare*); bur chervil (*Anthriscus caucalis*); coastal heron's bill (*Erodium cicutarium*); common mustard (*Brassica rapa*); Italian thistle (*Carduus pycnocephalus*), and oleander (*Nerium oleander*). Some of these introduced ornamental species have become locally naturalized. This land cover type is not classified as a biological vegetation community..

Non-Native Annual Grassland

Non-native annual grasslands land cover type is present throughout the Program Study Area. Non-native annual grasslands typically occur within and adjacent to the ROWs of roads and in areas absent of agricultural fields and crops. This land cover type is an invasive herbaceous biological vegetation community dominated by non-native and often invasive annual grass species, particularly in disturbed and ruderal areas. The establishment of these species is usually due to anthropogenic activities, including livestock grazing, recreation, and development. These grasslands often have reduced biodiversity and habitat suitability for native species. Species composition in non-native annual grassland habitats is similar to those exhibited in pastures and row crop composites. Common non-native annual grasses and other herbaceous species observed at the time of field surveys include clover species (*Trifolium* spp.), common mustard, common sowthistle (*Sonchus oleraceus*), dandelion species (*Agoseris* spp.), fiddleneck species (*Amsinckia* spp.), hairgrass species (*Deschampsia* sp.), prickly lettuce (*Lactuca*

serriola), redstem stork's bill, brome grass (*Bromus* spp.), slender oat (*Avena barbata*), and brome grass species.

Riparian Assemblages

Riparian plant species documented within the Program Study Area are primarily low stature hydrophytic species (rushes [*Juncus* sp.], ferns), including along and within the various MID ditches, canals, and detention ponds. Opportunistic and invasive species such as Himalayan blackberry (*Rubus armeniacus*), that grow in regularly maintained canals are typically not considered a sensitive natural community because they typically occur in disturbed areas and displace native plant species (Cal-IPC 2024). In addition, the regular and ongoing maintenance and operations of MID facilities and the marginal riparian canopy and potentially high velocity flows present in canals and ditches provide extremely limited habitat for non-special status fish, amphibian, and bird species. Further, no amphibian or fish species were documented in the review of various wildlife databases (e.g., CNDDB), nor during the field surveys conducted.

Riparian vegetation within the Program Study Area varies as it is found along the hydrological features such as Fahrens Creek, Bear Creek, Black Rascal Creek, Cottonwood Creek, Miles Creek, and Owens Creek. Riparian zones generally provide high-value habitat for a variety of plants and animals and are also known to be areas of high productivity (City of Merced 2010). Riparian areas may provide migration corridors, roosting habitat, and valuable reproductive areas, in addition to food and water for both plants and wildlife.

For example, typical bird species associated with riparian habitat in this region include songbirds such as northern flicker (*Colaptes auratus*), white-crowned sparrow (*Zonotrichia leucophrys*), song sparrow (*Melospiza melodia*), black phoebe (*Sayornis nigricans*), yellow-rumped warbler (*Setophaga coronata*), and spotted towhee (*Pipilo erythrophthalmus*). Common mammal species expected to occur in this habitat type include raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and Virginia opossum (*Didelphis virginiana*) (City of Merced 2010).Within the riparian areas found throughout the Program Study Area, willows (*Salix* spp.) and cattails (*Typha latifolia*) are prevalent. Other species include Fremont's cottonwood (*Populus fremontii*) and Himalayan blackberry. Riparian areas tend to be dense, with vegetation communities dominated by shrubs and associated with running water and wet conditions (City of Merced 2010). Blue elderberry (*Sambucus mexicana*), the host plant of the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) exists along Bear Creek but not within the Program Study Area(City of Merced 2010).

Although there are various MID ditches, canals, and detention ponds throughout the Program Study Area, most MID features possess a muddy or concrete substrate and lack riparian vegetation, though there are occasional patches of cattails. Water flow and levels are generally seasonal and inconsistent, which does not support plant and wildlife habitat year-round; however, this type of habitat may be used by seasonal, special status, or migratory species (City of Merced 2010).

Wetlands and Other Hydrologic Features

The Program Study Area receives water from two primary sources: local rainfall and runoff from the Sierra Nevada mountain range to the east, which impacts both surface and groundwater resources (City of Merced 2012). Bear Creek flows east to west through central Merced. In addition, Black Rascal Creek,

Cottonwood Creek, Miles Creek, and Owens Creek form the main drainage systems that flow through the Program Study Area, as shown on **Figure 3.4-2** (City of Merced 2010). Several MID ditches, canals, and detention ponds also exist throughout the Program Study Area. Seasonal wetlands and vernal pools often support special status plants and animals that have evolved to specialize in these habitats. However, due to habitat loss resulting from agricultural and residential development, much of the Central Valley, which was once dominated by seasonal wetlands, has become mostly fragmented (City of Merced 2010). There is DCH associated with these vernal pool communities within the Program Study Area, and several known special status species occur within these areas. No DCH, seasonal wetlands, or vernal pools were identified within CIPs 1–6 or are anticipated within the Program work areas because the pipelines will be within the public ROWs (i.e., roads or highways). Several MID ditches, canals, and detention ponds also exist throughout the Program Study Area and within CIPs 1–6. Yosemite Lake, a lacustrine habitat, is located about 1.5 miles to the northeast of the Program Study Area with a high concentration of seasonal wetlands and vernal pools (City of Merced 2010; USFWS 2024h).

North Merced Major Improvements, G Street Extension 3 and the West Cardella Trunk, cross Fahrens Creek while the East Cardella Trunk crosses a canal. In addition, the South Highway 59 Trunk crosses Black Rascal Creek. South Merced Major Improvements, Thorton Road Sewer 1 would be installed along the El Capitan Canal and the Gove Road Sewer crosses the Hartley Slough. CIP 1 and CIP 6 cross Cottonwood Creek, CIP 2 crosses Bear Creek, CIP 4 crosses the Hartley Slough, and CIP 5 crosses Fahrens Creek. Creeks and irrigation canals occur within the Program Study Area, with a presence of vernal pools and wetlands in the northeast portion of the Program Study Area (City of Merced 2006). These features are generally associated with DCH that provides suitable habitats (for all life-cycle stages: breeding, feeding, nesting, foraging, and migration) for a variety of special status plant and wildlife species, further discussed below. The Program Study Area has the potential to support a variety of these both special status and common species that may use these habitats during all stages of their life cycles.

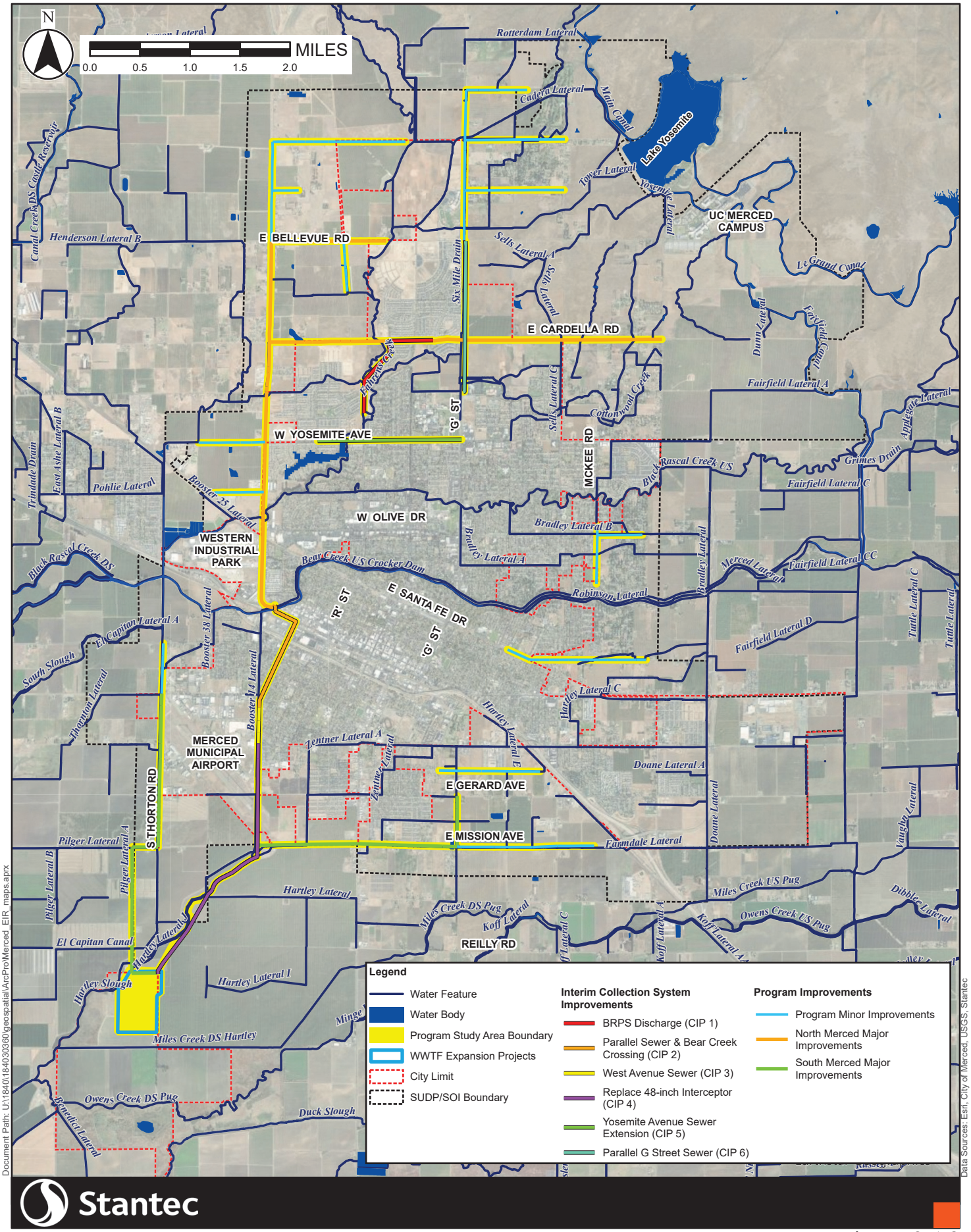


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Figure 3.4-2
Potential Jurisdictional Waters

Wildlife Corridors

Wildlife movement corridors have been recognized by USFWS and CDFW as important habitats worthy of conservation. Wildlife corridors provide migration channels seasonally (i.e., between winter and summer habitats); provide non-migratory wildlife the opportunity to move within their home range for food, cover, and reproduction; and allow for dispersal for individuals to colonize new areas (City of Merced 2010). Vegetation communities and biological communities within the Program Study Area have the potential to support wildlife movement. Specifically, the Program Study Area includes riparian, wetland and stream channels, with associated vegetation communities, that are favored habitats for a variety of wildlife species. Other contributing factors that are useful for wildlife migration include undisturbed and continuous expanses of land. Although the majority of the Program Study Area is considered rural, it is largely developed for agricultural purposes and is fragmented by human-made features such as fences, canals, busy roadways (i.e., Highway 99, SR 140, and SR 59), residential areas, and other local land uses. According to CDFW's Terrestrial Connectivity dataset accessed through CDFW's Biogeographic Information and Observation System (BIOS) (CDFW 2024l), the eastern and southern regions of the Program Study Area are considered to have "limited connectivity opportunity" (e.g., land use limits connectivity options and no connectivity importance identified in models). The northwestern and western regions of the Program Study Area are considered to have "connections with implementation flexibility" and "conservation planning linkages," which are areas that have connectivity importance or often represent the best connections between natural habitats to maintain habitat connectivity, respectively (CDFW 2024g). However, there are no City-designated movement corridors located within the borders of the Program Study Area (City of Merced 2010).

Special Status Species Assessment

As described in Section 3.4.3.1, Methodology, known occurrences of special status plant and wildlife species were queried for the BSA. The results of the CNDDB search can be found in Appendix C. A total of 68 special status plant and wildlife species (including nesting migratory birds and raptors as one) have known occurrences or possibility to occur within the BSA (within 5 miles and/or nine-quad area surrounding the Program Study Area). These 68 special status species, shown on **Figure 3.4-3**, can be categorized as follows:

- Forty-three special status plant species;
- Nine special status invertebrate species;
- Zero special status fish species;
- Two special status reptile species;
- Three special status amphibian species;
- Four special status mammal species; and
- Seven special status bird species.

The assessment identified two species with high or moderate potential to occur (including migratory birds and raptors) and an additional four species as having the most restrictive special status despite their low potential to occur. As shown in the following subsections and **Table 3.4-1**, all six of these species were

wildlife species, and no special status plant species were considered to have high or moderate potential to occur.

Special Status Plants

The desktop review of special status plant species identified 43 species with potential to occur within the BSA (Appendix C, Table C.1). Of the species identified, all were determined to have a low or nonexistent potential to occur within the Program Study Area. The habitat requirements for the 43 species were assessed and cross referenced with the land cover types, suitable habitats identified within the Program Study Area, site conditions, field survey results, and land use, soil types, and water sources. Limited to no suitable habitat was found for any of the plant species identified, and therefore, all 43 special status plant species are considered to have a low or very low to a nonexistent potential to occur within the Program Study Area. Additionally, no special status plant species were observed during the field survey conducted on February 11, 2019, and May 23–24, 2024. It is noted, however, there are limitations on the field survey results since they were conducted outside the typical bloom period for all of the identified species, which may mean the special status plant species were undetectable at the time of the survey.

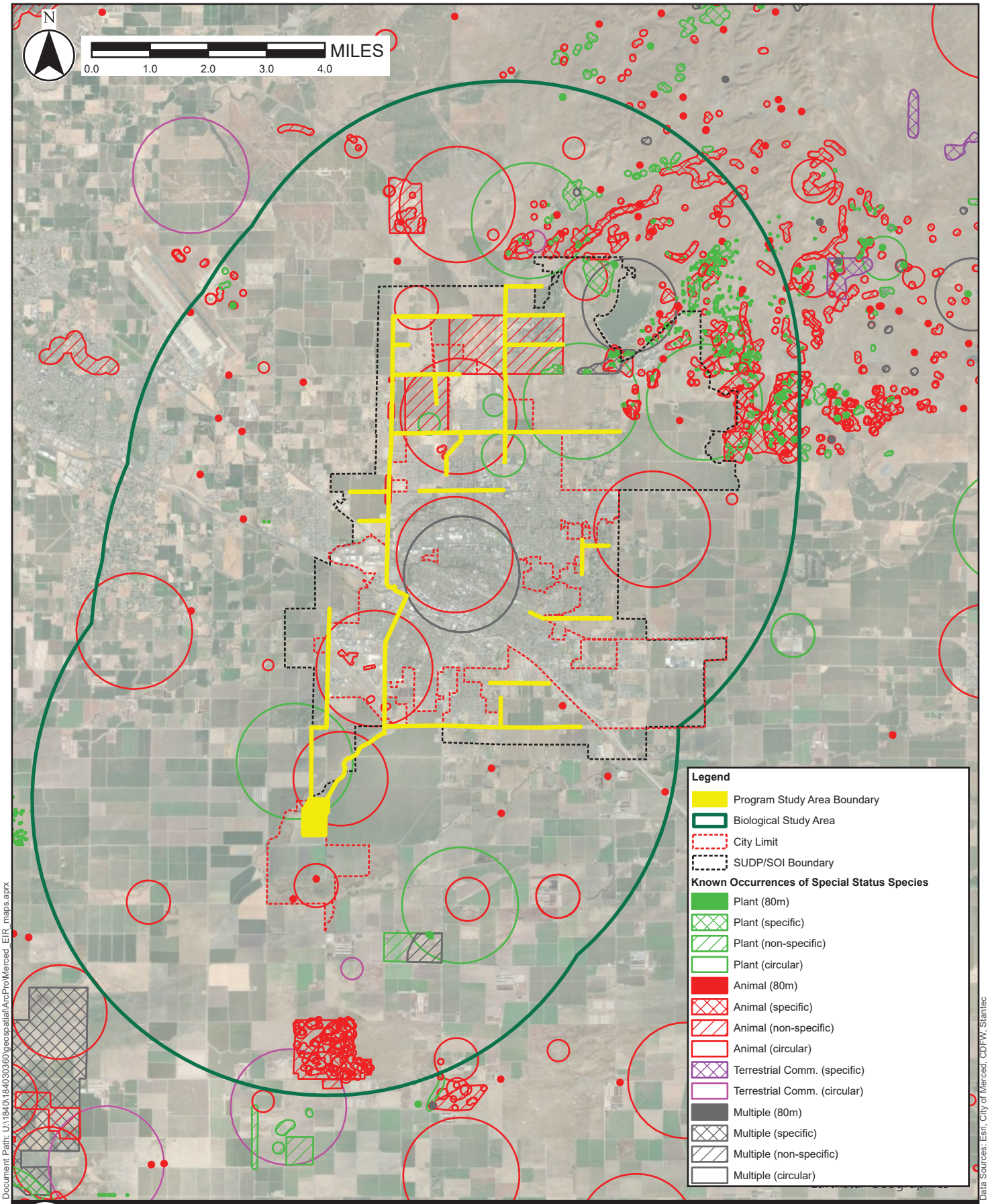

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Figure 3.4-3
Known Occurrences of Special Status Species

Table 3.4-1: Special Status Wildlife Species with High Profiles or Determined to Have a Moderate or High Potential to Occur within the Program Study Area

Common name Scientific name	Legal status		Geographic Distribution/ Floristic Province	Preferred Habitat	Identification Period	Level of Potential to Occur Within the Program Study Area
	Federal	State				
Amphibians						
California tiger salamander *Ambystoma californiense*	T, X	T, WL	Central Valley, and additional isolated populations: Gray Lodge NWR, Sonoma County, and Santa Barbara County. 9-3,500 feet (3-1,067 meters).	Upland grassland, oak savanna, edges of mixed woodland and coniferous forest with vernal pools and ephemeral or perennial ponds for breeding.	Year-round, breed December−February	**Moderate.** Limited suitable breeding habitat (i.e., seasonal pools or ponds) exists within the Program Study Area, and is mostly located to the northeast in the vicinity of the UC Merced campus. There are known occurrences of breeding California tiger salamander (CTS) within five miles of the Program Study Area (CDFW 2024f), and these occurrences are located farther than their known dispersal distance of up to 1.5 miles from breeding habitat (Searcy and Shaffer 2011, USFWS 2017a). Although there is a lack of suitable breeding habitat within the Program Study Area, dispersal habitat may occur. No suitable breeding habitat was observed within the Program Study Area and no CTS were observed during the February 11, 2019, and May 23–24, 2024 field surveys.
Birds						
Burrowing owl *Athene cunicularia*	BCC	SCC	Year-round in southeastern California and the Central Valley. Also winters in arid coastal and foothill areas and can be found in northeastern California in the summer.	Open, dry annual or perennial grasslands, deserts, and scrublands with by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, California ground squirrel.	Year-round	**High.** Suitable nesting habitat and foraging habitat for burrowing owl exists in the agricultural fields in the eastern part of Merced County and in areas within and adjacent to the Program Study Area. According to the desktop review, there have been nine occurrences from 2000 through 2017 within 5 miles of the Program Study Area (CDFW 2024f). Four observations from 2006 to 2007 were documented within approximately 1 mile of the Program Study Area, located northeast of the intersection of South Thornton Road and West Dickenson Ferry Road. The February 11 2019 and May 23–24, 2024 field surveys included a habitat assessment for burrowing owl, and no evidence of presence (i.e., tracks, molted feathers, cast pellets, prey remains, egg shell fragments, owl white wash, etc.) was observed within or directly adjacent to the Program Study Area.
Swainson's hawk *Buteo swainsoni*	–	T	Northwestern and western United States and Canada (breeding).	For nesting, scattered stands of trees near agricultural fields and grasslands.	Breeding (March–September)	**High.** Suitable nesting habitat and foraging habitat for Swainson's hawk exists in the agricultural fields in the eastern part of Merced County including within and surrounding the Program Study Area. According to CNDDB, there have been 15 known occurrences of Swainson's hawk from 1994 to 2016 within 5 miles of the Program Study Area (CDFW 2024f). No Swainson's hawk were observed during the field surveys conducted on February 11, 2019 and May 23–24, 2024; however, Swainson's hawk are migratory and typically inhabit California during breeding season each year (CDFW 2016).
Tricolored blackbird *Agelaius tricolor*	BCC	T, SSC	Highly colonial species, most numerous in Central Valley and Coastal Range.	Nest in wetlands cattails, willows, agricultural fields, blackberry thickets near stock ponds or irrigated pastures. Forage in cultivated fields and wetlands.	Year-round	**Low.** Potential suitable foraging habitat for tricolored blackbird exists in the agricultural fields within the Program Study Area. There have been five occurrences from 2012 to 2015 within 5 miles of the Program Study Area (CDFW 2024f); however, no tricolored blackbirds were observed within the Program Study Area during the February 11, 2019, and May 23–24, 2024 field surveys.
Other nesting raptors and migratory birds	MBTA	FGC	Migrants and resident species.	Tree, shrub, ground, grassland, and riparian vegetation.	February–August	**High.** Ideal habitat exists within and adjacent to the Program Study Area, providing a high potential of occurrence for birds protected under the MBTA and FGC to nest within the Program Study Area. Common migratory bird species that have the potential to nest and forage within or adjacent to the Program Study Area may include ground nesting species such as killdeer (*Charadrius vociferus*) and western meadowlark (*Sturnella neglecta*); shrub or grassland nesting birds such as bushtit (*Psaltriparus minimus)* and loggerhead shrike (*Lanius ludovicianus*); and tree/cavity nesters such as western scrub-jay, acorn woodpecker (*Melanerpes formicivorus*), red-tailed hawk, and red-shouldered hawk. A pair of red-tailed hawks were observed practicing nest building behavior within approximately 500 feet of the North Merced Major Improvements during the February 11, 2019 field survey. No nesting birds were observed during the field survey conducted on May 23–24, 2024.
Mammals						

Common name Scientific name	Legal status		Geographic Distribution/ Floristic Province	Preferred Habitat	Identification Period	Level of Potential to Occur Within the Program Study Area
	Federal	State				
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	San Joaquin Valley floor and surrounding foothills of the Coastal Ranges, Sierra Nevada, and Tehachapi Mountains.	Inhabits annual grasslands or grassy open stages with scattered shrubby vegetation.	Year-round	**Low.** Limited suitable habitat within the Program Study Area. However, there are four known occurrences of foraging adults within five miles of the Program Study Area (CDFW 2024f). During the field surveys conducted on February 11, 2019 and May 23–24, 2024, no evidence of the SJKF was observed within or immediately adjacent to the Program Study Area. There is limited potential foraging habitat within the Program Study Area.

Federal
T = Threatened under FESA
E = Endangered under FESA
X = Extirpated
– = No listing State
T = Threatened under the CESA
WL = Watch List
– = No listing
N/A= Not Applicable
Source: CDFW 2021, CDFW 2024f, CDFW 2024g, CDFW 2024h, CDFW 2024i, CDFW 2024k, CDFW 2024l, CornellLab 2024, Nafis 2024, UC Davis 2024, USEPA 2010, USEPA 2016b, USFWS 2017a, USFWS 2024f, USFWS 2024g, USFWS 2024j, USFWS 2024k, and Xerces Society 2024.

Special Status Wildlife

The desktop review within the BSA identified a total of 25 special status wildlife species with potential to occur within the Program Study Area. Of these 25 species identified, California tiger salamander (*Ambystoma californiense*) burrowing owl, Swainson's hawk, and nesting raptors, and other migratory birds were considered to have a moderate or high potential to occur within the Program Study Area (refer to Table C.1). In addition to these five species, two additional species including tricolored blackbird and San Joaquin kit fox (*Vulpes macrotis mutica*, SJKF), although having a low potential to occur in the Program Study Area, are listed under FESA and/or CESA in addition to having a high-profile in the Sacramento/San Joaquin Valley, including known occurrences within 5 miles of the Program Study Area and warrant further consideration for potential impacts within the Program Study Area .

The remaining 19 special status wildlife species identified during the desktop review have a low or very low to nonexistent potential to occur and are listed in Appendix C, Table C.1.

No special status species were observed in the Program Study Area, and specifically, no special status species were observed within the CIPs 1-6 during the February 11, 2019, and May 23–24, 2024 field surveys. A pair of MBTA and FGC protected red-tailed hawks were observed practicing nest building behavior within approximately 500 feet of the North Merced Major Improvements during the field survey in 2019. Based on vegetative communities and habitat characteristics within the Program Study Area and adjacent areas, special status species that may occur within the Program Study Area include Swainson's hawk (*Buteo swainsoni*) and burrowing owl (*Athene cunicularia*) as well as other common species such as mule deer (*Odocoileus hemionus*), red-shouldered hawk (*Buteo lineatus*), coyote (*Canis latrans*), and Valley gartersnake (*Thamnophis sirtalis fitchi*).

Common wildlife species that were observed include western scrub-jay (*Aphelocoma californica*), brown-headed cowbird (*Molothrus ater*), red-winged blackbird (*Agelaius phoeniceus*), red-tailed hawk (*Buteo jamaicensis*), and California ground squirrel (*Otospermophilus beecheyi*).

3.4.4 Environmental Impacts

This section analyzes potential for implementation of the Program to result in significant impacts to biological resources. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.4.4.1 Methodology

This analysis of impacts on botanical and wildlife resources resulting from implementation of the Program is based on review of data collected as a result of the desktop evaluations and field surveys performed for the Program at the time of draft EIR preparation using information incorporated into the GIS for analysis purposes.

3.4.4.2 Impact Analysis

Impact BIO-1: Potential to 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.

Impact BIO-1 Analysis

Generally, the Program has the potential to impact special status species identified in Section 3.4.3.2 and Appendix C, if they were determined to be present within the impact area of a Program-related activity indirectly (for instance, through habitat modification) or potentially direct effect to species individuals if present within the survey area. As described in Section 3.4.3.1 Methodology, and Section 3.4.3.2 Results, field surveys and database queries were used as screening tools to identify the potential for a species to occur. These tools, however, cannot conclusively eliminate the potential for habitat and species to be present during the long implementation duration of the Program. While the likelihood of encountering a special status species during Program implementation is low since most activities would be located underground in existing or future roadways, disturbed areas, or agricultural fields with limited suitable habitat for special status species. Implementation of the Program could result in a potential substantial direct or indirect impact to the special status species or their habitat and specific mitigation (MM BIO-1 through MM BIO-13, described in Section 3.4.5) would be required as described in the following subheadings to mitigate that potential impact.

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Potential Impacts to Special Status Plant Species

As discussed in the Section 3.4.3.2, Results, 43 special status plant species were identified and assessed for potential to occur within the Program Study Area. Following the analysis of potential suitable habitat characteristics (i.e., site conditions and land use, soil types, and water sources), and an assessment of each individual species' potential to occur within the Program Study Area, all these species were determined to have a low or very low potential to occur. The potential impacts to these species from construction and implementation of the Program were then assessed. Program facilities are reasonably anticipated to be located within future or current ROWs and other disturbed lands throughout the Program Study Area. Program activities are designed to avoid sensitive wetland and riparian habitats through the implementation of trenchless construction methods, that would limit potential impacts to sensitive plants within those communities. As such, the potential for impacts to the identified special status plant species as a result of Program activities is low. There is a low likelihood of the Program significantly impacting special status plant populations with a low or nonexistent potential to occur. However, the field survey had limitations—it was conducted outside the bloom period and did not follow protocol-level standards. Combined with uncertainties about the timing and location of specific Program activities, there remains a

possibility that unique populations of special status plants could be present and significantly impacted if appropriate mitigation measures are not implemented.

As a result, pre-construction surveys as described by MM BIO-1, Pre-Construction Botanical Surveys, during the mid-bloom period (i.e., April to June, ideally in May), would be required to confirm the absence or presence of special status plant species identified in Appendix C, Table C.1 that could have habitat present. . Pre-construction surveys would need to occur prior to the start of ground-disturbing activities in accordance with CDFW survey protocols for the associated plant communities (e.g., grassland, agricultural, riparian, etc.) (CDFW 2018). Additionally, MM BIO-2, Pre-Construction WEAP Training (Biological Resources), would educate construction staff on identification of special status species, stop work authority in the immediate area, and steps to avoid potential impacts to special status species. Therefore, with the implementation of MM BIO-1 and MM BIO-2, direct impacts to special status plant species would be less-than-significant.

Significant indirect impacts to special status plant species could result if construction equipment or workers were to introduce non-native or invasive species that have the potential to inhibit the success of native species survivorship by increasing competition for resources. To reduce the potential for spread of invasive noxious species and the potential for their impact on any nearby habitats for special status species, MM BIO-3, Reduce the Spread and Introduction of Invasive Noxious Weeds, would be required. MM BIO-3 would require the City to reduce the potential introduction or spread of invasive noxious weeds by requiring BMPs during construction to appropriately clean and inspect construction equipment brought in from other regions. Implementation of MM BIO-3 would reduce the potential impact to special status plant species from the spread of non-native or invasive species to a less-than-significant level.

With the implementation of MM BIO-1, MM BIO-2, and MM BIO-3, potential impacts to special status plants would be reduced to a less-than-significant level.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-1, MM BIO-2, and MM BIO-3
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to CTS

CTS, a federally and state threatened species, has low potential to occur across the majority of the Program Study Area, however, there is moderate potential for this species to occur in the creek crossings of the Program Study Area due to the presence of water (considered moderately suitable habitat). CTS could be impacted by the activities under the Program if suitable habitat or individual CTS were observed within Program work areas. Construction activities, including trenching and grading, could directly disturb upland or aquatic habitats occupied by CTS, if present, potentially resulting in a direct impact to individuals while they are above ground or in underground burrows. Indirect impacts could occur through degradation of aquatic, upland, or connecting habitats, increasing human presence, or degrading water quality, etc. Known occurrences do not occur, nor does suitable breeding habitat (i.e., vernal pools, ephemeral and/or perennial ponds) within the Program Study Area which predominately includes existing/disturbed road ROWs. Nevertheless, the Program Study Area lies within 1.5 miles of the potential dispersal range from suitable breeding habitats (Searcy and Shaffer 2011, USFWS 2017a). Consequently, there is a possibility that CTS may occur. No CTS were observed within or immediately adjacent areas surveyed during the field surveys conducted on February 11, 2019, and May 23–24, 2024.

The design methods for the program components primarily avoid CTS aquatic habitats by utilizing trenchless technologies and focusing work in existing roadways and disturbed areas, which also helps avoid suitable upland dispersal habitats. In areas where trenchless technologies are not used, the design generally circumvents aquatic and upland breeding habitats. However, where suitable habitat exists, MM BIO-4, Avoid Disturbance to California Tiger Salamander, shall be implemented to minimize impacts to CTS. Additionally, implementation of MM BIO-2, Pre-Construction WEAP Training (Biological Resources), would educate construction staff on identification of special status species, stop work authority in the immediate area, and steps to avoid potential impacts to special status species. Therefore, direct and indirect effects related to construction activities associated with Program activities would result in a less-than-significant impact to CTS with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-4
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Burrowing Owl

Burrowing owl could be subject to take (including adults, juveniles, or eggs, and/or the destruction of its burrowing (nesting) habitat) prohibited by USFWS and CESA based on its listed designations as Bird of Conservation Concern (BCC) and SSC. Impacts could occur directly during construction activities such as grading, earth-moving, and levee maintenance (causing burrow blocking, flooding or collapse). Indirect impacts may occur through activities such as changes in vegetation management, eradication of host burrowers, the use of pesticides or rodenticides, or the degradation of nesting, foraging, or over-wintering habitats (CDFG 2012).

As described in Section 3.4.3.2, Results, burrowing owl has a high potential to occur in the Program Study Area indicating that habitat or the species could be subject to impacts. Specifically, the agricultural fields in the eastern portion of Merced County provide suitable nesting and foraging habitat for burrowing owl. There is a potential for Program activities to occur within these areas which could result in a significant impact to the species if not properly mitigated by following CDFW guidance on mitigation and avoidance as required by MM BIO-5, Avoid Disturbance to Breeding Burrowing Owl. This guidance provides the best-known scientific approach to conducting habitat assessments and surveys, as well as general conservation goals and principles for developing effective mitigation for the burrowing owl impacts (CDFG 2012). Consistent with this guidance, MM BIO-5 requires an update to the desktop assessment and a site-specific field suitable nesting habitat assessment of the area within 492 feet (150 meters) of Program activities as they are proposed (CDFG 2012). MM BIO-5 further prescribes conducting and impact assessment and avoidance or mitigation plan in accordance with the CDFW guidance if the species is found or signs of presence are encountered. MM BIO-5 also provides specific methodology for conducting the habitat assessment, breeding season and non-breeding season surveys, as well as conducting the impact assessment consistent with the CDFW guidance document (CDFG 2012).

Additionally, MM BIO-2, Pre-Construction WEAP Training (Biological Resources), would educate construction staff on identification of special status species, stop work authority in the immediate area, and steps to avoid potential impacts to special status species. Last, MM BIO-8, Avoid Disturbance to Nesting Raptors and Other Migratory Birds, would also be implemented to protect and avoid identified

active burrowing owl burrow sites. As a result, impacts would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-5, and MM BIO-8
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Swainson's Hawk

Swainson's hawk could be subject to take (including adults, nestlings, or eggs, and/or the destruction of its habitat and/or nests) prohibited by USFWS and CESA based on protections under the MBTA and state status as threatened. Impacts could occur directly during construction activities that result in a disturbance to nesting and foraging habitat or indirectly through activities such as changes in degradation of suitable nesting trees, increase in the use of pesticides on crops or a magnification of consumption in birds, or the elimination of foraging habitat (including on agricultural lands, due to development) (CDFW 2024k).

As described in Section 3.4.3.2, Results, Swainson's hawk has a high potential to occur in the Program Study Area indicating that habitat or the species could be impacted if present within the area surrounding Program activities and if Program activities were to occur during the species' active period within California (March to September) (CDFW 2016). Swainson's hawk nest sites are generally found in riparian corridor trees or adjacent to agricultural fields. Swainson's hawks typically feed in agricultural lands or non-native grasslands where rodent and reptile populations may abound (CDFW 2024k). Suitable nesting habitat and foraging habitat for Swainson's hawk exists in the agricultural fields in the eastern part of the Merced County, within the Program Study Area. Eucalyptus trees within the Program Study Area and near the WWTF provide suitable nesting habitats. There is a potential for Program activities to occur within these areas which could result in a significant impact to the species if not properly mitigated by following CDFW guidance on mitigation and avoidance as required by MM BIO-6, Avoid Disturbance to Nesting Swainson's Hawk (SHTAC 2000).

MM BIO-6 requires Swainson's hawk surveys be conducted within 0.5 mile of all identified Program construction activities pursuant to the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SHTAC 2000), the current protocol approved by CDFW, and if an active nest is detected, MM BIO-6 requires agency consultation to determine specific avoidance and/or compensation measures to sufficiently mitigate the impact. MM BIO-6 requires that, "to meet the minimum level of protection for the species, surveys should be completed for at least the two survey periods immediately prior to a project's initiation," consistent with the current CDFW-approved protocol (SHTAC 2000). The protocol outlined in MM BIO-6 determined survey periods by timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawk within the Central Valley (dates may be adjusted in consideration of early and late nesting seasons and geographic differences). With MM BIO-6, implementation of the Program poses a very low risk of impacting nesting Swainson's hawk nesting and foraging habitat either directly or indirectly.

Additionally, implementation of MM BIO-2, Pre-Construction WEAP Training (Biological Resources), would educate construction staff on identification of special status species, stop work authority in the immediate area, and steps to avoid potential impacts to special status species. Implementation of MM BIO-2, MM BIO-6, and MM BIO-8 would mitigate potential direct and indirect impacts to Swainson's hawk

(both nesting and foraging) by providing identification and avoidance. Therefore, direct and indirect impacts related to construction activities associated with Program activities would result in a less-than-significant impact to Swainson's hawk with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-6, MM BIO-8, and MM BIO-13
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Tricolored Blackbird

The tricolored blackbird is native to California, requires open water, and therefore is usually found near freshwater marshes, swamps, and wetlands, often close to agricultural areas. Foraging habitat includes a wide area, but adults feeding nestlings typically concentrate foraging efforts on small, highly productive habitats, including shrublands, pasturelands, wetlands, and rice paddies (UC Davis 2024). The majority of the Program Study Area is impacted lands. If there are unimpacted lands, such as cultivated fields and wetlands, there may be potential foraging habitat for tricolored blackbird. However, the likelihood of the Program significantly impacting these wetted habitats is low due to the nature of the Program serving planned developments and the general nature of placing Program infrastructure within existing or planned road ROWs or other disturbed areas. Program impacts could occur from construction or operation activities directly affecting cultivated field foraging habitat or in indirect ways as degradation of known nesting colony sites by way of water diversions and draining of wetlands, conversion of habitat to agricultural land and urban areas, and the destruction of breeding colonies in grain fields most often adjacent to dairies (UC Davis 2024). No tricolored blackbird were observed within or immediately adjacent to the Program Study Area during the February 2019 and May 2024 field surveys; but survey results from the February survey may be inconclusive because, although the species often remains in California during the winter months, they are not typically in the region at this time of year (Shuford and Gardali 2008). It is anticipated that the Program could and would be designed to avoid wetland habitat; however, the potential for direct and indirect impacts, which if they were to occur could be significant, cannot be eliminated.

MM BIO-7, Avoid Disturbance to Breeding Colonies of Tricolored Blackbird, implements the 2015 CDFW Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields (CDFW 2015) primarily designed with agricultural activities in mind and are a starting point for take to be avoided and provide guidance to determine where CDFW should be consulted if there is a potential that "take" may not be avoided during construction activities associated with Program implementation. Consistent with the guidance, MM BIO-7 requires that a pre-construction survey is conducted in suitable nesting habitat within approximately 300 feet of construction activities. MM BIO-7 also requires that if an active breeding colony is observed, CDFW's guidance must be followed. Pursuant to the 2015 staff guidance, if a breeding colony is found to be within or adjacent to a construction area, potential avoidance measures available under MM BIO-7 would include establishing a buffer zone, altering the work period to according to their nesting stage, and hazing, which is the deterring or dispersing of wildlife away from a specific location (CDFW 2015). Each measure is further described in the guidance document and is referenced within MM BIO-7.

Additionally, by implementing MM BIO-2, Pre-Construction WEAP Training (Biological Resources), and MM BIO-8, Avoid Disturbance to Nesting Raptors and Other Migratory Birds, construction crews would be

properly trained on potential impacts, avoidance measures, and disturbance to nesting tricolored blackbirds. The potential impacts resulting from Program activities would be mitigated for foraging or nesting tricolored blackbirds or their habitat since MM BIO-2, MM BIO-7, and MM BIO-8 would provide the successful identification and avoidance of this habitat and species. Therefore, direct and indirect impacts related to construction activities would result in a less-than-significant impact to tricolored blackbirds with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-7, and MM BIO-8
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Nesting Raptors and Other Migratory Birds

Migratory birds and nesting raptors are protected under the MBTA and FGC and have a high potential to occur within and adjacent to the Program Study Area. Common migratory bird species that have the potential to nest and forage within or adjacent to the Program Study Area may include ground nesting species such as killdeer (*Charadrius vociferus*) and western meadowlark (*Sturnella neglecta*); shrub or grassland nesting birds such as bushtit (*Psaltriparus minimus*) and loggerhead shrike (*Lanius ludovicianus*); and tree/cavity nesters such as western scrub-jay, acorn woodpecker (*Melanerpes formicivorus*), red-tailed hawk, and red-shouldered hawk. Although impacts from construction or operation of Program activities would be incidental, activities during the nesting season (from about February 15 to August 31 for most species within this region) have the potential to cause direct impacts to birds from the loss of habitat and direct fatality, which could directly impact the survivorship of birds, and the removal or disturbance of active nests may result in breeding failure. Birds could be killed, injured, or disturbed by vehicles or equipment from construction activities. Any disturbance resulting in nest abandonment, the loss of eggs, or direct mortality to a nesting bird would be considered a significant impact. However, the implementation of MM BIO-2 and MM BIO-8 would help protected bird species be identified and appropriately avoided by scheduling disturbance activities outside of the nesting season or by implementing other proscribed avoidance measures that would reduce the potential significance of any potential impact. Therefore, no direct impacts are expected to occur to raptors and other migratory birds with mitigation incorporated.

Indirect impacts to birds could result from habitat changes that affect sources of food or breeding suitability. Construction disturbance, such as noise, may cause short-term avoidance of the surrounding area of a Program activity by birds. The introduction of non-native or invasive species could alter breeding or foraging habitat suitability, and habitat fragmentation may impact bird dispersal and increase populations of species that prey on special status birds (e.g., raccoons, brown-headed cowbirds). However, no indirect significant impacts to nesting raptors and other migratory birds protected under the MBTA and the FGC, including special status species, are expected to occur because the Projects would not introduce non-native or invasive species.

With the implementation of MM BIO-2 and MM BIO-8, potential impacts to nesting migratory birds or raptors would be reduced to a less-than-significant level.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2 and MM BIO-8
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to San Joaquin Kit Fox

Direct impacts to the SJKF could include injury or mortality as a result of construction activities. Common impacts related to construction and facility operation include grading, disking, cultivation, earth-moving, burrow blockage and crushing, levee maintenance, and flooding. Indirect impacts typically include the conversion of native grassland habitats to agricultural or other development, changes in vegetation management, the eradication of host burrowers and prey such as California ground squirrel, the use of pesticides or rodenticides, or the degradation of nesting, foraging, or over-wintering habitats (CDFG 2012).

The desktop review for SJKF identified four observations of non-breeding adults from 1999 to 2001 within five miles of the Program Study Area (CDFW 2024f). However, the February 2019 and May 2024 field surveys did not identify evidence (i.e., species observations, active den sites, tracks, scat, and prey remains) of SJKF. Although potential foraging habitat exists within the Program Study Area, fragmented development within the region has resulted in the limited availability of suitable denning habitat making the possibility for SJKF occurrence within the Program Study Area low.

Due to the absence of potential denning habitat and signs of SJKF observed during the field survey, along with most Project components being located in-road or in disturbed areas, the Interim Collection Systems Improvements (CIPs 1-6) present a low risk of encountering breeding and foraging SJKF. In addition, in recent years successful dispersal of juvenile SJKF has shown a decrease from their core habitat areas (i.e., western Kern County and Carrizo Plain National Monument), which shows that movement of SJKF from those core areas is becoming less likely. Although it is unlikely that there would be impacts to the SJKF as a result of Program implementation, habitat assessment and survey would need to be conducted during individual project planning to the conditions of the project site for SJKF foraging or denning habitat. Without being able to eliminate the possibility of occurrence, there could be a potentially significant impact if habitat were to occur within the impact area of a Program activity. Therefore, MM BIO-9, Avoid Disturbance to Breeding SJKF, is required to conduct surveys and assessment in accordance with the *USFWS San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999). MM BIO-9 would identify potential SJKF habitat, determine if habitat would be impacted by the Program activity, and identify protection and avoidance measures in accordance with the USFWS protocol as well as in accordance with USFWS consultation and guidance. If USFWS determines that the Program activity would not result in direct impacts (i.e., take), the City may proceed with the activity. However, if USFWS determines that take would occur as a result of the Program activity, the City shall consult with the USFWS to determine the appropriate measures to avoid impacts to the SJKF. Measures taken could include project modifications; avoidance and minimization measures; and restoration, preservation, or compensatory actions (USFWS 1999). Specific methods and descriptions for conducting the habitat assessment, both breeding season and non-breeding season surveys, and an impact assessment are described further within the guidance document and outlined in MM BIO-9 (USFWS 2011). Implementation of MM BIO-9 would sufficiently mitigate for the risk of SJKF presence and would reduce potential significant impacts to habitat or the species.

To properly implement these measures and reduce all potential for impact, MM BIO-2 would educate construction staff on identification of special status species, stop work authority in the immediate area, and steps to avoid potential impacts to special status species. Therefore, the potential for direct or indirect

impacts would be mitigated to a less-than-significant level, and impacts would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-9
Level of Significance After Mitigation: Less-than-Significant

Operation

Potential Impacts to Special Status Plants and Wildlife

After construction is finished, the regular operation of the facilities will be confined to previously disturbed areas and existing roads, where no potential habitat or species not previously identified or mitigated for are present. Consequently, it is generally expected that no significant adverse impacts will occur to the identified special status species, as outlined in Section 3.4.5, Environmental Setting. Nesting birds might establish nests within areas of ongoing operation, but it is assumed that they are accustomed to these pre-existing activities. To avoid disturbing these birds, regular maintenance and operations would need to avoid active nests if found within the direct footprints of activities such as pipeline or pump station maintenance or daily treatment tasks at the WWTF. Similar to the discussion of nesting birds for construction, impacts to nesting raptors or other migratory bird species could be potentially significant if the nests were physically disturbed or moved resulting in the likelihood of nest abandonment or harm. MM BIO-10, Install Exclusion Fencing for Environmentally Sensitive Areas, would provide steps to install exclusion fencing around the nest to prevent accidental impact by City staff or contractors. If an active nest cannot be avoided, the assessment, consultation, and compensation measures of MM BIO-8 would be required to reduce the potential for substantial adverse impact. MM BIO-13, Avoid Disturbance to Small Mammal Burrows, would provide steps to install exclusion fencing around mammal burrows of potentially listed small mammals and relocate them if necessary. Therefore, with the implementation of MM BIO-8, MM BIO-10, and MM BIO-13, this impact would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-8, MM BIO-10, MM BIO-13
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Collection System Improvements (CIPs 1-6)

Construction

Potential impacts from the interim sewer improvements would be similar to the impacts described for the Program. However, the location and approximate footprints of the CIPs 1-6 is known, so additional assessment or exclusion of potential impacts is provided where applicable. Like the impacts and setting described for the Program, the CIPs 1-6 have the potential for localized site impacts to sensitive species if species and their habitat exist. With the implementation of the MM BIO-1 through MM BIO-3, these impacts would be less-than-significant as described for the Program and supplemented by the following subsections:

Potential Impacts to Special Status Plant Species

CIPs 1-6 would be located within previously disturbed areas and existing roads where limited to no suitable habitat exists for special status plants as identified through the desktop screening and February

2019 and May 2024 field surveys. However, as mentioned in the Program discussion, the field surveys were not protocol-level and were conducted outside the typical bloom period for special status plant species listed in Appendix C, therefore, there may be the potential for a unique population of special status plants to be present and significantly impacted. As a result, MM BIO-1 would require pre-construction surveys to mitigate potential impacts as described for the Program. MM BIO-1 would identify and appropriately avoid or relocation previously unidentified special status plant species within CIPs 1–6 in accordance with CDFW Guidelines mitigating any significant impacts. In addition to MM BIO-1, MM BIO-2and MM BIO-3, Reduce the Spread and Introduction of Invasive Noxious Weeds, would also be implemented. The implementation of MM BIO-2 would help educate construction personnel on how to identify special status plant species, how to stop work in the immediate area in the event of identification, and how to avoid or mitigate to appropriate standards any encountered special status species. MM BIO-3 would require the City to reduce the potential introduction or spread of invasive noxious weeds by requiring BMPs during construction to appropriately clean and inspect construction equipment brought in from other regions. Therefore, with the implementation of MM BIO-1, BIO-2, and BIO-3, impacts to special status plant species would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-1, MM BIO-2, and MM BIO-3
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to CTS

The CIPs 1-6 have been designed to avoid potential impacts to potential CTS habitat, including both aquatic and upland habitats. Similar to the Program, the CIPs 1-6 are located outside the dispersal area for the known occurrences of CTS, indicating that Project activities would not be likely to encounter a population of CTS (USFWS 2024j). Water features within CIPs 1-6 have marginal suitable habitat characteristics to support CTS. No CTS were observed within or immediately adjacent to CIPs 1–6 during the February 2019 and May 2024 field surveys. Like the Program, the placement of the new trunk sewer infrastructure would not interfere with suitable habitat due to the location and installation methods of the Projects. Therefore, the potential for impacts to occur to CTS or their habitat as a result of the Program is very low and considered less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Burrowing Owl

Potential impacts to burrowing owl from the CIPs 1-6 would be similar to the impacts described for the Program. No evidence (i.e., tracks, molted feathers, cast pellets, prey remains, eggshell fragments, owl whitewash, etc.) of burrowing owl presence was observed within or directly adjacent to CIPs 1–6 during the February 2019 and May 2024 field surveys. However, the desktop review identified nine occurrences from 2000 to 2017 within five miles of the Program Study Area, four of which from 2006 to 2007 were within one mile northeast of the intersection of South Thornton Road and West Dickenson Ferry Road (CDFW 2024f).

While the lack of potential burrow sites and signs of burrowing owl found during the field survey and the CIPs 1–6 locations within mostly disturbed areas and current or future road ROWs indicate a low risk of impact, the proximity of known occurrences coupled with nearby suitable nesting habitat and foraging habitat in agricultural fields could result in burrowing owl establishment or presence within CIPs 1–6. This potential presence while limited could result in a potentially significant impact. The MMs prescribed for the Program would also apply to the CIPs 1-6. MM BIO-5 would require a survey of the area within 492 feet of the proposed alignments to confirm absence of burrowing owl. If burrowing owl were to be identified, BIO-2, MM BIO-4, and MM BIO-8 would be implemented similar to the way described for the Program to effectively identify, mitigate, and protect burrowing owl from potential significant impacts. With the implementation of these measures, the potential impact would be reduced to a less-than-significant level.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-5, and MM BIO-8
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Swainson's Hawk

Potential impacts to Swainson's hawk from the CIPs 1-6 would be similar to the impacts described for the Program. No species or evidence of active or inactive nests indicating Swainson's hawk presence was observed within or directly adjacent to CIPs 1–6 during the February 2019 and May 2024 field surveys. However, the survey was conducted slightly outside the migratory window of March through September and the desktop review identified 15 occurrences from 1994 to 2016 within 5 miles of the Program Study Area (CDFW 2016; CDFW 2024f). None of these recorded occurrences documented nesting Swainson's hawk within or immediately adjacent to CIPs 1-6; however, these areas are immediately adjacent to suitable foraging habitat and nesting habitat such as eucalyptus, a common nesting tree species for breeding Swainson's hawk in the Central Valley. Similar to the Program, potential suitable nesting and foraging habitat exists adjacent to CIPs 1–6, which could result in a potentially significant impact. MM BIO-2 would be required to educate construction personnel of potential sensitive resources and habitats, MM BIO-6 would be required to avoid disturbance to nesting Swainson's hawk, and MM BIO-8 would be required to avoid potential removal of nesting Swainson's hawk. Therefore, with the implementation of MM BIO-2, MM BIO-6, and MM BIO-7, impacts to Swainson's hawk would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-6, and MM BIO-8
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Tricolored Blackbird

No suitable breeding habitat or foraging habitat was observed within 300 feet of CIPs 1-6 during the February 2019 and May 2024 field surveys. However, there have been five occurrences from 2012 to 2015 within five miles of the Program Study Area (CDFW 2024f) and the timing of the field survey does not preclude existence within CIPs 1–6. With no potential (inactive) breeding colony sites observed within or directly adjacent to CIPs 1–6 during the field survey, and with no wetlands, riparian, or foraging habitat observed that would require removal, impacts resulting from the CIPs 1–6 are not anticipated, and impacts are expected to be less-than-significant. Habitat within CIPs 1–6 is limited and it is anticipated that any potential habitat such as wetlands and riparian areas would be avoided by trenchless construction methods. However, to be extra protective and to confirm that no breeding habitat would be

present within 300 feet of any construction activities, the implementation of MM BIO-7 would require a pre-construction survey to be conducted and implementing appropriate avoidance and mitigations that neither the tricolor blackbird nor its breeding habitat shall be impacted as a result of a Project through, if necessary. Additionally, MM BIO-2, Pre-Construction WEAP Training (Biological Resources), would educate construction staff on identification of special status species, stop work authority in the immediate area, and steps to avoid potential impacts to special status species.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-7, and MM BIO-8
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to Nesting Raptors and Other Migratory Birds

As described for the Program, suitable nesting habitat also exists within CIPs 1–6, and therefore, the construction of the CIPs 1–6 has the potential to cause direct and/or indirect impacts to nesting raptors and other migratory birds. Further, a pair of red-tailed hawks were observed practicing nest building behavior within approximately 500 feet of the North Merced Major Improvements alignment during the February 2019 field survey. Similar to the Program, direct or indirect impacts to nesting raptors or migratory birds would be a potentially significant impact. However, the location and installation methods of the CIPs 1–6, limits the potential for nesting raptors and migratory birds. MM BIO-2, Pre-Construction WEAP Training (Biological Resources), MM BIO-8, Avoid Disturbance to Nesting Raptors and Other Migratory Birds, and MM BIO- 10, Install Exclusion Fencing for Environmentally Sensitive Areas impacts would be required to reduce the potential for impacts to a less-than-significant level. MM BIO-2 and MM BIO-7 would schedule disturbance activities during non-nesting season or implement other proscribed avoidance measures that would reduce the potential significance of any potential impact including training construction personnel for how to avoid species that protected bird species are identified and appropriately avoided by. In addition, MM BIO-10 would mark active bird nests adequately for avoided during Project implementation. Therefore, with the implementation of MM BIO-2, MM BIO-8, and MM BIO-10, potential impacts to nesting raptors and other migratory birds would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-8, and MM BIO-10
Level of Significance After Mitigation: Less-than-Significant

Potential Impacts to San Joaquin Kit Fox

No evidence of SJKF presence was observed within or directly adjacent to CIPs 1–6 during the February 2019 and May 2024 field surveys. This lack of potential den sites or signs of SJKF combined with an examination of the CIPs 1-6 potential for impact, indicate that impacts area unlikely because the Projects will be largely located in highly disturbed areas in existing road ROWs, future road ROWs, or in disturbed habitats. However, potential suitable foraging habitat may exist in the grassland habitats and agricultural fields adjacent to CIPs 1, 4, 5, and 6, which also may inhabit an occasional dispersing SJKF. This could result in a potentially significant impact. However, with the implementation of MM BIO-9, Avoid Disturbance to Breeding San Joaquin Kit Fox, and MM BIO-2, impacts to the SJKF would be less-than-significant. MM BIO-9 would require a desktop field habitat assessment, and an impacts analysis should be conducted prior to the CIPs 1-6 (USFWS 1999), and results shall be submitted to USFWS for evaluation and further guidance. MM BIO-9 would identify SJKF denning sites for appropriate avoidance.

Therefore, with the implementation of MM BIO-2 and MM BIO-9, potential impacts to SJKF would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-9
Level of Significance After Mitigation: Less-than-Significant

Operation

Potential Impacts to Special Status Plants and Wildlife

If a nest is found during operations, MM BIO-10 would be required to protect the nest until hatchlings fledge. If an active nest cannot be avoided, the assessment, consultation, and compensation measures of MM BIO-8 would be required to reduce the potential for substantial adverse impact. MM BIO-13, Avoid Disturbance to Small Mammal Burrows, would provide steps to install exclusion fencing around mammal burrows of potentially listed small mammals and relocate them if necessary. Therefore, with the implementation of MM BIO-8, MM BIO-10, and MM BIO-13, this impact would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-8, MM BIO-10, and MM BIO-13
Level of Significance After Mitigation: Less-than-Significant

Impact BIO-1 Findings

Impact BIO-1 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact BIO-1 Overall Mitigation Required: MM BIO-1 through MM BIO-10, and MM BIO-13

Impact BIO-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact BIO-2: Potential to have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

Impact BIO-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The Program Study Area is predominantly made up of agricultural and rural residential–disturbed–ruderal lands; however, as described in Section 3.4.3, Environmental Setting, various creeks, irrigation canals, are present and seasonal wetlands and vernal pools are present and scattered to the north of the Program Study Area (City of Merced 2006). In addition, the existing WWTF property is a rural, previously disturbed area with no waters or riparian habitats. These potentially sensitive biological areas exist mainly outside of or not in conflict with, the Program Study Area or areas anticipated to have the majority of Program development. However, if the Program were required to construct facilities within a riparian or other sensitive natural community such as vernal pools, there would be a potentially significant impact.

Generally, the Program has been designed with controls to prevent impacts such as implementation of trenchless technologies to avoid streams, water crossings, and sensitive communities, among other things. Wetland plant species documented within the Program Study Area were identified as primarily low stature hydrophytic and upland vegetation along and within the various MID ditches, canals, and detention ponds. Invasive species, such as Himalayan blackberry, that grow in regularly maintained canals, are typically not considered a sensitive natural community because they typically occur in disturbed areas and displace native plant species (Cal-IPC 2024).

Because of the potential for significant impact, the City would implement the following MMs to limit that impact to a less-than-significant level and prevent significant harm to that sensitive community. The implementation of MM BIO-2, Pre-Construction WEAP Training (Biological Resources), would educate construction staff on identification of special status species, stop work authority in the immediate area, and steps to avoid potential impacts to special status species. BIO-10, Install Exclusion Fencing for Environmentally Sensitive Areas, includes the requirements to install exclusion fencing for sensitive communities that may be identified. MM BIO-11, Avoid and Reduce Disturbance and Impacts to Riparian Habitat and/or Sensitive Natural Communities, would survey Program activity footprints and limit disturbance (by provisions such as scheduling construction timing in non-wet periods) should riparian areas be identified by inclusion of avoidance procedures and permitting and consultation requirements that meet the requirements for riparian habitat or other sensitive natural communities identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. MM GEO-1, Prepare an Erosion Control and Stormwater Pollution Prevention Plan (as discussed in Section 3.6, Geology and Soils, and Section 3.9, Hydrology and Water Quality) would implement sediment control BMPs in any area where construction activities would approach a canal, ditch, or other hydrological feature. Therefore, with the incorporation of MM BIO-2, MM BIO-10, MM BIO-11, and MM GEO-1, Program construction impacts would be reduced to a less-than-significant.

Operation

The Program Study Area is predominantly made up of agricultural and rural residential–disturbed–ruderal lands with various creeks, irrigation canals, are present and seasonal wetlands and vernal pools (City of Merced 2006). Any potentially sensitive biological areas exist mainly outside of or not in conflict with, the Program Study Area or areas anticipated to have the majority of Program development. Therefore, Program operation impacts would be reduced to less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-10, MM BIO-11, and MM GEO-1.
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Collection System Improvements (CIPs 1-6)

Construction

Similar to the impacts described for the Program, the CIPs 1-6 have the potential to impact riparian or other sensitive natural communities if construction were to interfere with those areas. Potential impacts from the installation of new trunk sewer infrastructure would generally be the same as described for the Program; however, riparian vegetation was not identified as present within the impact areas of the CIPs 1-6. Riparian vegetation is present along hydrological features such as Fahrens Creek, Bear Creek, Black

Rascal Creek, Cottonwood Creek, Miles Creek, Owens Creek, and Hartley Slough. However, these areas are outside CIPs 1-6 and would not be directly impacted by construction activities due to tunneling. These various creeks and MID canal crossings would use trenchless technologies to avoid riparian habitats by tunneling underneath them, as discussed in Section 2.4.1.2, Pipeline and/or Facility Construction. Tunneling is a generally sufficient way to avoid impacts to streams and riparian habitats; however, frac-outs or other potential impacts can arise during construction that have the potential to be significant if they were to result in degradation of water quality or sensitive habitats were to occur. Impacts would be avoided by compliance with existing water quality laws and regulations, which require preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) and associated BMPs, as required by MM GEO-1, and thus would not have a substantial adverse impact to riparian communities. MM BIO-2 would be required to educate construction personnel of potential impacts and MM BIO-10 would be required to protect any riparian vegetation that may present changed conditions from the February 2019 and May 2024 field surveys. Finally, MM BIO-11 would provide specific measures for the assessment and mitigation of the riparian or sensitive habitat community to avoid or provide measures to limit the significance of the potential impact. Therefore, impacts associated with the CIPs 1-6 would not have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS with mitigation incorporated.

Operation

Similar to the impacts described for the Program, the CIPs 1-6 is predominantly made up of agricultural and rural residential – disturbed – ruderal lands with various creeks, irrigation canals, are present and seasonal wetlands and vernal pools (City of Merced 2006). Any potentially sensitive biological areas exist mainly outside of or not in conflict with, the Program Study Area or areas anticipated to have the majority of Program development. Therefore, CIPs 1-6 operation impacts would be reduced to less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-10, MM BIO-11, and MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Impact BIO-2 Findings

Impact BIO-2 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact BIO-2 Mitigation Required: MM BIO-2, MM BIO-10, MM BIO-11, and MM GEO-1

Impact BIO-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact BIO-3: Potential to conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or potential to conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.

Impact BIO-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

The Program does not conflict with the City of Merced General Plan Open Space, Conservation, and Recreation Element. Specifically, the Program is in compliance with Goal Area OS-1: Open Space for the Preservation of Natural Resources and Policies OS-1.1, OS-1.2, and OS-1.4, because habitat classifications, assessments, and field surveys were conducted for special status plant and wildlife species as well has sensitive habitats, allowing for impacts to be avoided, as discussed above.

Specific to Policy OS-1.1: Identify and mitigate impacts to wildlife habitats which support rare, endangered, or threatened species, the Program has the potential to significantly impact rare, endangered, or threatened, species and their habitats. With the implementation of the MMs defined above, these impacts would be less-than-significant. A complete impact assessment is included in Impact BIO-1.

In addition, in accordance with General Plan Policy OS-1.2: Preserve and enhance creeks in their natural state throughout the planning area, and as discussed in Impact BIO-2, the Program would not significantly impact riparian habitat or other natural communities. The Program Study Area is predominantly made up of agricultural and disturbed and ruderal areas and does not include the removal or impacts to trees, including oaks, oak woodlands, and trees along the streets of the City. Therefore, construction and operation of the Program would result in a less-than-significant impact related to Policy OS-1.4: Improve and expand the City's urban forest.

In addition, there are no HCPs, NCCPs, or any other approved local, regional, or state HCPs within the vicinity of the Program Study Area (CDFW 2023). The Program Study Area is predominantly made up of agricultural and disturbed and ruderal areas and does not include the removal or impacts to trees, including oaks and oak woodlands, and therefore does not conflict with the COWCA. As such, the Program nor the CIPs 1-6 would have no potential to conflict with HCPs, NCCPs, the COWCA, or other approved local, regional, or state HCPs, ordinances, or policies. Therefore, this impact would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-1 through MM BIO-10
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction and Operation

The CIPs 1-6 do not conflict with the City of Merced General Plan Open Space, Conservation, and Recreation Element. Specifically, the CIPs 1-6 are in compliance with Goal Area OS-1: Open Space for the Preservation of Natural Resources and Policies OS-1.1, OS-1.2, and OS-1.4, because habitat classifications, assessments, and field surveys were conducted for special status plant and wildlife species as well has sensitive habitats, allowing for impacts to be avoided, as discussed above.

Specific to Policy OS-1.1: Identify and mitigate impacts to wildlife habitats which support rare, endangered, or threatened species, the CIPs 1-6 have the potential to significantly impact rare, endangered, or threatened, species and their habitats. With the implementation of the MMs defined

above, these impacts would be less-than-significant. A complete impact assessment is included in Impact BIO-1.

In addition, in accordance with General Plan Policy OS-1.2: Preserve and enhance creeks in their natural state throughout the planning area, and as discussed in Impact BIO-2, the CIPs 1-6 would not significantly impact riparian habitat or other natural communities. The Program Study Area is predominantly made up of agricultural and disturbed and ruderal areas and does not include the removal or impacts to trees, including oaks, oak woodlands, and trees along the streets of the City. Therefore, construction and operation of the CIPs 1-6 would result in a less-than-significant impact related to Policy OS-1.4: Improve and expand the City's urban forest.

In addition, there are no HCPs, NCCPs, or any other approved local, regional, or state HCPs within the vicinity of the Program Study Area (CDFW 2023). The Program Study Area is predominantly made up of agricultural and disturbed and ruderal areas and does not include the removal or impacts to trees, including oaks and oak woodlands, and therefore does not conflict with the COWCA. As such, the CIPs 1-6 would have no potential to conflict with HCPs, NCCPs, the COWCA, or other approved local, regional, or state HCPs, ordinances, or policies. Therefore, this impact would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-1 through MM BIO-10
Level of Significance After Mitigation: Less-than-Significant

Impact BIO-3 Findings

Impact BIO-3 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact BIO-3 Overall Mitigation Required: MM BIO-1 through MM BIO-10

Impact BIO-3 Overall Level of Significance After Mitigation: Less-than-Significant

Impact BIO-4 Potential to have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

Impact BIO-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction According to the City's 2030 General Plan, the surface water system of the region is vulnerable to discharge containing contaminants, and pollution into the surface water is largely from direct stormwater and irrigation water discharges (City of Merced 2012). As described in Section 3.4.3, Environmental Setting, there is a high concentration of wetted areas including vernal pools and wetlands in northeastern portion of the Program Study Area while the remainder of the Program Study Area is predominantly made up of agricultural and disturbed and ruderal areas with the exception of the denoted creeks and MID canals traversing the Program Study Area (USFWS 2020c). Wetland plant species documented within the Program Study Area were identified as primarily low stature hydrophytic and upland vegetation along and within the various MID ditches, canals, and detention ponds.

The Program has been designed to reduce impacts to and avoid federally protected wetlands and federally and state-protected waters by designing to avoid these features by component placement in previously disturbed areas, in existing or planned roadway ROWs and trenchless techniques underneath riparian areas. Therefore, no permanent or direct impacts are expected to occur, and the potential for the Program to have a substantial adverse impact on federally and state-protected wetlands through direct removal, filling, hydrological interruption, or other means is low. However, if a frac-out from trenchless technologies were to occur in the stream area or trenchless technologies where to not be feasible there could be direct or indirect significant impacts to a federally or state-protected wetland, either directly or indirectly, impacts would be temporary and decreased to a less-than-significant level with the implementation of MM BIO-12, Avoid and Reduce Disturbance to Waters of the U.S. Other Waters, and WOTS. If impacts cannot be avoided, MM BIO-12 requires the City apply for a CWA Section 404 Nationwide Permit through the USACE Sacramento District, and CWA Section 401 Water Quality Certification through the Central Valley RWQCB for the permanent and/or temporary impacts (e.g., dredge or fill) of jurisdictional waters. The City shall also be in compliance with existing water quality laws and regulations which require preparation and implementation of a SWPPP and associated BMPs. MM BIO-2, MM BIO-10, and MM GEO-1 (as discussed in Section 3.6, Geology and Soils, and Section 3.9, Hydrology and Water Quality) would also be implemented. Therefore, with the incorporation of MM BIO-2, MM BIO-10, MM BIO-12 and MM GEO-1, Program impacts would be reduced to less-than-significant.

Operations

Given the surface water system of the region is vulnerable to discharge containing contaminants, and pollution from direct stormwater and irrigation water discharges, the Program has been designed to reduce impacts to and avoid federally protected wetlands and federally and state-protected waters. Therefore, no permanent or direct impacts are expected to occur during operations, and the potential for the Program to have a substantial adverse impact on federally and state-protected wetlands through operations is low.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-10, MM BIO-12, and MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Potential impacts from the installation of the proposed CIPs 1-6 would be expected to be similar to those described for the Program. Activities associated with the CIPs 1-6 have been designed to avoid wetlands and waters by implementation of trenchless technologies that would avoid impacts. However, if proposed activities were not able to avoid the wetland areas there would be a potentially significant impact to federally or state-protected wetland. This impact would be reduced to less-than-significant with the implementation of MM BIO-12 and WOTS. If impacts cannot be avoided, MM BIO-12 would require that the City apply for a CWA Section 404 Nationwide Permit through the USACE Sacramento District, and CWA Section 401 Water Quality Certification through the Central Valley RWQCB for the permanent and temporary impacts (e.g., dredge or fill) of jurisdictional waters. In addition, MM BIO-2, MM BIO-10, and MM GEO-1 would be implemented. Therefore, impacts associated with new trunk sewer infrastructure

would not have a substantial adverse impact on federally protected wetlands as defined by Section 404 and Section 401 of the CWA with mitigation incorporated, resulting in a less-than-significant impact.

Operations

Potential impacts from the operation of the proposed CIPs 1-6 would be expected to be similar to those described for the Program. The activities associated with the CIPs 1-6 have been designed to reduce impacts to and avoid federally protected wetlands and federally and state-protected waters. Therefore, no permanent or direct impacts are expected to occur during operations, and the potential for the proposed CIPs 1-6 to have a substantial adverse impact on federally and state-protected wetlands through operations is low, resulting in a less-than-significant impact.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM BIO-2, MM BIO-10, MM BIO-12, and MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Impact BIO-4 Findings

Impact BIO-4 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact BIO-4 Overall Mitigation Required: MM BIO-2, MM BIO-10, MM BIO-12, MM GEO-1

Impact BIO-4 Overall Level of Significance After Mitigation: Less-than-Significant

Impact BIO-5 Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

Impact BIO-5 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

Wildlife movement may include behaviors such as migration (typically one direction per season), interpopulation movement or dispersal (long-term genetic exchange), and small-distance travel (daily movement) within an animal's territory or home range. The linkages between habitat types that allow for wildlife movement can extend for miles between key habitat areas and may occur on a large scale. Though small travel corridors generally facilitate movement for daily activities within a home range (e.g., foraging and avoiding predators), these corridors also provide connection between other populations, allowing gene flow between populations and resulting in a healthier and more heterogeneous population of a particular species.

The Program Study Area is predominantly made up of agricultural and disturbed and ruderal areas and includes features such as irrigation canals. Areas adjacent to the Program Study Area include habitats such as various creeks and irrigation canals scattered to the north of the Program Study Area (City of Merced 2006), which may provide corridors to facilitate movement of wildlife species within the local region. The presence and or normal velocities of flowing water within these features would remain the

same with the construction and operation the Program and would continue to receive and convey the same capacity of stormwater flows.

Although the Program Study Area includes or is located adjacent to natural communities that provide habitat that may be considered highly favored by a variety of wildlife species in regard to allowing them to move from one place to another, it is also largely developed for agricultural purposes and fragmented by human-made features such as fences, busy roadways (i.e., Highway 99, SR 140, and SR 59), residential areas, and other local land use practices. In addition, the Program Study Area does not intersect significant habitats that would increase wildlife movements, and there are no designated movement corridors located within the borders of the Program Study Area (City of Merced 2010).

Therefore, the potential for Program construction or operation activities to interfere substantially with the movement of any native resident or migratory fish or wildlife species, with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites, is unlikely. Therefore, impacts to wildlife movement would less-than-significant, and no mitigation would be required.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction and Operation

Potential impacts from the CIPs 1-6 are expected to be the same as described within the Program impacts above and would result in a less-than-significant impact. Therefore, construction and operation of the proposed CIPs 1-6 would result in a less-than-significant impact to the movement of any native resident or migratory fish or wildlife species, with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact BIO-5 Findings

Impact BIO-5 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact BIO-5 Overall Mitigation Required: None Required

Impact BIO-5 Overall Level of Significance After Mitigation: Less-than-Significant

3.4.5 Biological Resources Mitigation

Mitigation Measure GEO-1: Prepare an Erosion Control Plan and SWPPP

See MM GEO-1, Section 3.6.

Mitigation Measure BIO-1: Pre-Construction Botanical Surveys

A qualified botanist or biologist shall conduct special status botanical surveys prior to construction activities in a given work area. Surveys shall follow protocols designated by the USFWS (USFWS 2000), CDFW (CDFW 2018), and CNPS (CNPS 2001) and shall occur during the appropriate floristic bloom

periods for the special status species identified as having a potential to occur in the Program Study Area (Appendix C, Table C.1). The majority of special status species with a potential to occur in the Program Study Area have an overlapping bloom period such that if surveys are conducted between April and June (i.e., ideally mid-bloom period in May), target special status species are most likely to be identifiable.

Given that Program activities would be conducted primarily within disturbed areas, the probability of impacting a special status plant species is low. If special status plants are not detected during pre-construction botanical surveys, no further mitigation is required. However, if special status plant species are identified within the Program Study Area, their locations shall be mapped, and the City shall require the implementation of the following measures:

If feasible, construction activities shall avoid special status plants by installing an exclusion area with fencing and signage located at least 50 feet from special status plant populations.

If avoidance is not feasible, the City shall consult with the appropriate regulatory agency (i.e., USFWS for federally listed species and CDFW for state- and CNPS-listed species) to identify appropriate procedures and measures capable of reducing impacts to a less-than-significant level. Recommended measures to mitigate impacts to special status species may include those found in the *Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants* (CNPS 1998). Other measures may include compensation for any impacts to special status plants via replacement (e.g., seed collection and replanting or transplanting of plants) or substitute resources (e.g., mitigation fees) as defined by regulatory agencies. The City shall implement all measures recommended by the appropriate regulatory agencies.

Mitigation Measure BIO-1 Implementation

Responsible Party: The City

Timing: Pre-construction botanical surveys for special status species shall be conducted by a qualified botanist or biologist between April and June (i.e., ideally during the mid-bloom period in May), or as otherwise deemed appropriate by a qualified botanist.

Monitoring and Reporting Program: The survey shall be conducted by a qualified botanist, and a brief Botanical Survey Results Report shall be completed and kept on file with the City. If special status species are encountered, the Pre-Construction Botanical Survey Report shall be submitted to the appropriate regulatory agencies (i.e., CDFW and/or USFWS).

Standards for Success: The presence or absence of special status plant species shall be documented and, if observed, shall be handled and mitigated according to the performance standards outlined above and developed with the appropriate regulatory agencies.

Mitigation Measure BIO-2: Pre-Construction WEAP (Biological Resources)

The purpose of a WEAP training is to educate personnel (i.e., construction workers) about the existing onsite and surrounding resources and the measures required to protect these resources as well as avoidance and potential hazards within these sites to or from these resources. The WEAP, developed by the City, shall include materials and information on potentially sensitive biological and the resources identified as mitigation in other sections of this EIR that require protection, procedures, or identification

during construction. The WEAP training shall educate personnel about the applicable precautions that personnel should take to reduce potential impacts.

The WEAP training shall be given to all personnel who may be responsible for causing a significant impact as identified within the Section 3.4.4 of the draft EIR and below. The WEAP training shall be given on a Project-specific level prior to the start of construction of each Program activity and as necessary throughout the life of construction as new personnel arrive onsite. The City and the contractor are responsible for ensuring that all onsite personnel attend the WEAP training, receive a summary handout, and sign a training attendance acknowledgement form to indicate that the contents of the WEAP are understood and to provide proof of attendance. Each participant of the WEAP training shall be responsible for maintaining their copy of the WEAP reference materials and making sure that other onsite personnel are complying with the recommended precautions. The contractor shall keep the sign-in sheet onsite and shall submit copies of the WEAP sign-in sheet to the City's Project Manager, who shall keep it on file at City offices.

For the biological resources portion of the WEAP training, the following information and implementation steps shall be prepared and presented to aid in the prevention of and to raise awareness of the potential impacts to biological resources:

- How to identify the special status species identified to potentially occur within the project limits consistent with other biological MMs. An overview of species identified with potential to occur in the Program Study Area (as identified in Appendix C of the draft EIR) shall be given with an emphasis on those species identified or with a medium to high potential to occur within the project limits (identified in **Table 3.4-1** of the draft EIR and subsequently by surveys required during implementation of other MMs). A review of the avoidance measures and BMPs incorporated to prevent impacts to those species and regulations as well as applicable civil and criminal penalties associated with violations shall also be provided;
- If special status species are encountered in the work area, construction shall cease within the species habitat range, and the City and a qualified environmental representative shall be notified for guidance on appropriate MMs to be implemented before any construction activities are resumed. Depending on the federal or state listing status, the observed species, and its persistence in the area, the City shall consult with the USFWS and CDFW for guidance;
- Remove litter and other debris that might attract animals from the construction site daily and store it in enclosed containers; and
- Exclude pets from the Program site, including access roads and staging areas.

WEAP materials shall be provided by the City and kept onsite for use by an environmentally trained foreman for training new Program personnel in the absence of the City representative. If special status species are encountered in the Project work area, construction shall cease, and the City, as well as a qualified environmental representative shall be notified for guidance on appropriate MMs, to be implemented before any construction activities are resumed. Depending on the listing of the observed special status species and its persistence in the area, the City shall consult with the USFWS and/or CDFW for guidance.

Mitigation Measure BIO-2 Implementation

Responsible Party: The City and the contractor.

Timing: The WEAP training shall be conducted on a project-specific level prior to construction of each Project and throughout construction activities as new personnel arrive on the Program site. Avoidance or buffer zones will be marked before construction begins.

Monitoring and Reporting Program: Development of a WEAP and handout packet in accordance with this MMs and any other resource-specific WEAP requirements. A sign-in sheet for each Project shall be completed for all workers on the construction site and shall be kept at the Program site, and copies shall be submitted to the City's Project Manager to be kept on file at City offices.

Standards for Success: The prevention of biological resources from being disturbed or destroyed by Program activities. Construction personnel will be trained in the key characteristics for identifying and avoiding impacts to special status species and sensitive habitats.

Mitigation Measure BIO-3: Reduce the Spread and Introduction of Invasive Noxious Weeds

To reduce the spread and introduction of invasive and noxious weeds, the following measures shall be implemented:

1. All Program -related equipment and vehicles shall be decontaminated and inspected for soils or other evidence of materials containing invasive or noxious weed seeds prior to entering the Program work areas and prior to initiation of work on the Program;

Invasive plants and noxious weeds shall be abated by discing, mowing, or rototilling. All weeds shall be disposed of offsite at an appropriate bio-waste disposal location; and

Any topsoil, mulch, and seed used in Program-related activities (e.g., restoration, reseeding, erosion control, and soil stabilization) shall be certified weed-free through visual inspection and/or a signed affidavit from the contractor.

Mitigation Measure BIO-3 Implementation

Responsible Party: The City

Timing: Prior to the initiation of construction with each new piece of equipment and other materials.

Monitoring and Reporting Program: The City shall verify that all equipment and other materials brought onsite are certified weed-free through visual inspection and/or a signed affidavit from the contractor.

Standards for Success: Minimize the potential for introduction and/or spread of invasive and noxious weed species into the Program Study Area through visual inspection of equipment and other materials and/or signed affidavits from the contractor of weed-free certification.

Mitigation Measure BIO-4: Avoid Disturbance to CTS

For Program activities that occur in upland areas (non-developed) that may be considered suitable dispersal habitat for CTS

Mitigation Measure BIO-5: Avoid Disturbance to Breeding Burrowing Owl

For Program activities, this MM requires an update to the desktop screenings and a field-based suitable nesting habitat assessment of the areas within 492 feet (150 meters) of the proposed activity in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). If burrowing owl, evidence of their presence, and/or their habitat is identified during the desktop screening and field survey the CDFW guidance shall be followed to incorporate the general conservation goals and principals prescribed for developing effective mitigation for the burrowing owl impacts (CDFG 2012). If the species is identified as present, the City shall consult with CDFW and follow the specific methodology and mitigation prescribed in the guidance (CDFG 2012). Methods for conducting the habitat assessment, breeding season and non-breeding season surveys, as well as conducting the impact assessment shall be consistent with the CDFW guidance document (CDFG 2012).

Mitigation Measure BIO-5 Implementation

Responsible Party: The City

Timing: Field habitat assessment, field surveys, and/or impact assessment shall be conducted prior to construction activities in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012).

Monitoring and Reporting Program: Surveys and data collection shall be conducted by a qualified biologist, and reporting shall be completed in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). Results of habitat assessment, field surveys, and/or impact assessment conducted shall be compiled in a brief Burrowing Owl Survey Results Report and kept on file with the City. In addition, all mitigation methods developed and implemented by the City shall be documented and kept on file by the City.

Standards for Success: Burrowing owls would not be significantly impacted by the Program activities, and therefore the Project would help meet the conservation goals for the burrowing owl in California as stated in the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012).

Mitigation Measure BIO-6: Avoid Disturbance to Nesting Swainson's Hawk

In accordance with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SHTAC 2000), surveys shall be conducted within 0.5-mile of all Program activities. Surveys shall be completed for the two survey periods immediately prior to a Project's initiation, as defined within the protocol above. The defined survey periods are determined by timing of migration, courtship, and nesting in a typical year for the majority of Swainson's hawks within California's Central Valley. Dates may be adjusted in consideration of early and late nesting seasons, and geographic differences. If an active nest is detected, the City shall follow recommendations included within CDFW's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California* (CDFW 1994) as well as consult with CDFW to determine the most appropriate mitigation methods for a specific Project. Please note that the measures described within this document were developed primarily with agricultural activities in mind and are a starting point to avoid "take" (to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Therefore, if there is additional concern that take may not be avoided due to Program activities during breeding season,

CDFW shall be consulted for guidance so additional and the most appropriate avoidance measures will be developed and implemented from the specific Project.

Mitigation Measure BIO-6 Implementation

Responsible Party: The City

Timing: Prior to the initiation of construction per suggested survey timing within the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SHTAC 2000). If the aforementioned surveys do not fall within 10 days prior to initiation of construction, an additional survey shall be conducted within 0.5-mile of the Project area within 10 days prior to the initiation of construction.

Monitoring and Reporting Program: The survey shall be conducted by a qualified biologist, and results of surveys conducted will be compiled in a brief Swainson's Hawk Survey Results Report and kept on file with the City, in addition to any reporting requirements as stipulated by CDFW in the event that active Swainson's hawk nests are within 0.5 mile of the Project area. If an active Swainson's hawk nest is observed, the City shall submit occurrence data via CDFW's online California Natural Diversity Database submission form.

Standards for Success: Nesting Swainson's hawk will not be impacted by the Program.

Mitigation Measure BIO-7: Avoid Disturbance to Breeding Colonies of Tricolored Blackbird

Prior to Program implementation, a pre-construction survey shall be conducted in accordance with the *Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields* (CDFW 2015). If construction is planned to take place during breeding season, the survey shall be conducted within one week before initiation of construction in suitable nesting habitat within approximately 300 feet of Program activities. If an active breeding colony is observed, CDFW's guidance should be followed (i.e., if a breeding colony is within or adjacent to the Program Study Area, potential avoidance measures include establishing a buffer zone, altering work period to according to their nesting stage, hazing, etc.).

Mitigation Measure BIO-7 Implementation

Responsible Party: The City

Timing: A pre-construction survey and applicable avoidance measures shall be conducted within one week prior to the initiation of Project construction should the Program be initiated between February 15 and September 1.

Monitoring and Reporting Program: The survey shall be conducted by a qualified biologist and results of surveys conducted will be compiled in a brief Tricolored Blackbird Survey Results memo and kept on file with the City in addition to any reporting requirements as stipulated by CDFW in the event that active breeding colonies of tricolored blackbird may be directly impacted as a result of Project activities.

Standards for Success: Breeding colonies of the tricolored blackbird will not be impacted by the Project.

Mitigation Measure BIO-8: Avoid Disturbance to Nesting Raptors and Other Migratory Birds

To the extent feasible, vegetation removal activities shall be conducted during the non-nesting season (i.e., approximately September 1 to February 14). If construction, such as tree removal, trench excavation, pipe installation, etc., have the potential to disturb nesting birds occurs during the nesting season, then a qualified biologist shall conduct a pre-construction nesting bird survey prior to vegetation removal or ground-disturbing activities in a given area with the following criteria:

- Surveys shall be conducted within the Program Study Area and all potential nesting habitat for passerine species within approximately 100 feet of this area, and raptor species within approximately 500 feet of this area.
- The surveys should be conducted within one week before initiation of construction activities at any time between February 15 and August 31. If no active nests are detected, then no additional mitigation is required.
- If surveys indicate the presence of nesting birds within the survey area, the biologist shall establish an exclusion buffer (consistent with MM BIO-10) around the nest in which no work would be allowed until the young have successfully fledged or the nest has been abandoned. The size of the exclusion zone shall be determined by a qualified biologist and shall depend on the status of the species present, the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, other topographical or artificial barriers, and the sensitivity of the nesting bird to the disturbance. In general, exclusion zones of up to 500 feet for raptors and approximately 150 feet for passerines are sufficient to prevent substantial disturbance to nesting birds. However, these buffers may be increased or decreased at the discretion of the biologist, as appropriate. Active nest sites shall be monitored periodically throughout the nesting season to identify any sign of disturbance.
- If nesting birds are documented to have established themselves in a given location within the Program Study Area during pre-existing construction activities, then it shall be assumed that the nesting birds are habituated to the construction activities. Under this scenario, the active nest shall be monitored by a qualified biologist periodically until the young have successfully fledged, or the nest has been abandoned, as described above.
- If active nests are identified on or immediately adjacent to the Program Study Area, then all non-essential construction activities (e.g., equipment storage and meetings) should be avoided in the immediate vicinity of the nest site, but the remainder of construction activities may proceed.

Mitigation Measure BIO-8 Implementation

Responsible Party: The City.

Timing: A pre-construction nesting survey shall be conducted by a qualified biologist within one week prior to construction in any given area of the Program, should the Program be initiated between February 15 and August 31.

Monitoring and Reporting Program: The survey(s) shall be conducted by a qualified biologist, and a brief Nesting Raptor and Migratory Bird Survey Results Report shall be documented and kept on file with the City.

Standards for Success: Special status species and nesting birds covered under the MBTA shall not be disturbed during the Program construction activities; exclusion buffers will be installed and monitored, as necessary.

Mitigation Measure BIO-9: Avoid Disturbance to Breeding San Joaquin Kit Fox

In accordance with the *USFWS San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999), a desktop, field habitat assessment, and impacts analysis shall be conducted, and the results shall be submitted to the USFWS so that they may evaluate the assessment to determine the presence, quality, and value of SJKF habitat. If USFWS determines that the Project will not result in direct impacts (i.e., take), the City may proceed with the Project. However, if the USFWS determines that take will occur as a result of the Project, the City shall work with USFWS to determine the appropriate measures to avoid impacts to the SJKF. This may include project modifications; avoidance and minimization measures; and restoration, preservation, or compensatory actions (USFWS 1999). Specific and typical recommendations for measures for the protection of SJKF may also be found in the *USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior To or During Ground Disturbance* (USFWS 2011).

Mitigation Measure BIO-9 Implementation

Responsible Party: The City

Timing: A desktop field habitat assessment and impacts analysis shall be conducted prior to Program construction activities, results submitted to USFWS at least 30 days prior to construction of the proposed Project activities. In accordance with the *USFWS San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999).

Monitoring and Reporting Program: Surveys and data collection shall be conducted by a qualified biologist and reporting shall be completed in accordance with the *USFWS San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999). Results of habitat assessments, field surveys, and impact assessments conducted will be submitted to USFWS and kept on file with the City. In addition, all mitigation methods developed and implemented by the City shall be documented and kept on file with the City.

Standards for Success: SJKF will not be impacted by the Program.

Mitigation Measure BIO-10: Install Exclusion Fencing for Environmentally Sensitive Areas

As described in MM BIO-2 and BIO-11, the City shall install exclusionary fencing around environmentally sensitive areas prior to construction or during operation. The fencing shall delineate environmentally sensitive area buffers to assist the Program personnel avoid impacts to environmentally sensitive areas (e.g., special status plant occurrences, active bird nests, riparian habitat, sensitive biological communities, and waters of the U.S.) by staying within the Program construction footprint or avoiding sensitive areas within operational areas (i.e., active bird nest). During the construction phase of a Project, these avoidance areas will be identified prior to initiating construction activities, will be included within construction plans as appropriate, and will be protected by the installation of appropriate exclusion zone fencing. Sensitive areas observed during the operational phase of a project (i.e., active bird nests) will be addressed as needed.

Mitigation Measure BIO-10 Implementation

Responsible Party: The City

Timing: During the construction phase, a qualified biologist shall delineate biologically sensitive areas prior to construction via flagging, and the contractor shall then install exclusion fencing, also prior to Program construction. Sensitive areas observed during regular operation will be addressed as needed.

Monitoring and Reporting Program: The City shall verify the exclusion area fencing is properly installed and maintained throughout Program activities.

Standards of Success: No impacts shall occur to environmentally sensitive areas.

Mitigation Measure BIO-11: Avoid and Reduce Disturbance and Impacts to Riparian Habitat and/or Sensitive Natural Communities

The City plans to avoid and reduce potential impacts to riparian habitat and/or sensitive natural communities. If avoidance is not feasible, the City shall apply and obtain a LSAA through CDFW prior to Program activities.

Work including those actions that would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed shall be addressed within the approved LSAA, including temporary impacts to riparian vegetation. To avoid and reduce disturbance and impacts to riparian habitat and sensitive natural communities, the following shall be implemented:

1. If riparian habitat or any other natural communities are present within the Program Study Area, then they shall be identified and flagged and/or mapped by a qualified biologist prior to construction activities. Specifically, when working within 100 feet of a water feature (e.g., creeks, irrigation canals, seasonal wetlands, and vernal pools) exclusion fencing shall be installed that delineates the area to be avoided.
2. All riparian vegetation disturbance shall be avoided during Program implementation. Activities shall be confined to the defined Program work areas, including access routes and staging areas. Active work shall not occur in areas designated as exclusionary by the qualified biologist.
3. If riparian habitat or other sensitive natural communities are present within and/or adjacent to the Program Study Area, all onsite personnel shall be instructed on the importance of avoiding and reducing disturbance in these areas if present within the Program Study Area.
4. If impacts to riparian habitat cannot be avoided, the City shall obtain a LSAA from CDFW prior to Program activities.

Mitigation Measure BIO-11 Implementation

Responsible Party: The City shall ensure that a qualified biologist conducts pre-construction sensitive area and habitat delineation of environmentally sensitive areas, and where appropriate, flag where exclusion fencing shall be installed to show what areas shall be avoided. If Program activities cannot avoid riparian habitat or sensitive communities, the City shall obtain an LSAA from CDFW.

Timing: Exclusion fencing and buffer distances shall be established prior to any work, including staging or ground-disturbing activities within the Program Study Area, including staging and access areas. If necessary, a LSAA must be obtained prior to the commencement of Program activities.

Monitoring and Reporting Program: Following the pre-construction sensitive area/habitat delineation and flagging of exclusion areas within the Program Study Area, a brief technical memorandum shall be completed and kept on file with the City. If a LSAA is required for the Program, the City shall complete required reporting per LSAA permit stipulations.

Standards for Success: Impacts to riparian habitat and other sensitive natural communities shall be avoided and minimized to the greatest extent feasible.

Mitigation Measure BIO-12: Avoid and Reduce Disturbance to Waters of the United States, Other Waters, and WOTS

The City plans to avoid potential impacts to WOTUS, other waters, and WOTS to the extent feasible. If avoidance is not feasible, the City shall apply for a CWA Section 404 Nationwide Permit through the USACE Sacramento District, and CWA Section 401 Water Quality Certification through the Central Valley RWQCB for the permanent and/or temporary impacts (e.g., dredge or fill) of jurisdictional waters. Temporary impacts to jurisdictional waters shall be addressed with first, onsite restoration, if possible, then if not possible through compensatory mitigation, for impacts from Program activities.

Mitigation Measure BIO-12 Implementation

Responsible Party: The City is responsible for applying for all permits and acquiring the appropriate approvals needed for temporary and/or permanent impacts to WOTUS, other waters, and WOTS within the proposed Program Study Area.

Timing: Permits shall be obtained prior to construction.

Monitoring and Reporting Program: The City shall ensure that all permits are obtained prior to construction and the appropriate fees paid, including any for compensatory mitigation, as needed. The City shall comply with Program permit stipulations. The City shall prepare a brief technical memorandum on the compliance with this MMs for City files and the permitting agencies, as needed.

Standards for Success: No permanent impacts to WOTUS, other waters, and/or WOTS.

Mitigation Measure BIO-13: Avoid Disturbance to Small Mammal Burrows

For Program activities that occur in non-developed areas and may be considered suitable habitat for small mammals, a 50-foot no-disturbance buffer shall be delineated around all small mammal burrows throughout localized construction activities. Additionally, a no-disturbance buffer will be established within 250 feet of any known breeding habitat. If burrows occur directly within the proposed construction areas, the City shall have a qualified biologist development and implement a relocation plan, which will include the identification of suitable relocation sites with similar habitat characteristics, methods for humane trapping and transport, and timing for relocation.

Mitigation Measure BIO-13 Implementation

Responsible Party: The City

Timing: No-disturbance buffer shall be established prior to construction activities occurring.

Monitoring and Reporting Program: No-disturbance buffers shall be conducted by a qualified biologist, and record of habitat delineation shall be documented and kept on file with the City.

Standards for Success: Small mammal burrows will not be impacted by Program activities.

3.5 CULTURAL RESOURCES

3.5.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in the cultural resources section of the EIR. Would the Project:

- Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.

This section describes the existing regulatory and environmental setting for cultural resources within the Program Area and Projects and evaluates the potential for impacts related to cultural resources to occur as a result of implementation of the Program development and of the Projects. The term “cultural resources” refers to built environment resources (e.g., buildings, structures, objects, districts) and archaeological resources.

3.5.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives that relate to cultural resources or Tribal Cultural Resources and are relevant to the Program.

3.5.2.1 Federal

This Program does not involve a federal undertaking or federal funding; therefor there are no federal plans, policies, regulations, or ordinances related to cultural resources that apply.

3.5.2.2 State

California Environmental Quality Act, Public Resources Code Section 21082.2, and State CEQA Guidelines

CEQA requires the lead agency to consider the effects of a project on historical resources. State CEQA Guidelines Section 15064.5 provides specific guidance for determining the significance of impacts on historical resources (State CEQA Guidelines Section 15064.5(b)) and unique archaeological resources (State CEQA Guidelines Section 15064.5(b) and PRC Section 21083.2). Under CEQA, these resources are called “historical resources” whether they are of historic or pre-European contact age. CEQA Section 21084.1 defines historical resources as those listed, or eligible for listing, in the California Register of Historical Resources (CRHR), or those listed in the historical register of a local jurisdiction (county or city) unless the preponderance of the evidence demonstrates that the resource is not historically or culturally significant. National Register of Historic Places (NRHP)-listed “historic properties” in California are considered historical resources for the purposes of CEQA and are also listed in the CRHR. The CRHR criteria for listing such resources are based on, and are similar to, the NRHP criteria. CEQA Section

21083.2 and State CEQA Guidelines Section 15064.5(c) provide further definitions and guidance for archaeological sites and their treatment.

California Register of Historical Resources (PRC Section 5024.1)

PRC Section 5024.1 establishes the CRHR. The register lists California properties considered to be significant historical resources. The CRHR also includes all properties listed or determined eligible for listing in the NRHP, including properties evaluated and determined eligible under Section 106. The criteria for listing in the CRHR, Criteria 1–4, are similar to those of the NRHP:

- 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 that represent the work of a master.
- Criterion 4: Resources that have yielded, or may be likely to yield, information important in prehistory or history.

The CRHR regulations govern the nomination of resources to the CRHR (14 CCR Section 4850). The regulations set forth the criteria for eligibility as well as guidelines for assessing historical integrity and resources that have special considerations.

Unique Archaeological Resources

State CEQA Guidelines Section 15064.5(c) specifies how CEQA applies to archaeological sites, including archaeological sites that are historical resources, unique archaeological resources, or neither.

PRC Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. It contains information needed to answer important scientific research questions, and there is a demonstrable public interest in that information.
2. It has a special and particular quality, such as being the oldest of its type or the best available example of its type.
3. It is directly associated with a scientifically recognized important prehistoric or historic event or person.

State CEQA Guidelines Sections 15064.5(d) and (e) specify responsibilities and respectful treatment of human remains, including Native American human remains, that are found or likely to be found within a project site.

Human Remains – Health and Safety Code 7050.5

In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, Section 7050.5 of the Health and Safety Code states that there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the remains were discovered has determined whether the remains are

subject to the coroner's authority. If the human remains are of Native American origin, the coroner must notify the Native American Heritage Commission (NAHC) within 24 hours of this identification. State CEQA Guidelines Sections 15064.5(d) and (e) specify responsibilities regarding human remains as well as the respectful treatment of human remains, including Native American human remains, that are found or likely to be found within a project site.

3.5.2.3 Local

Merced Vision 2030 General Plan

The 2030 General Plan contains several policies that directly or indirectly pertain to cultural resources, including the following:

Goal Area SD-2: Cultural Resources

- **Policy SD-2.1.** Identify and preserve the City's archaeological resources.
- **Policy SD-2.2.** Identify and preserve the City's historic and cultural resources.

Historic Preservation Commission

The purpose of the Planning Commission is to hold public hearings to periodically update the City's General Plan and to review applications for discretionary development within the City, including recommendations for projects requiring final City Council action. The Planning Commission also acts as the Design Review Commission and Historic Preservation Commission. The Design Review/Historic Preservation Commission performs comprehensive site plan and architectural review within the downtown area to promote orderly development of the City and stability of land values and investments. The Historic Preservation Commission was established to promote the protection, enhancement, perpetuation, and use of structures, sites, and areas that are reminders of past eras, events, and persons important to local, state, or national history.

3.5.3 Environmental Setting

The environmental section is based on information provided in the *Historical Resources Technical Report* (Stantec 2024) included as (Appendix D) and *Archaeological Resources Study*[21] (Stantec 2024). The Project's ethnographic setting and impacts on Tribal Cultural Resources are addressed in Section 3.16 *Tribal Cultural Resources.*

[21] Such resources are nonrenewable, and their scientific, cultural, and aesthetic values can be significantly impaired by disturbance. To deter vandalism, artifact hunting, and other activities that can damage such resources, this study is not included in Appendix ***. The legal authority to restrict cultural resources information is in Section 304 of the National Historic Preservation Act of 1966, as amended. Furthermore, California Government Section Code 6254.10 exempts archaeological sites from the California Public Records Act, which requires that public records be open to public inspection

3.5.3.1 Pre-European Contact Cultural Chronology Pre-European Contact Cultural Chronology[22]

The archaeological record of the Central Valley, and the San Joaquin Valley in particular, is divided into three time periods, with many periods themselves being subdivided. The simplified chronology here includes the Paleo-Indian (13500-10500 BP [years before present]), the Archaic (10500-850 BP, divided into Lower, Middle, and Upper), and the Emergent Period (850-180 BP). 180 BP (1770 AD) generally represents the date of historic contact with Euro American settlers.

Paleo-Indian Period (13500-10500 BP)

This period represents the transition from the Pleistocene to the Holocene period, and many Pleistocene landforms are long eroded, and sites lost. However, a distinctive projectile point type, basally thinned with a central flute, is well dated to this time period. These concave-base points have been found in several locations within the San Joaquin Valley.

Archaic Period (10500-850 BP)

Lowe Archaic (10500-7500 BP): During the middle Holocene, a period of climate change resulted in a cycle of “widespread fan and floodplain deposition”, presumably burying deeply and destroying many archaeological sites that would date to this time period. However, the limited evidence that does exist suggests that regional trade networks had been established by this point, as shell beads from California are found in the western and central Great Basin.

Middle Archaic (7500-2500 BP): The subsistence base begins to expand and diversify during the Middle Archaic period with a developing acorn economy, as evidenced by the advent of the mortar and pestle, and the growing importance of fishing, as evidence by novel technology like gorge hooks, composite bone hooks and spears.

Upper Archaic (2500-850 BP): In the San Joaquin Valley, the Windmiller Pattern continued into the Upper Archaic. Additionally, a proliferation of specialized tool technologies developed, including bone whistles and other ornaments. An increasing abundance of mortars and pestles indicate the arrival of acorn-centric economies.

Emergent Period (850-180 BP)

The Emergent Period is thought to be associated with a new level of sedentism, status ascription, and regional trade as indicated by the presence of finished artifacts and food remains that could not be obtained locally. This set of characteristics at the beginning of the Emergent Period is referred to as the Augustine Pattern.

The Emergent Period was marked by wide-ranging changes in Olivella bead forms and their distribution. The Olivella saucer bead trade network appears to have collapsed suddenly between 1520 and 900 BP, and Olivella saucer bead industry was replaced by more regionally integrated shell bead forms, such as Olivella wall beads and clamshell disk beads, later in time. This change possibly indicates an increased

[22] These phases are academic constructs and do not necessarily reflect the views of Indigenous groups of California.

importance of communicating identity, status, and cultural affiliation within an increasingly populated region. These shifts in technology, artifact types, and mortuary practices spread throughout the San Francisco Bay Area and into the Central Valley from north to south and appear to indicate that another cycle of regional integration took place during this period. However, Russian and Spanish incursion and settlement in the region disrupted the cultural developments associated with this period.

3.5.3.2 Historic Era Context

Development of Merced

The first Europeans to enter what is now Merced County was a group of 25 men led by Gabriel Moraga in 1806. After passing through what is now Mariposa Slough in Mariposa County, they group traveled 40 miles through dry treeless plains until they came upon a stream, which they named El Rio de Nuestra Senora de la Merced. This stream name ended up becoming the name of the Merced River, City of Merced, and Merced County. Father Pedro Munoz, who accompanied Moraga's expedition, declared the stream to be a spot for a mission, but no plans materialized from this declaration. After this 1806 expedition, European exploration into Merced County was minimal until the 1830s when fur trappers started venturing into the area.

The City of Merced did not grow and develop quickly until 1872 with the construction of the Central Pacific Railroad. The introduction of the Central Pacific Railroad was one of the most important events to Merced County because it shifted the dominant industry of the area. The main industry in Merced County prior to 1872 was the cattle industry, but after 1872 the main industry shifted to grain.

The City of Merced was located along the trainline in close proximity to Yosemite while still being a valley town, causing its rapid growth in the subsequent years after the railroad's construction. In 1872, the County seat of Merced County was moved to the City of Merced, where it has remained ever since.

Water Infrastructure and History

The first canal irrigation company to begin building water infrastructure in Merced County was the Robla Canal Company. The company was bought when it was still in its early years by the Farmers Canal Company in 1873. Shortly after the purchase, the railroad magnet Charles Crocker and nationally known banker C.H. Huffman partnered up to form the Merced Canal and Irrigation Company and acquired the small Farmers Canal Company. In 1888, the company name was changed to the Crocker-Huffman Land and Water Company. Starting in the mid-1870s, the company began the process of expanding irrigation to a majority of the eastern section of Merced County through canals. The company was responsible for 50,000 acres of irrigation being created from Livingston to several miles south of the City of Merced. In 1914, the company decided it wanted to sell its irrigation system, which prompted residents of eastern Merced County to begin trying to form the MID. Five years later in November of 1919, residents voted to formally establish the MID. The Crocker-Huffman Land and Water Company was eventually able to sell their canal irrigation system to the MID in 1922 for $2.25 million dollars. The MID promptly began constructing its first dam on the Merced River, the Exchequer Dam located at the Exchequer Mining Company.

By 1926, the MID had sold $16 million in bonds that allowed them to not only have the completed Exchequer Dam, one of the largest concrete gravity arch dams at the time that allowed for 281,000 acre-

feet of water, but also power facilities with two generators that each had a rated capacity of 15,625 kilowatts and an extended canal system. During the Great Depression of the 1930s, growth of the district was delayed due to financial hardship, and in the 1940s was again put on hold due to World War II. After the war, the bounce back of the 1950s increased the community's demand for water and forced to district to search for new water supplies. In 1957, Kenneth McSwain, "Mr. MID," was appointed Chief Engineer/Manager and looked for a solution. The solution came in the form of a license granted by the Federal Power Commission in 1964 that allowed for the expansion of irrigation and power facilities on the Merced River. McSwain oversaw the new Merced River Development Project which included building a new Exchequer Dam and a new dam to act as a regulating reservoir named McSwain Dam, completed in 1967. Over the course of the 1970s and 80s, improvements were made to fisheries and recreational facilities as part of the MID, as well as more land acquirement and the construction of three new small dams. The 1990s started with a severe drought in Merced County, which would have been devastating to the County's agriculture industry had it not been for the earlier improvements made to the MID. Since the early 1990s, multiple new plans have been implemented to protect water supplies and irrigation that are part of the MID, including the MID Groundwater Management Plan in 1996 and the San Joaquin River Agreement in 1999. Since its creation in 1919, the MID has expanded to provide approximately 135,000 acres of irrigation within Merced County.

3.5.3.3 Methodology

This section describes the methods used to identify cultural resources that may meet the CEQA definition of a historical resource (PRC Section 21084.1) or unique archaeological resource (PRC Section 21083.2), and that may be affected by development of the Program Area and the Projects.

California Historical Resources Information Systems (CHRIS) Record Search and Literature Review

In June 2024 a records search was conducted by staff at the Central California Information Center (CCIC). The CCIC, an affiliate of the California Office of Historic Preservation, is the official state repository of cultural resources records and reports for Merced County.

Built Environment

Within the Program Area are 815 previously documented built environment resources, 23 of which were identified through the CHRIS records search, and 792 are listed in the Built Environment Resources Directory (BERD).

Archaeology

Twenty previously recorded archaeological sites were identified within the Program Area consisting of four pre-European contact era and sixteen historic-period sites. One historic-period archaeological site (P-24-001773) was identified within the CIP 1 corridor, no resources were identified within the CIP 2,4,5, and 6 corridors. The records search identified 165 cultural resources studies previously conducted within the Program Area.

A review of geologic maps to assess the potential for the Project CIP corridors to contain intact subsurface cultural resources indicates the CIPs extend across numerous geologic units with varying degrees of archaeological sensitivity that range from high, to moderate, and low; however, the highest

where the Project CIP corridors intersect or run adjacent to stream beds in portions of CIP numbers 2, 4, 5, and 6

Field Survey

Built Environment

A built environment field survey for the Project CIPs was conducted on September 17 and 18, 2024. Two previously unrecorded resources within the CIPs were identified, documented, and photographed, which included overview and detailed digital photographs, as well as digital photographs of associated surrounding buildings, structures, and objects. One resource was not subject to digital photographs (Hartley Slough) because it was inaccessible at the time of the survey; however, this resource was still evaluated using aerial images and topographic maps. Six previously recorded resources within the Project CIPs were revisited and field checked.

None of the built environment resources identified or revisited during the survey are eligible for the CRHR under Criterion 1, 2, 3, or 4, or at the local level, pursuant to Merced's Historic Preservation Ordinance criteria which follows the CRHR criteria.

Archaeology

A pedestrian survey of the Project CIP corridors 2-6 was conducted on September 24 and 25, 2024, to examine the ground surface for evidence of archaeological materials. All exposed soils were inspected for pre-European contact archaeological materials (e.g., stone tools, lithic debitage, ground stone), historic-period artifacts (e.g., metal, glass, ceramics), and discoloration that might indicate the presence of archaeological deposits. No surface indications of archaeological resources were identified during the pedestrian survey. Due to a lack of ground disturbance associate with CIP 1, the corridor was not surveyed.

3.5.4 Environmental Impacts

In accordance with Appendix G of the State CEQA Guidelines, the Project would have a significant effect if it would result in any of the conditions listed below.

- Cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.

3.5.4.1 Impact Analysis

Impact CUL-1: Potential to cause a substantial adverse change in the significance of a historical resource[23] as defined in section 15064.5.

Impact CUL-1 Analysis

For a cultural resource to be considered a historical resource (i.e., eligible for listing in the CRHR), it must generally be 50 years or older. Under CEQA, historical resources can include pre-European contact (i.e., Native American) archaeological deposits, historic-period archaeological deposits, historic buildings, and historic districts. CEQA requires that agencies considering projects that are subject to discretionary action shall consider the potential impacts on cultural resources that may occur from project implementation.

Program Impacts

Construction

Built Environment

Within the Program Area are 815 previously documented built environment resources, of which 23 were identified through the CHRIS records search and 792 are listed in the BERD. Because the entirety of the Program Area has not been subject to a built environment survey, there are an unknown number of built environment resources that have not been previously evaluated for the CRHR or local listing and have the potential to be identified as historical resources through future evaluation. While the Program does not specifically involve the demolition, destruction, relocation, or alteration of any historical resources, the nature, size, and location of the individual projects comprising the Program are unknown. Therefore, it is possible the future projects within the Program Area may impact known and previously unidentified resources. Potential project impacts with the Program Area would generally include the demolition or alteration of a historical resource; demolition and/or new construction within the boundaries of a historic district; and introducing a new visual element that alters the setting of a historical resource. As such impacts to built environment historical resources would be potentially significant.

Implementation of MM CUL-1 would ensure that impacts related to built environment resources that qualify as historical resources would be reduced to less-than-significant with mitigation through the identification, evaluation and treatment of built environment resources.

Archaeology

According to the State CEQA Guidelines, “When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource” (State CEQA Guidelines Section 15064.5[c][1]).

Twenty previously recorded archaeological resources were identified within the Program Area consisting of four pre-European contact era and sixteen historic-period resources, in addition, the entirety of the

[23] The term is described in Section 3.5.2.2

Program Area has not been subject to archaeological survey; therefore, construction excavations associated with future projects within the Program Area could encounter archaeological deposits and result in an adverse change to a buried archaeological deposit that could qualify as a historical resource. Thus, potentially significant impacts related to buried archaeological deposits could result from future construction within the Program Area.

Implementation of MM CUL-2 would ensure that impacts related to archaeological resources that qualify as historical resources would be reduced to less-than-significant impact with mitigation through identification, evaluation, and treatment of archaeological resources within the Program Area.

Operation

Any impact on archaeological sites that could qualify as historical resources would occur during Program construction, as discussed above; thus, no impact to cultural resources could result from operation of the Program

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM CUL-1 and MM CUL-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Sewer Improvements (CIPs 1-6)

Construction

Built Environment

Six previously recorded resources are documented within the Project CIPs. Two previously unrecorded resources were identified during the field survey, None of the previously documented or resources identified during the survey are eligible for the CRHR under Criterion 1, 2, 3, or 4, or at the local level, pursuant to Merced's Historic Preservation Ordinance criteria which follows the CRHR criteria; therefor, the Project CIP improvements would have no impacts on built environment historical resources.

Archaeology

No surface indications of archaeological resources were identified during the pedestrian survey. The results of the CCIC records search identified one historic-period archaeological site within the CIP 1 corridor. However, the site is currently a residential development and the features associated with the site are no longer extant; therefore, it is unlikely that any historic-period archaeological deposits are located within the site boundaries that could qualify as historical resources.

A review of geologic maps to assess the potential for the Project CIPs to contain buried pre-European contact archaeological deposits indicates the CIPs extend across numerous geologic units with varying degrees of archaeological sensitivity that range from high, to moderate, and low; however, the highest sensitivity for buried pre-European contact archaeological deposits is where the Project CIP corridors intersect or run adjacent to stream beds in portions of CIPs 2, 4,5, and 6. Therefore, construction excavations in these high sensitivity areas related to Project CIP improvements could encounter archaeological deposits and result in an adverse change to a buried archaeological deposit that could qualify as a historical resource. Thus, potentially significant impacts related to buried archaeological deposits could result from construction of the Project CIP improvements

Implementation of MM CUL-3, CUL-4, and CUL-5 would ensure that impacts related to archaeological resources that qualify as historical resources would be reduced to less-than-significant impact with mitigation through development and implementation of a monitoring plan, archaeological monitoring of the Project CIP improvement excavations in area of high sensitivity, worker awareness training, and requirements to stop work if archaeological deposits are encountered during ground-disturbing activities.

Operation

Any impact on cultural resources would occur during Project CIP improvement construction, as discussed above; thus, no impact to historical resources could result from operation of the Project CIP improvements.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM CUL-3, MM CUL-4, and MM CUL-5
Level of Significance After Mitigation: Less-than-Significant

Impact CUL-1 Findings

Impact CUL-1 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact CUL-1 Mitigation Required: MM CUL-1, MM CUL-2, MM CUL-3, MM CUL -4, and MM CUL-5

Impact CUL-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact CUL-2: Potential to cause a substantial adverse change in the significance of an archaeological resource[24] pursuant to section 15064.5.

Impact CUL-2 Analysis

Program Impacts

Construction

According to the State CEQA Guidelines, archaeological sites that do not qualify as historical resources shall be assessed to determine if they qualify as “unique archaeological resources” (PRC Section 21083.2; State CEQA Guidelines Section 15064.5[c][3]). As discussed above, excavations related to future projects with the Program Area could encounter archaeological deposits and result in an adverse change to a buried archaeological deposit that could qualify as an archaeological resource. Thus, potentially significant impacts related to unidentified archaeological resources could result from construction of the Project.

Implementation of MMs CUL-2 would ensure that impacts related to archaeological deposits that qualify as archaeological resource would be reduced to less-than-significant impact with mitigation through identification, evaluation, and treatment of archaeological resources within the Program Area.

[24] The term is described in Section 3.5.2.2

Operation

Any impact on archaeological resources would occur during Program construction, as discussed above; thus, no impact to archaeological resources could result from operation of the Program

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM CUL-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Sewer Improvements (CIPs 1-6)

Construction

As discussed above, construction excavations related to Project CIP improvements could encounter archaeological deposits and result in an adverse change to an archaeological resource. Thus, potentially significant impacts related to unidentified archaeological resources could result from construction of the Project.

Implementation of MMs CUL-3, CUL-4, and CUL-5 would ensure that impacts related to archaeological deposits that qualify as an archaeological resource would be reduced to a less-than-significant impact with mitigation through implementation of a monitoring plan, worker awareness training, and requirements to stop work if archaeological deposits are encountered during ground-disturbing activities.

Operation

Any impact on resources would occur during Project CIP improvement construction, as discussed above; thus, no impact to archaeological resources could result from operation of the Project CIP improvements.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM CUL-3, MM CUL-4, and MM CUL-5
Level of Significance After Mitigation: Less-than-Significant

Impact CUL-2 Findings

Impact CUL-2 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact CUL-2 Mitigation Required: MM CUL-2, MM CUL-3, MM CUL-4 and MM CUL-5

Impact CUL-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact CUL-3 Potential to disturb human remains, including those interred outside of formal cemeteries.

Impact CUL-3 Analysis

Combined Program/ Project Impacts

Construction

Based on the records search results and the desktop archaeological sensitivity assessment described above, excavations related to the current Project CIPs and future Project construction with the Program Area could result in substantial adverse changes to historical resources and/or archaeological deposits that may contain human remains. Thus, potentially significant impacts and disturbance of human remains

outside of dedicated cemeteries could result from construction of the Project CIPs and future construction within the Program Area.

In the event that human remains are identified during Project activities, these remains would be required to be treated in accordance with Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the PRC, as appropriate. Section 7050.5 of the California Health and Safety Code states that, in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the Site or any nearby area reasonably suspected to overlie adjacent remains until the County Coroner has determined whether or not the remains are subject to the coroner's authority. If the human remains are of Native American origin, the coroner must notify the NAHC within 24 hours of this identification. The NAHC will identify a Native American Most Likely Descendant (MLD) to inspect the Site and provide recommendations for the proper treatment of the remains and associated grave goods. Compliance with the California Health and Safety Code and with implementation of MMs CUL-2, CUL-3,CUL-4, and CUL-5 impacts to human remains in any location other than a dedicated cemetery would be reduced to less-than-significant impact.

Operation

Any impact on human remains in any location other than a dedicated cemetery would occur during construction as discussed above; thus, no impact could result from operations of the Project CIPs or within the Program Area.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM CUL-2, MM CUL-3, MM CUL-4, and MM CUL-5
Level of Significance After Mitigation: Less-than-Significant

Impact CUL-3 Findings

Impact CUL-3 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact CUL-3 Mitigation Required: MM CUL-2, MM CUL-3, MM CUL-4, and MM CUL-5

Impact CUL-3 Overall Level of Significance After Mitigation: Less-than-Significant

3.5.5 Cultural Resources Mitigation

Mitigation Measure CUL -1 Identification, Evaluation, and Treatment of Built Environment Historical Resources

Prior to project implementation within the Program Area a built environment resources survey and Historical Resource Evaluation Report (HRER) shall be prepared to determine if the project has the potential to alter or demolish a historical resource. The HRER shall include a CHRIS and BERD records search; preparation of a historic context; and evaluation for NRHP, CRHR, and local landmark eligibility. All evaluated resources shall be documented on Department of Parks and Recreation Series 523 Forms. The HRER shall be prepared by a qualified architectural historian or historian who meets the Secretary of

the Interior's Professional Qualifications Standards[25] in architectural history or history and submitted to the City prior to project approval.

If the HRER concludes that the project would result in a substantial adverse change in the significance of a historical resource, additional measures to reduce the impacts to a less-than-significant level should be implemented which include, but not be limited to

A. Rehabilitation of Historical Resources

   For projects with the potential to alter a historical resource, rehabilitation in compliance with the SOI Standards for the Treatment of Historic Properties (Standards) would reduce potential impacts to less-than-significant. Prior to the project's approval, a SOI qualified architectural historian or historian shall review proposed Project plans and prepare a memorandum to be submitted to the City outlining the project's compliance with the Standards.

B. Construction Monitoring

   For projects where resources are being rehabilitated in compliance with the Standards, construction shall be monitored by a SOI qualified architectural historian at regular intervals that may include, but not necessarily limited to 50 percent, 90 percent, and 100 percent construction. The monitor shall prepare a memorandum at these intervals to be submitted to the City documenting construction with digital photographs, summarizing the findings, and outlining any recommendations for continued compliance with the Standards. If the City determines that the project is not complying with the Standards, all activities shall cease until compliance with the Standards is resolved.

C. New Construction Design Standards

   For projects with the potential to introduce new construction on a site or adjacent to a site containing a historical resource, new construction shall be designed and built in compliance with the Standards. Prior to the project's approval, a SOI qualified architectural historian or historian should review proposed Project plans and prepare a memorandum to be submitted to the City outlining the project's compliance with the Standards.

D. HABS/ HAER Documentation of Historical Resources

   For projects where significant impacts to historical resources cannot be avoided, Historic American Buildings Survey (HABS) Level II documentation or Historic American Engineering Record (HAER Level II documentation shall be prepared prior to the issuance of a permit for the demolition or alteration of a historical resource). The HABS/HAER documentation shall be

[25] U.S. Department of the Interior. 1983. *Archaeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines.* Available: https://www.nps.gov/subjects/historicpreservation/upload/standards-guidelines-archeology-historic-preservation.pdf

prepared according to the SOI Standards and Guidelines for Architectural and Engineering Documentation by a SOI qualified architectural historian or historian.

E. Interpretive Program

For projects where significant impacts to historical resources cannot be avoided, an interpretive sign, exhibit, website, or documentary shall be prepared that addresses the architectural or historical significance of the historical resource and discusses the resource's history and original location. The interpretive program shall be prepared in consultation with a SOI qualified architectural historian or historian and submitted to the City for approval prior to the issuance of a permit for demolition or alteration of a historical resource.

Mitigation Measure CUL-1 Implementation

Responsible Party: The City

Timing: Prior to construction at future Project sites

Monitoring and Reporting Program: HRER

Standards for Success: Complete HRER.

Mitigation Measure CUL-2: Identification, Evaluation, and Treatment of Archaeological Resources within the Program Area.

An archaeological resource study shall be completed as Project sites within the Program Study Area are identified The study shall include but not be limited to a project-specific records search at the CCIC and a pedestrian archaeological survey of the Project site.

If an archaeological site is identified within the Project site, the resource should be avoided through redesign. If avoidance is not possible, a CRHR evaluation of the archaeological site shall take place. If found not eligible for the CRHR, and not considered a historical resource or a unique archaeological resource for the purposes of CEQA, no further consideration is required. If the resource is found eligible to the CRHR, any potentially significant impacts to the resource must be addressed and mitigated following guidance at CCR 15064.5 and PRC 21083.2, which identify specific measures such as preservation, excavation, and capping of sites. The archaeological resource study shall be submitted to the CCIC.

Mitigation Measure CUL-2 Implementation

Responsible Party: The City

Timing: Prior to construction at future Project sites

Monitoring and Reporting Program: .

Standards for Success: A complete Archaeological Resource Study.

Mitigation Measure CUL-3: Development of an Archaeological Monitoring Plan and Archaeological Monitoring of all CIP Related Ground Disturbance Within the High Sensitivity Areas in the Vicinity of a Waterway.

Prior to any Project-related ground disturbance an Archaeological Monitoring Plan (AMP) shall be developed by a qualified archaeologist who meets SOI Professional Qualifications Standards for Archaeology for review and approval by the City.

- The AMP shall include but not limited to, (1) archaeological monitoring location and methods specific to Project excavation; (2) protocols and a chain of contact if unanticipated archaeological discoveries are encountered during Project-related ground disturbance; (3) a summary of documentation procedures for unanticipated discoveries; (4) a description of the types of archaeological deposits that are likely to be encountered; and (5) procedures for evaluating these archaeological deposit types as historical resources or unique archaeological resources pursuant to PRC Section 5024.1 or PRC Section 21083.2(g)

Prior to any Project-related ground disturbance, the City shall retain the services of an SOI qualified archaeologist to implement the AMP and oversee archaeological monitoring of CIP related ground disturbance within high sensitivity areas within the vicinity of a waterway and pursuant to the AMP.

- If archaeological deposits are encountered during Project-related ground disturbance, the monitoring archaeologist shall have the authority to stop work in the area (50-foot radius) and implement the procedures outlined in the AMP.
- Work shall not resume until the monitoring archaeologist under the oversight if the SOI qualified archaeologist and, in consultation with the, determines that all applicable protocols of the AMP have been meet and that the archaeological deposit does not qualify as a historical resource or unique archaeological resource pursuant to PRC Section 5024.1 or PRC Section 21083.2(g) and no further archaeological investigation is necessary.
- Should the monitoring archaeologist under the oversight if the SOI qualified archaeologist and, in consultation with the City, determine the archaeological deposit does qualify as a historical resource or unique archaeological resource pursuant to PRC Section 5024.1 or PRC Section 21083.2(g), a treatment plan with appropriate protection and preservation measure will be developed for review, approval, and implementation by the City to mitigate impacts to the resource.
- Following the completion of all ground disturbance associated with Project construction, the results of the archaeological monitoring will be summarized in a technical document. The technical document shall be provided to the City for review and approval and submitted to the CCIC.

Mitigation Measure CUL-3 Implementation

Responsible Party: The City

Timing: Prior to and during CIP construction

Monitoring and Reporting Program: AMP and Archaeological Monitoring Results Report

Standards for Success: A complete AMP and Archaeological Monitoring Results Report

Mitigation Measure CUL- 4: Conduct Cultural Resource Sensitivity Training

Prior to any Project-related ground disturbance, the City shall retain the services of an SOI qualified archaeologist to oversee and ensure that all construction workers involved in ground-disturbing activities

receive Cultural Resource Sensitivity Training by an archaeologist who is experienced in teaching non-specialists to recognize archaeological resources in the event that any are discovered during construction. Construction staff directly overseeing or engaged in ground-disturbing activities must participate in this training. This training shall be provided once to each worker involved in ground-disturbing activities before they begin work and shall be documented in training records submitted to the City.

This training shall be administered as stand-alone trainings or included as part of the overall environmental awareness training. The training shall include, at minimum, the following:

- The appearance and types of cultural and archaeological resources that are likely to be encountered.
- The notification procedures and protocols to be taken in the event of an inadvertent cultural or archaeological resource discovery.
- The penalties for disturbing or destroying cultural resources.

Mitigation Measure CUL-4 Implementation

Responsible Party: The City

Timing: Prior to and during CIP construction

Monitoring and Reporting Program: Documented in training records submitted to the City.

Standards for Success: Complete training records submitted to the City.

Mitigation Measure CUL-5: Stop Work if Archaeological Deposits and/or Human Remains Are Encountered During Ground-Disturbing Activities.

If archaeological deposits are encountered during Project-related ground disturbance, work in the area (50-foot radius) shall stop immediately and the procedures outlined in the AMP will be implemented. If any human remains are discovered during ground-disturbing activities, there shall be no further excavation or disturbance of the Site, or any nearby area reasonably suspected to overlie adjacent human remains. These remains shall be treated in accordance with existing state laws, including California PRC Section 5097.98 and California Health and Safety Code Section 7050.5

Mitigation Measure CUL-5 Implementation

Responsible Party: The City

Timing: During CIP construction

Monitoring and Reporting Program: Procedures outlined in the AMP

Standards for Success: Documented in the Archaeological Monitoring Results Report

3.6 GEOLOGY, SOILS, AND MINERAL RESOURCES

3.6.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues for Geology and Soils and Mineral Resources would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving the following:
    - 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 or strong seismic ground shaking;
    - Seismic-related ground failure, including liquefaction;
    - Landslides;
    - Result in substantial soil erosion or the loss of topsoil;
    - 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 offsite landslide, lateral spreading, subsidence, liquefaction or collapse;
    - Be located on expansive soil, as defined in Table 18-1-B from the Uniform Building Code (UBC) (1994), creating substantial direct or indirect risks to life or property;
    - Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
    - Directly or indirectly destroy a unique paleontological resource, site, or geologic feature;
    - Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state; and
    - 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.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to geology, soils, and mineral resources that may result from implementation of the Program, identifying mitigation for potentially significant impacts, where feasible.

3.6.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives that are related to geology, soils, and mineral resources and are relevant to the Program.

3.6.2.1 Federal

Clean Water Act

The CWA (33 USC]1344) primarily focuses on WOTUS and is more thoroughly described in Section 3.4, Biological Resources, and Section 3.9, Hydrology and Water Quality. However, the CWA focuses on sediment control in three aspects. First, the United States Army Corps of Engineers (USACE) administers CWA Section 404, which regulates the discharge of fill into WOTUS. Secondly, the state Water Resources Control Board (SWRCB) administers CWA Section 401, which applies to stormwater discharges where erosion control is an integral part of achieving permit compliance. Third, under direction from the SWRCB, the RWQCB administers CWA Section 402, which regulates point and non-point source discharges requiring a general or individual permit based on discharge type and size through the NPDES program.

Earthquake Hazards Reduction Act of 1977

The Earthquake Hazards Reduction Act of 1977 established the National Earthquake Hazards Reduction Program (NEHRP) “to reduce the risks of life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program.” The four principal goals of the NEHRP are as follows:

- Develop effective practices and policies for earthquake loss reduction and accelerate their implementation;
- Improve techniques for reducing earthquake vulnerabilities of facilities and systems;
- Improve earthquake hazards identification and risk assessment methods, and their use; and
- Improve the understanding of earthquakes and their effects.

Many of the tools used to assess, as well as mitigate, earthquake hazards and impacts were developed under the NEHRP (FEMA 1977).

Occupational Safety and Health Administration

The Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration, which is responsible for protecting the health of workers in events that could cause injury to workers. Occupational Safety and Health Administration (OSHA) has created regulations to set federal standards of workplace safety including hazardous materials exposure limits, mandatory workplace training, accident and injury reporting, and safety procedures. These regulations are recorded in the CFR Title 29. Regulations specific to safety of trench work include: 29 CFR 1926.620, 29 CFR 1926.651, and 29 CFR 1926.652.

3.6.2.2 State

Alquist-Priolo Fault Zoning Act

The Alquist-Priolo Fault Zoning Act (AP Act), administered by the California Geological Survey (CGS), provides a mechanism for reducing losses from surface fault ruptures on a statewide basis. The AP Act requires the mapping of zones around active faults in California, in an effort to prohibit the construction of structures for human occupancy on active faults and minimize damage due to rupture of a fault. Active

faults are those that have ruptured within the past 11,000 years. Where the AP Act identifies an Earthquake Fault Zone, a geologic investigation and report is necessary to prevent siting of buildings on active fault traces (CGS 2024a).

California Department of Transportation, Highway Design Manual Section110.6

California Department of Transportation (Caltrans) has developed roadway design standards, including those for seismic safety. Consideration of seismic risks and hazards in roadway design is detailed in the Caltrans Highway Design Manual Section 110.6, Earthquake Consideration. Construction within local highways and roads (including removing and replacement of existing roadways) would be required to adhere to Caltrans' engineering standards to minimize settlement (Caltrans 2023).

California Standard Building Code

Title 24, Part 2 of the California Building Code (CBC) of the CCR contains specific requirements for construction with respect to earthquakes and seismic hazards intended to be protective of public health. Chapter 16 Section 1613, Earthquake Loads, of the 2016 CBC (effective January 1, 2017) deals with structural design and requires that every structure and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions (Caltrans 2023). For pipelines and other Program infrastructure, structural stability is guided by ASCE-7, Minimum Design Loads for Buildings and Other Structures, which is produced by the American Society for Civil Engineers and adopted into CBC design standards. ASCE-7 sets standards for above-ground facilities such as pump stations and WWTF facilities.

Government Code Section 65302(g)

Government Code Section 65302(g) discusses the elements of safety for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8, Division 2 of the PRC; as well as other geologic hazards known to the legislative body. This code requires mapping of known seismic areas and other geologic hazards. It also addresses evacuation routes, military installations, water supply requirements, and minimum road widths and clearances around structures as those items relate to identified geologic hazards (CGC, Title 7, Division 1, Chapter 3, Article 5, Local Planning [65100-65763]).

Paleontological Resources

CEQA includes in its definition of historical resources "any object [or] site …that has yielded or may be likely to yield information important in prehistory" (14 CCR 15064.5[3]), which is typically interpreted as including fossil materials and other paleontological resources. More specifically, destruction of a "unique paleontological resource or site or unique geologic feature" constitutes a significant impact under CEQA per CEQA Guidelines Appendix G. Treatment of paleontological resources under CEQA is generally similar to treatment of cultural resources, requiring evaluation of resources in the project; assessment of potential impacts on significant or unique resources; and development of MMs for potentially significant impacts, which may include monitoring combined with data recovery excavation and/or avoidance.

Seismic Hazard Mapping Act

The Seismic Hazard Mapping Act of 1990 governs the responsibilities of city, county, and state agencies in identifying and mapping seismic hazard zones and mitigation seismic hazards to protect public health and safety in accordance with the provision of the California PRC, Division 2, Chapter 7.8, Geology, Mines and Mining, Seismic Hazards Mapping. The publication delineates zones where earthquakes could cause hazardous ground shaking and ground failure, including liquefaction and landslides (CGS 2024b). Currently, zones near the San Andreas Fault in the urban centers of the greater San Francisco Bay Area and Los Angeles have been delineated. Local cities and counties within these zones regulate construction to minimize loss associated with these seismic hazards.

Surface Mining and Reclamation Act

The California Surface Mining and Reclamation Act of 1975 (SMARA) was enacted in response to land use conflicts between urban growth and essential mineral production. SMARA (PRC Section 2710 et seq., subsequently amended) is the primary regulation for onshore surface mining in the state. SMARA mandated that aggregate resources throughout the state be identified, mapped, and classified by the state geologist so that local governments could make land use decisions in light of the presence of aggregate resources and the need to preserve access to those resources. Local jurisdictions are required to enact specific plan procedures to guide mineral conservation and extraction at particular sites and to incorporate mineral resource management policies into their General Plans. The state Mining and Geology Board has prepared Mineral Land Classification Maps for aggregate resources. The Mineral Land Classification Maps designate four different types of resource sensitivities. The four Mineral Resource Zone (MRZ) sensitivity types are as follows:

- **MRZ-1:** Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood for their presence exists;
- **MRZ-2:** Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists;
- **MRZ-3:** Areas containing mineral deposits the significance of which cannot be evaluated from available data; and
- **MRZ-4:** Areas where available information is inadequate for assignment of any other MRZ zone.

3.6.2.3 Local

Merced Vision 2030 General Plan

The 2030 General Plan contains several policies that directly or indirectly pertain to geology, soils, and mineral resources, including the following:

Goal Area OS-5: Conservation of Resources

- **Policy OS-5.2.** Protect soil resources from the erosive forces of wind and water.

Goal Area S-2: Seismic Safety

- **Policy S-2.1.** Reduce the potential danger from earthquake and seismic-related activity from existing buildings where necessary.
- **Policy S-2.2.** Encourage the improvement of all public facilities and infrastructure such as natural gas, fuel, sewer, water, electricity, and railroad lines and equipment with up-to-date seismic safety features.
- **Policy 2.3-** Restrict urban development in all areas with potential for ground failure characteristics.

City of Merced Municipal Code

Title 15, Division III-Storm Water System, Chapter 15.50.120 (B) Storm Water Management and Discharge Control Code states that:

> *"Any person performing construction activities in the City shall prevent pollutants from entering the storm water conveyance system and comply with all the applicable Federal, State, and local laws, ordinances, or regulations, including, but not limited to, the current California NPDES General permit for storm water discharges associates with construction activities (Construction General Permit) and the City Storm Water Management and Discharge Control Chapter. All construction projects, regardless of size, having soil disturbance or activities exposed to storm water must, at a minimum, implement BMPs for erosion and sediment controls, soil stabilization, dewatering, source controls, pollution prevention measures, and prohibited discharges. Any person subject to a construction activities NPDES storm water discharge permit shall comply with all provisions of such permit"*

City of Merced Standard Designs of Common Engineering Structures

The City's Engineering Department has developed standard design requirements for common engineering structures that are frequently installed as part of improvements in the City. The standards include requirements for the design of streets, driveways, sidewalks, trenching, storm drains, water systems, bikeways, refuse facilities, landscaping grading, traffic control, fences, and sewer systems. Sewer system design standards are included in sheets S-1, through S-18 of the standards and include specifications for stability of pipelines, manhole requirements, and testing of newly installed sewer systems (City of Merced 2024a).

3.6.3 Environmental Setting

3.6.3.1 Regional Geology

The Program Study Area is located approximately 115 miles southeast of the City of Sacramento along the west side of the southern portion of the Great Valley Geomorphic Province, more commonly referred to as the San Joaquin Valley. The Great Valley is a broad interior lowland (i.e., flat area in central part of the State of California), that is bounded by the Sierra Nevada mountain range to the east and the Coastal Ranges to the west (City of Merced 2012), and as such, is a basin valley formed between mountain ranges (San Joaquin Valley Geology 2024). This region's geology dates to the Pliocene-Pleistocene

Period transition, and into the more recent Quaternary Period. The region is comprised primarily of sedimentary and metasedimentary rock substrates, including Great Valley Fan and Basin Deposits, and other non-marine deposits.

3.6.3.2 Local Geology

The Program Study Area is located within the U.S. Geological Survey (USGS) Merced 7.5-Minute Quadrangle. Site topography is nearly flat, with elevations within the Program Study Area ranging from 153 feet above mean sea level (amsl) near the City's WWTF , to 208 feet amsl near the junction of SR (SR) 140 and Kibby Road.

A review of the geologic maps indicate that the vicinity of the Program Study Area is primarily underlain by Laguna, Mehrten, Modesto, and Riverbank Formations. The Laguna Formation was developed during the Pliocene. The Laguna Formation is a heterogeneous mixture of interbedded alluvial gravel, fine sand, silt, and clay of granitic and metamorphic origin. The Mehrten formation was developed during the Miocene and Pliocene. The Mehrten formation is made up of sandstone, laminated siltstone, conglomerate, and tuff breccia that is composed almost entirely of andesitic material, with only small amounts of igneous and metamorphic rock fragments (Arkley 2016; Burrow et. al. 2004). The Modesto and Riverbank Formations developed during the Pleistocene and Holocene, with alluvium from drainages being deposited (i.e., floodplain deposits, unconsolidated soils, and sediment). The Modesto and Riverbank Formation deposits are specifically characterized by sand and silt alluvium derived from weathering of rocks, which generally forms a thin layer of sedimentary materials over bedrock unit's underneath (City of Merced 2012; San Joaquin Valley Geology 2024).

3.6.3.3 Program Area Soils

Based on the USDA's NRCS Web Soil Survey, there are 24 different soils series present within the Program Study Area (USDA 2024; NRCS 2024). A complete summary of the soil series that occur in the Program Study Area are outlined in **Table 3.6-1.**

The soils in this region generally consist of poorly sorted gravel, sand, silt, and clay and are acidic with low fertility. The soils have a moderate shrink-swell potential, with a granular, clayey, and relatively consolidated and cemented nature, and as such the soils in the Program Study Area are regarded as moderately expansive, with low to moderate erosion potential (City of Merced 2012).

Table 3.6-1: Program Study Area Soils Summary

Soil Series Name	Typical Program Study Area Pedon	Slope (%)	Drainage	Permeability	Runoff
Alamo	Clay	0–1	Poor	Very slow	Ponded - Very slow
Anderson	Gravel	0–3	Excessive	Moderate – Rapid	Slow - Medium
Bear Creek	Clay, Loam	0–3	Poor - Moderate	-	Low - Very low
Burchell	Silt, Clay, Loam, Saline-Alkali	0–1	Poor	Slow – Moderately slow	Slow - Medium

Soil Series Name	Typical Program Study Area Pedon	Slope (%)	Drainage	Permeability	Runoff
Corning	Gravel, Loam, Sand	0–8	Well - Moderate	Very slow - Slow	Very high
Greenfield	Sand, Loam	0–3	Well	Moderate - Rapid	Slow - Medium
Honcut	Silt, Clay, Loam	0–1	Well	Moderate - Rapid	Slow - Medium
Hopeton	Gravel, Clay, Loam	0–8	-	-	-
Keyes	Gravel, Clay, Loam	0–8	Well - Moderate	Very slow	Slow - Medium
Landlow	Silt, Clay, Loam, Alkali	0–1	Poor	Slow	Slow
Lewis	Silt, Clay, Loam, Saline-Alkali	0–1	Well	Slow	Medium - High
Marguerite	Silt, Clay, Loam	0–1	-	-	-
Montpellier	Sand, Loam	0–8	Well - Moderate	Slow –– Moderate	Slow - Medium
Pentz	Gravel, Clay, Loam	0–30	Well drained	-	-
Peters	Clay	0–8	Well drained	-	-
Porterville	Clay	0–3	Well drained	Slow	Very slow - Rapid
Raynor	Clay, Cobbly	0–8	-	-	-
Redding	Gravel, Loam	0–30	Well - Moderate	Very slow - Slow	Very low - High
Rocklin	Loam, Sand	0–8	Well drained	Very slow – Slow	Very slow - Medium
Ryer	Clay, Loam	0–8	Well drained	Slow	Very slow - Medium
San Joaquin	Loam, Sand	0–8	Well - Moderate	Very slow	Medium - Very high
Whitney	Sand, Loam	0–8	Good	Moderate - Rapid	Slow - Medium
Wyman	Clay, Loam	0–3	Well drained	Slow - Moderate	Slow - Medium
Yokohl	Clay, Loam	0–3	Well drained	Very slow - Slow	Very slow - Rapid

Note:
- = No data for soil series
Source: USDA 2024, NRCS 2024

3.6.3.4 Mineral Resources

Mineral resources are generally finite and occur in sporadic deposits, which often create a relative scarcity and a need to protect access to supplies. Many mineral resources are important to global, national, state, and local economies. In 2022, California had approximately 634 active mines, which are responsible for approximately 5.71 percent of the United States non-fuel mineral production (CGS 2022). The largest component of this production was derived from sand and gravel mining.

Primary mineral resources within the region of the City generally include antimony, diatomite, copper, gold, gravel, gypsum, magnesium, manganese, mercury, sand, and stone. A desktop review of Mineral

Land Classifications and Historic Mines and Prospects was conducted for the Program Study Area. Approximately five historic mines were identified within the vicinity (i.e., within approximately 10 miles) of the City. This includes sand and gravel pits known as Borrow, Sunset, George, Jordan, and Bear Creek near Atwater and Planada. Approximately five permitted mines were also identified within the vicinity of the City, including Hailey Pit, Olive Avenue Pit, WCR Mine, Central Pit, and Sunset Pit. Specifically, the States Mining and Geology Board found no areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists (i.e., MRZ-2), no active mining sites, and no Aggregate Resources Areas within the City (Clinkenbeard 1999).

3.6.3.5 Environmental Hazards

Seismic Activity

Seismic activity originates as movement or slippage occurring along an active fault. A fault is fracture along which the blocks of crust move relative to one another parallel to the fracture. These movements generate shock waves that result in ground shaking (i.e., seismic activity, earthquakes) (USGS 2024a). Seismic activity is generally measured by type, frequency, and duration. It is assumed that those faults that have been recently active are the most likely to be active in the future, although even inactive faults may not be “dead.” “Potentially Active” faults are those that have been active during the past two million years, or during the Quaternary Period. “Active” faults are those that have been active within the past 11,000 years (City of Merced 2012). Seismic activity is considered the first of “primary” hazards, in that it is caused by the direct interaction of seismic wave energy with the ground (Branz 2024).

Based on a desktop evaluation of fault activity maps of the Merced region, there are 13 known faults within approximately 60 miles of the City (CGS 2010). No AP Act earthquake fault zones were identified within the Program Study Area (CGS 2024c). **Table 3.6-2** summarizes the regional “active” faults within approximately 60 miles of the Program Study Area.

Table 3.6-2: Regional Active Faults within Approximately 60 Miles of the Program Study Area

Fault Name	Fault Type	Average Fault Age	Approximate Distance From Program Study Area (miles)
Black Butte Fault	Certain (ball and bar)	Quaternary (age undifferentiated)	60
Bowie Flat Fault	Certain	Late Quaternary	50
Clovis Fault	Concealed	Pre-Quaternary	60
Green Springs Run Fault	Certain (ball and bar)	Late Quaternary	50
Kings Canyon Lineament	Concealed	Pre-Quaternary	20
Melones Fault Zone	Certain	Pre-Quaternary	40
Midway Fault	Approximate	Late Quaternary (fault displacement)	60
Negro Jack Point Fault	Approximate	Late Quaternary	50
Panoche Hills Fault	Concealed	Quaternary (age undifferentiated)	60
O’Neill Fault	Concealed	Late Quaternary	50

Fault Name	Fault Type	Average Fault Age	Approximate Distance From Program Study Area (miles)
		(fault displacement)	
Ortigalita Fault	Certain	Holocene (fault displacement)	60
San Joaquin Fault	Concealed	Holocene (fault displacement)	40
Vernalis Fault	Concealed	Quaternary (age undifferentiated)	40

Fault Type
Approximate = General location with uncertainty.
Ball and Bar = Downthrown side of fault.
Certain = Location of fault with no uncertainty.
Concealed = Buried under many layers of younger rock/ sedimentary materials and/or hydrologic feature (e.g., lake or bay).
Average Fault Age
Pre-Quaternary = Prior to 1.6 million years ago.
Quaternary = Faults with undivided Quaternary displacement (last 1.6 million years).
Late Quaternary = Faults with late Quaternary displacement (last 750,000 years).
Source: CGS 2010

The results of the desktop evaluation of fault activity maps for the Merced region indicate that Kings Canyon Lineament and the San Joaquin Fault are the closest sources of potential ground motion (CGS 2010). These fault systems are not considered “active” by the California Division of Mines and Geology; however, in some areas there is evidence of geomorphic processes that indicate that there has been fault movement as recently as the Pleistocene, and as such, these faults can be considered as “potentially active” (Bartow 1991). Although there are no known faults within the City limits, shaking has occurred within the City in the past associated with earthquakes throughout Central California, the Sierra, and the Bay Area. These shaking events depend on the magnitude and intensity of the surrounding earthquakes. The potential for ground shaking in the event of a major earthquake within the Program along these faults or from other fault areas is possible; however, shaking would not likely be substantial (City of Merced 2012).

USGS ranks the California Central Valley around and in Merced as having a moderate hazard potential on the 2018 Long-term National Seismic Hazard Map. Showing a general earthquake hazard potential from a regional perspective. The earthquake hazard map shows peak ground accelerations having greater than a two percent probability of being exceeded in 50 years for a firm rock site. The map is based on the most recent USGS models for the conterminous U.S. (2018). The CGS further maintains a similar map titled the Probabilistic Seismic Hazards Assessment Peak Ground Acceleration Map that provides data specific California’s seismic shaking hazards. For the region surrounding the Program Study Area, the Peak Ground Acceleration, which has a 10-percent probability of being exceeded within the next 50 years, ranges from approximately 10 to 20 percent of acceleration of gravity (g) (i.e., the force caused by shaking) (CGS 2024d). While Peak Ground Acceleration is useful for the regional comparisons of potential effects of fault activity, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the Program Study Area (City of Merced 2012).

Additionally, a desktop review of regulatory maps within the CGS Information Warehouse provide delineated “zones of required investigation” to reduce the threat to public health and safety and minimize the loss of life and property posed by an earth-triggered quakes were reviewed. The review results

indicated no regulatory information, evaluation and/or fault evaluation reports, no hazard zones have been recorded in the Program Study Area under the Seismic Hazard Mapping Act (CGS 2024e).

Ground Failure

Ground failure includes ground shaking, ground settlement and surface rupture. Ground shaking is the vibration that radiates from the epicenter of an earthquake (City of Merced 2012). Ground shaking can vary over an area as a result of factors such as topography, bedrock type, and the location and orientation of a fault rupture due to seismic activity. Ground settlement (i.e., subsidence) is the lowering of the ground surface during seismic activity and is caused by consolidation of the underlying sediments, densification of soil material, or liquefaction (discussed below). Surface rupture is when some ground is raised or lowered leaving a visible crack in the earth surface. Ground failure can cause serious direct damage or collapse of infrastructure caused by seismic activity and is considered the second “primary” earthquake hazard. The severity of ground failure depends on the strength and depth of the earthquake, but there are several other contributing factors, such as the regional geology, local topography, and the site-specific ground characteristics within the Program Study Area (Branz 2024). Specifically, the intensity of the vibration or shaking and its potential impact to buildings and other development in the Program Study Area is determined by several factors (City of Merced 2012):

- The nature of the underlying materials, including rock and soil;
- Structural characteristics of a building;
- Quality of workmanship and materials used in its construction;
- Location of the epicenter and the magnitude of the earthquake; and
- Duration and character of the ground motion.

The Program Study Area could be subjected to ground failure in the event of a major earthquake along the faults mentioned above or other area faults.

Landslides and Lateral Displacement

Any slope where relatively large masses of material are supported by soil that is likely to soften under strain is prone to a landslide. The risk increases in areas where the ground is steep, weak, or fractured; is saturated by heavy rain; or is compromised by historical ground movements (Branz 2024). Landslides occur most frequently during or following large storms or seismic activity and is most likely to take place in areas where large storms or seismic activity have previously occurred.

Lateral movement (i.e., displacement, spreading, etc.) occurs when seismic shaking causes a mass of soil to lose cohesion and move relative to the surrounding soil. Lateral movement can be entirely horizontal and can occur on flat ground, but it is more likely to occur on or around sloping ground, such as adjacent to hillsides and waterways (Branz 2024).

In general, the potential for land sliding, slope failure, and lateral displacement in the Program Study Area in its current condition is very low due to the overall topography, slope, and compositions of soils. A desktop review of Landslide Maps and Report Indices was conducted for the Program Study Area. The review results indicated no landslide information or reports, and as such there is no potential areas for landslides within the Program Study Area (CGS 2024f).

Liquefaction

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits, along with recent Holocene age deposits, are more susceptible to liquefaction, while older deposits of clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking.

Liquefaction can damage buildings, roads, and pipelines through loss of structural support capabilities and subsequent destabilization of soils. The Program Study Area primarily consists of well drained, coarse-loamy soils that have a low potential for liquefaction or ground failure to occur. Groundwater levels within the City fluctuate regularly depending on the location within the City and time of year. Generally, groundwater levels within the Mehrten formation are located at a depth of approximately 300 feet, while groundwater levels within shallower aquifers in the City can be accessed as close as 1 to 15 feet in depth (City of Merced 2012). Therefore, the liquefaction potential within the City varies from low to moderate depending on the location within the City and due to the low potential for ground shaking to occur within the City (City of Merced 2012).

3.6.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to geology, soils, and minerals. Potential direct and indirect Program impacts related to geology and soils were evaluated against the thresholds of significance listed in Section 3.2.1 and are discussed below. The impact analysis evaluates potential Program impacts during both construction and operation. When a potential impact is determined to be potentially significant, MMs were identified that would reduce or avoid that impact.

3.6.4.1 Methodology

Potential impacts of the Program on geology, soils, and mineral resources were assessed with the aid of maps and technical reports (Arkely 2016; Bartow 1991; Burrow et al. 2004; CGS 2024a-g; Clinkenbeard 1999; and San Joaquin Geology 2024). The impacts were evaluated qualitatively based on the type, intensity, equipment and materials used, locations and duration of Program activities.

3.6.4.2 Impact Analysis

Impact GEO-1: Potential to directly or indirectly expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
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 as defined by the Division of Mines and Geology Special Publication 42 or strong seismic ground shaking;

Seismic-related ground failure, including liquefaction; or Landslides.

Impact GEO-1 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The Program would be developed in accordance with current design standards and codes (Section 3.6.2, Regulatory Framework: UBC, California Standard Building Code, City of Merced Municipal Code, and City of Merced Standard Designs of Common Engineering Structures) which account for the generally high seismic probability within the state and the moderate ground shaking potential of the Program Study Area. New buildings associated with the Program would obtain a building permit and go through the City's building permit process to approve the building design plans. These standards include structural stability requirements such as foundation support, grading and earthwork specifications, and testing and start-up of newly installed facilities. The design plans would be approved and stamped by a licensed engineer in conformance with these applicable building codes and key design standards (i.e., ASCE-7 and the City's standards for common engineering structures). implementing structural standards accounting for seismic hazards thus limiting the potential for placing people or infrastructure at risk of substantial adverse effects from rupture or ground shaking from a known earthquake fault.

Additionally, none of the Program components would include uses for human habitation, although a few structures would occasionally be occupied by City personnel. The AP Act prohibits new buildings intended for human occupancy to be constructed on the surface trace of active faults. Given there are no AP Act earthquake fault zones within the Program Study Area and none of the Program components are designed for human occupancy, the construction of linear infrastructure is not prohibited and would meet the necessary design requirements to limit the risk of injury, loss, or death as a result of failure of Program facilities.

Therefore, the potential for rupture of a known earthquake fault, seismic shaking, seismic-related ground failure including liquefaction, or landslides from Program construction is considered less-than-significant.

Operation

There are no known faults within the Program Study Area. Further, a review of seismic ground shaking probability identifies the Program Study Area to have a moderate potential for ground shaking having a Peak Ground Acceleration range of 10 to 20 percent acceleration of gravity with a 10 percent probability of being exceeded within the next 50 years (USGS 2024b; CGS 2024d). Consistently, the Program Study Area has historically experienced low levels of ground shaking from earthquakes occurring on surrounding faults. As recently as June 2020, a 5.8 intensity earthquake in Lone Pine, California was felt at City offices. The Kings Canyon Lineament (i.e., approximately 20 miles from the Program Study Area) and the San Joaquin Fault (approximately 40 miles from the Program Study Area) are the closest potentially active sources of ground shaking to the Program Study Area (USGS 2024b).

Additionally, the majority of the Program components would be located underground and would not pose a risk related to injury, loss, or death. To date, the existing collection system has not experienced rupture,

failure, or release of raw sewage as a result of ground shaking from an earthquake, indicating that the construction and operation of additional similar wastewater facilities would not further expose people or structures to potential substantial effects as a result of the Program. Operation of the improved wastewater collection system would be similar to the existing system; therefore, the potential for rupture of a known earthquake fault or seismic shaking that could expose people or structures to risk from implementation of the Program is less-than-significant.

As stated above, there are no known faults within the Program Study Area, however ground shaking has been observed in Merced from faults in the Sierra Nevada mountains. The Program Study Area has the potential to be subject to ground failure in the event of a major earthquake caused by one of the region's potentially active faults. The Program Study Area consists primarily of well drained, coarse-loamy soils that have a low potential for liquefaction or ground failure due to liquefaction. Therefore, the potential for implementation of the Program to expose people or infrastructure to potentially adverse effects related to liquefaction or ground failure is considered less-than-significant.

According to the assessment of the CGS Landslide Maps and Report Indices reviewed for the Program Study Area, no active landslide deposits have been identified in the Program Study Area. That means, in addition to the fact that the Program Study Area is relatively flat and is not surrounded by any topographic features (e.g., hills or mountains) that have slopes steep enough to cause landslides, that the potential for a landslide to occur in the area is very low. Therefore, the potential for landslides to occur and cause substantial harm or threat to persons or structures as a result of implementation of the Program would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

The new pipelines for the CIPs 1-6 would be designed and built in accordance with the City's standards for common engineering structures, which includes stability specifications for sewer systems. These standards would limit the potential for failure of the new wastewater collection system infrastructure through the use of appropriate construction materials and installation methods, and the stabilization of underlying soils and would limit the potential for risk of structure or pipeline failure during a ground shaking event.

As described for the Program, construction of trenches or excavations for the new facilities (i.e., pipelines) associated with the new trunk sewers could result in localized land sliding, bank collapse, or other ground failure but worker safety regulations (Section 3.6.2.1 Regulatory Framework) provide procedures that would be followed during construction, which would make this impact less-than-significant. Additionally, none of the new trunk sewer infrastructure components are meant for human habitation; therefore, there would be no potential for injury, loss, or death related to rupture of a fault or ground shaking. Therefore, impacts related to ground shaking or failure as a result of implementation of the new trunk sewer infrastructure would be less-than-significant.

Operation

As described for the Program above, the Program Study Area is not located near a fault zone, and the potential for rupture of a known earthquake fault or ground failure, which could expose people or structures to risk from the new trunk sewer infrastructure, is considered low.

The new trunk sewer infrastructure would not trigger landslides or result in different conditions from those described above. Therefore, the potential for landslides to occur as a result of the new trunk sewer infrastructure would be less-than-significant.

Rupture of a Known Earthquake Fault or Strong Seismic Ground Shaking

The CIPs 1-6 would be developed in accordance with current design standards and codes (Section 3.6.2, Regulatory Framework: UBC, California Standard Building Code, City of Merced Municipal Code, and City of Merced Standard Designs of Common Engineering Structures) which account for the generally high seismic probability within the state and the moderate ground shaking potential of the Program Study Area. Program design plans would require a stamp by a licensed civil and/or structural engineer whose professional licensures ensure implementing structural standards accounting for seismic hazards thus limiting the potential for placing people or infrastructure at risk of substantial adverse effects from rupture or ground shaking from a known earthquake fault. Additionally, none of the CIPs 1-6 components would include uses for human habitation, although a few structures would occasionally be occupied by City personnel. As stated, the facilities built as part of the CIPs 1-6 would meet the necessary design requirements to limit the risk of injury, loss, or death as a result of failure of CIPs 1-6 facilities. Construction of the improved wastewater collection system would be similar to the existing system related to structural stability and installation methods; therefore, the potential for rupture of a known earthquake fault or seismic shaking that could expose people or structures to risk from implementation of the CIPs 1-6 is less-than-significant.

Seismic-Related Ground Failure

Similar to the discussion of seismic ground shaking above, the CIPs 1-6 components would be designed in accordance with current codes and design standards (Section 3.6.2, Regulatory Framework: UBC, California Standard Building Code, City of Merced Municipal Code, and City of Merced Standard Designs of Common Engineering Structures). These standards include structural stability requirements such as foundation support, grading and earthwork specifications, and testing and start-up of newly installed facilities. The design plans would be approved and stamped by a licensed engineer in conformance with these applicable building codes and key design standards (i.e., ASCE-7 and the City's standards for common engineering structures). Therefore, the potential for implementation of the CIPs 1-6 to expose people or infrastructure to potentially adverse effects related to liquefaction or ground failure is considered less-than-significant.

Landslides

While localized landslides associated with construction requiring trenching or digging could occur even with low potential for landslides in the area, construction safety precautions, such as shoring or other trench stabilization measures, would be implemented as a part of OSHA regulations, specifically, 29 CFR 1926.620, 29 CFR 1926.651, and 29 CFR 1926.652 (Section 3.6.2.1 Regulatory Framework), and would not directly or indirectly expose people or structures to the threat of landslide. Therefore, the potential for

landslides to occur and cause substantial harm or threat to persons or structures as a result of construction of the CIPs 1-6 would be less-than-significant.

Operation

Rupture of a Known Earthquake Fault or Strong Seismic Ground Shaking

There are no known faults within the Program Study Area. Further, a review of seismic ground shaking probability identifies the Program Study Area to have a moderate potential for ground shaking having a Peak Ground Acceleration range of 10 to 20 percent acceleration of gravity with a 10 percent probability of being exceeded within the next 50 years (USGS 2024b; CGS 2024d). Consistently, the Program Study Area has historically experienced low levels of ground shaking from earthquakes occurring on surrounding faults. As recently as June 2020, a 5.8 intensity earthquake in Lone Pine, California was felt at City offices. The Kings Canyon Lineament (i.e., approximately 20 miles from the Program Study Area) and the San Joaquin Fault (approximately 40 miles from the Program Study Area) are the closest potentially active sources of ground shaking to the Program Study Area (USGS 2024b).

Additionally, the majority of the CIPs 1-6 components would be located underground and would not pose a risk related to injury, loss, or death. To date, the existing collection system has not experienced rupture, failure, or release of raw sewage as a result of ground shaking from an earthquake, indicating that the construction and operation of additional similar wastewater facilities would not further expose people or structures to potential substantial effects as a result of the CIPs 1-6. Operation of the CIPs 1-6 would be similar to the existing system related to structural stability and installation methods; therefore, the potential for rupture of a known earthquake fault or seismic shaking that could expose people or structures to risk from implementation of the Program is less-than-significant.

Seismic-Related Ground Failure

As stated above, there are no known faults within the Program Study Area; however, ground shaking has been observed in Merced from faults in the Sierra Nevada mountains. The Program Study Area has the potential to be subject to ground failure in the event of a major earthquake caused by one of the region's potentially active faults. The Program Study Area consists primarily of well drained, coarse-loamy soils that have a low potential for liquefaction or ground failure due to liquefaction. Therefore, the potential for implementation of the CIPs 1-6 to expose people or infrastructure to potentially adverse effects related to liquefaction or ground failure is considered less-than-significant.

Landslides

According to the assessment of the CGS Landslide Maps and Report Indices reviewed for the Program Study Area, no active landslide deposits have been identified in the Program Study Area. That means, in addition to the fact that the Program Study Area is relatively flat and is not surrounded by any topographic features (e.g., hills or mountains) that have slopes steep enough to cause landslides, that the potential for a landslide to occur in the area is very low. Therefore, the potential for landslides to occur and cause substantial harm or threat to persons or structures as a result of implementation of the CIPs 1-6 would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required

Level of Significance After Mitigation: Less-than-Significant

Impact GEO-1 Findings

Impact GEO-1 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact GEO-1 Mitigation Required: None Required

Impact GEO-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact GEO-2: Potential to result in substantial soil erosion or the loss of topsoil.

Impact GEO-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Due to the relatively flat nature of the Program Study Area, substantial soil loss from precipitation or secondary stormwater runoff is not anticipated. However, construction activities associated with the Program, including for the new pipelines, potential pump stations, and WWTF expansion, would include the excavation and the movement of soil, which could result in the loss of topsoil if not properly handled. Although the majority of the existing WWTF consists of previously disturbed areas and paved and gravel pathways, the construction of the expansion would involve work on topsoil currently used for agricultural operations. This is anticipated for areas of the Program that would not occur in the paved ROW or previously disturbed areas. Temporary stockpiles of soil have the potential to result in loss of topsoil during construction when soils are exposed and being transported and could potentially result in a significant impact if not appropriately stored and handled. However, implementation of the Program would comply with MM GEO-1, Prepare an Erosion Control and SWPPP, and Title 15, Division III, Chapter 15.50 of the City's Municipal Code related to discharge control for construction projects. This Code includes requirements for obtaining a grading permit, obtaining a CWA Section 402 NPDES General Construction Permit, and general design standards, as well as BMPs for construction-related grading and drainage activities. MM GEO-1 would incorporate the principles outlined in the City Code requirement for the City and the Contractor to follow, which would minimize the potential erosion and loss of topsoil from the Program construction activities. The Erosion Control Plan and SWPPP would include other requirements from the NPDES permit related to stormwater, erosion, and sediment control. Therefore, construction-related erosion and loss of topsoil would be considered less-than-significant with MM GEO-1 incorporated.

All topsoil exposed as a part of implementation of the Program would be restored to pre-existing contours to the extent possible and revegetated or stabilized as required by MM GEO-1. As such, the potential for substantial erosion would be limited since the site would be revegetated, and site grading would be designed for adequate drainage, limiting exposed soils that could be subject to erosion. Therefore, operational impacts resulting from implementation of the Program related to erosion and loss of topsoil would be considered less-than-significant with mitigation incorporated.

Through the implementation of MM GEO-1, impacts associated with substantial soil erosion or the loss of topsoil would be less-than-significant with mitigation incorporated.

Operation

There would be no operational impacts related to loss of topsoil because once constructed, Program components would be stationary and would not result in substantial movement of soils and above-ground sites would be regulated by City stormwater permits. Therefore, impacts from operation would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Similar to the discussion for the Program above, construction activities associated with the CIPs 1-6 would consist of the excavation and movement of soil, which could result in the loss of topsoil and increase erosion potential in the construction area if not properly handled. Movement of soils could occur through the placement of facilities such as the new pipelines. As such, all topsoil exposed as a part of the activities related to new trunk sewer infrastructure would be restored to pre-existing contours to the extent possible and revegetated as required by MM GEO-1. MM GEO-1 would be required for the new trunk sewer infrastructure, which includes the preparation and implementation of an Erosion Control Plan and SWPPP, along with the appropriate BMPs, and the new trunk sewer infrastructure would be inspected throughout the construction process. Therefore, with the implementation of MM GEO-1, the potential for erosion and loss of topsoil during construction would be reduced to a less-than-significant impact.

Operation

There would be no operational impacts related to loss of topsoil because once constructed, the new trunk sewer infrastructure components would be stationary and would not result in a substantial amount of soil movement. Therefore, impacts would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Impact GEO-2 Findings

Impact GEO-2 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact GEO-2 Mitigation Required: MM GEO-1

Impact GEO-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact GEO-3: Potential to 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 offsite landslide, lateral spreading, subsidence, liquefaction or collapse.

Impact GEO-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The City is located on four geologic formations, which include a mixture of interbedded alluvium with a mixture of sedimentary and metamorphic deposits. The soils in this region primarily consist of poorly sorted gravel, sand, silt, and clay, with a low to moderate erosion potential. As discussed in Impact GEO- 1, there is a low potential for ground failure, lateral spreading, subsidence, liquefaction, or collapse to occur within the Program Study Area due to the low likelihood of seismic activity of a significant magnitude. There is no potential for landslides to occur in the Program Study Area due a relatively flat topography in the area. In addition, there is a very low to nonexistent potential for soils and underlying geology to become unstable due to Program activities because the Program components would be built in accordance with state and local standards, including ASCE-7, Minimum Design Loads for Buildings and other Structures, for above-ground Program components such as pump stations or WWTF facilities and with the City's standards for common engineering structures, which include stability specifications for sewer systems, such as pipelines. These standards would limit the potential for failure of the new wastewater collection system infrastructure through the use of appropriate construction materials and installation methods, and the stabilization of underlying soils. Further, as required to meet these design standards, site-specific geotechnical investigations would be performed prior to the start of any construction activities associated with Program activities to identify any possible unstable soils, and design modifications would be required to address these soils (i.e., soil stabilization for pipelines or reinforced concrete foundations for buildings). While localized landslides or unstable soils associated with excavation of trenches and foundations could occur even with the low potential for landslides in the area, construction safety precautions, such as shoring or other trench stabilization measures, would be implemented as a part of OSHA regulations (Section 3.6.2.1, Regulatory Framework) and would not directly or indirectly expose people or structures to threat of unstable soils. Therefore, impacts related to unstable soils would be less-than-significant.

Operation

There would be no operational impacts related to the potential of landslides, lateral spreading, subsidence, liquefaction or collapse because once constructed, Program components would be stationary and built in accordance with state and local standards, including ASCE-7, Minimum Design Loads for Buildings and other Structures, Therefore, impacts from operation would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

As described for the Program above, there is low potential for ground failure, lateral spreading, subsidence, liquefaction, or collapse to occur within the area due to seismic activity. There is low potential

for landslides to occur in the Program Study Area due to gentle slopes and soil types. In addition, there is a very low to nonexistent potential for soils and underlying geology to become unstable due to the installation of new trunk sewer infrastructure. As described previously, design and construction of CIPs 1-6 facilities would comply with ASCE-7, Minimum Design Loads for Buildings and other Structures. Design and construction of Program facilities would also comply with the City's standards for common engineering structures, which includes stability specifications for sewer systems and the new pipelines. Further, as described above, excavation of trenches and foundations associated with construction could result in bank collapse, but OSHA worker safety regulations would provide procedures that would be followed during construction, which would make this impact less-than-significant. Therefore, landslides, lateral spreading, subsidence, liquefaction, or collapse during construction or the operation of the new trunk sewer infrastructure is not expected, and impacts would be considered less-than-significant.

Operation

There would be no operational impacts related to the potential of landslides, lateral spreading, subsidence, liquefaction or collapse because once constructed, CIPs 1-6 components would be stationary and built in accordance with state and local standards, including ASCE-7, Minimum Design Loads for Buildings and other Structures, Therefore, impacts from operation would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact GEO-3 Findings

Impact GEO-3 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact GEO-3 Mitigation Required: None Required

Impact GEO-3 Overall Level of Significance After Mitigation: Less-than-Significant

Impact GEO-4: Potential to be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial direct or indirect risks to life or property.

Impact GEO-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Expansive or collapsible soils are characterized by the ability to undergo significant volume change (e.g., shrink and swell) as a result of variation in soil moisture content. Specifically, the causes of soil expansion or collapse are related to the type and amount of clay minerals in the soil, conditions under which the clay originated, and the original density of the soil. Clay minerals can form in place by weathering of rocks, or they can be transported and deposited by water or wind. A change in the moisture content of a soil can cause clay minerals to shrink or expand (i.e., swell) (Arizona Geological Survey 2024). Soil moisture content can change due to many factors, including perched groundwater, landscape irrigation, rainfall,

and utility leakage. Engineering standards govern expansion potential evaluations and the expansion index. Section 1803.2 of the 1994 UBC directs expansive soil tendency be graded by this method. The UBC mandates that “special [foundation] design consideration” be employed if the expansion index is 20 or greater.

The soils in the Program Study Area generally consist of poorly sorted gravel, sand, silt, and clay and are acidic with low fertility. The soils have a moderate shrink-swell potential, with a granular, clayey, and relatively consolidated and cemented nature, and as such, the soils in the Program Study Area are regarded as moderately expansive, with a low to moderate erosion potential (City of Merced 2012). Program components would be built in accordance with state and local standards, including ASCE-7, Minimum Design Loads for Buildings and other Structures, and with the City’s standards for common engineering structures, which would limit the potential for failure of the new wastewater collection system infrastructure from being located on potentially expansive soils through the use of appropriate construction materials and installation methods, and the stabilization of underlying soils. Further, as required to meet these design standards, site-specific geotechnical investigations would be performed prior to the start of any construction activities associated with Program activities in order to identify any possible unstable soils and design modifications that would be required to address these soils (i.e., soil stabilization for pipelines or reinforced concrete foundations for buildings). Therefore, the impact associated with expansive soils in conjuncture with the implementation of the Program would be less-than-significant.

Operation

As described for the Program’s construction above, the soils in the Program Study Area consist of poorly sorted gravel, sand, silt, and clay. These soils have a moderate shrink-swell potential, and as such, the soils in the Program Study Area are regarded as moderately expansive (City of Merced 2012). Program components would be built and operated in conformance with ASCE-7, Minimum Design Loads for Buildings and other Structures. Therefore, the operational impact associated with expansive soils would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

As described for the Program above, the soils in the Program Study Area consist of poorly sorted gravel, sand, silt, and clay. These soils have a moderate shrink-swell potential, and as such, the soils in the Program Study Area are regarded as moderately expansive (City of Merced 2012). The CIPs 1-6 would be constructed with ASCE-7, Minimum Design Loads for Buildings and other Structures, and with the City’s standards for common engineering structures, which would limit the potential for failure of the new wastewater collection system infrastructure from potentially expansive soils through use of construction materials, installation methods, and stabilization of underlying soils. Therefore, the impact associated with expansive soils in conjuncture with the new trunk sewer infrastructure would be less-than-significant.

Operation

As described for the Program's operation above, the soils in the Program Study Area consist of poorly sorted gravel, sand, silt, and clay. These soils have a moderate shrink-swell potential, and as such, the soils in the Program Study Area are regarded as moderately expansive (City of Merced 2012). CIPs 1-6 components would be built and operated in conformance with ASCE-7, Minimum Design Loads for Buildings and other Structures. Therefore, the operational impact associated with expansive soils in conjuncture with the CIPs 1-6 would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact GEO-4 Findings

Impact GEO-4 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact GEO-4 Mitigation Required: None Required

Impact GEO-4 Overall Level of Significance After Mitigation: Less-than-Significant

Impact GEO-5: Potential to have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

Impact GEO-5 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

The Program proposes to provide wastewater collection services to areas within the SUDP/SOI that are currently not served by sewer collection systems and are typically reliant on septic systems, which would reduce the reliance on septic systems and does not include installation or use of septic systems or other alternative disposal systems. As such, implementation of the Program would not affect the use of septic tanks or alternative wastewater disposal systems. Therefore, there would be no impact to soils incapable of adequately supporting septic tanks or alternative wastewater disposal systems.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Project Impacts: CIPs 1-6

Construction and Operation

The CIPs 1-6 proposes to provide wastewater collection services to areas within the SUDP/SOI that are currently not served by sewer collection systems and are typically reliant on septic systems, which would reduce the reliance on septic systems and does not include installation or use of septic systems or other alternative disposal systems. As such, implementation of the Program would not affect the use of septic

tanks or alternative wastewater disposal systems. Therefore, there would be no impact to soils incapable of adequately supporting septic tanks or alternative wastewater disposal systems.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Impact GEO-5 Findings

Impact GEO-5 Overall Level of Significance Prior to Mitigation: No Impact

Impact GEO-5 Mitigation Required: None Required

Impact GEO-5 Overall Level of Significance After Mitigation: No Impact

Impact GEO-6: Potential to directly or indirectly destroy a unique paleontological resources or site or unique geologic feature.

Impact GEO-6 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Unique geologic features are those that are rare, of scientific interest, or have significant aesthetic value. Examples of unique geologic features include volcanic formations, fossil beds, geothermal features, and unusual rock formations such as monoliths or natural arches.

Construction

The Program Study Area lies within an area of both Neogene and Quaternary Periods (i.e., Cenozoic Era) deposits. The paleontological potential of the Program Study Area is high. The Mehrten formation, one of the four geologic formations occurring in the Program Study Area, is a sedimentary unit known for its fossil plant and vertebrate localities. According to the Society of Vertebrate Paleontology (SVP) guidelines, this rock unit has a high potential to yield significant paleontological resources. Given the high paleontological potential of rock units in the Program Study Area, there is the potential for ground-disturbing construction activities from installation of Program facilities to unearth potentially significant paleontological resources in previously undisturbed areas. In addition, the WWTF is considered a previously disturbed area; however, there would still be a possibility that previously undiscovered paleontological resources could be encountered during construction of the WWTF expansion. Therefore, in order to ensure that construction personnel are trained in appropriate identification and treatment procedures for these potentially significant resources, MM GEO-2 would be required and would include the development of a WEAP for paleontological resources. Further, if previously undiscovered paleontological resources are encountered on a Program facilities site, MM GEO-3 would also be required to properly handle and treat these resources in compliance with federal regulations and SVP guidelines. Proper handling of these previously undiscovered resources identified in MM GEO-3 would include stopping all work within 100 feet of the discovery, notifying City staff, retaining a qualified geologist or paleontologist to evaluate the resource, and implementing further treatment measures as prescribed by professional standards, and if a significant resource, consulting with the resource agencies. For trenchless installations of the pipelines (i.e., under major highways, railways, or waterways), impacts

to paleontological resources would likely be avoided due to the small drilling footprint of these methods. However, if visible paleontological resources, such as bone fragments, are witnessed in the drilling slurry, then MM GEO-3 would be employed. Implementation of MM GEO-2 and MM GEO-3 would develop treatment measures to effectively eliminate potentially significant impacts to resources related to undiscovered paleontological resources; therefore, the impact would be considered less-than-significant with mitigation incorporated.

Operation

Once operational, the Program components would involve limited and non-substantial ground-disturbing activities that would have limited potential to impact to paleontological resources. Therefore, there would be a less-than-significant impact.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM GEO-2 and MM GEO-3
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

As described for the Program above, the Mehrten formation occurring within the Program Study Area has the potential to yield undiscovered paleontological resources during construction of the new trunk sewer infrastructure. Pipeline construction and installation would involve excavation and open trenches, and thus, construction could potentially disturb previously undiscovered paleontological resources and result in a potentially significant impact prior to mitigation. As such, MM GEO-2 and MM GEO-3 would be required to ensure that construction personnel are properly trained on the identification of paleontological resources, should they be encountered during the construction and to ensure that the proper treatment measures are implemented if paleontological resources are encountered, including stopping all work within 100 feet of the discovery, notifying appropriate and qualified personnel, and further treatment measures (should the resource be identified as a potentially significant paleontological resource). Construction of all six CIPs 1-6 would also involve several trenchless pipeline installations to go under major highways (i.e., SR 99), railways, and waterways. These trenchless pipeline installations would involve limited work zones, and the underground impacts would be limited to approximately the circumference of the drill pipe. Although it is difficult to distinguish potential paleontological resources in drilling slurry, the workers would be trained through MM GEO-2 on identification of paleontological resources and would employ MM GEO-3 if any potential paleontological resources are witnessed in the drilling slurry. If paleontological resources are witnessed, all work within the trenchless work area would cease until a qualified geologist or paleontologist evaluates the resource, and further treatment measures would be implemented if the identified resource is determined to be significant. Therefore, with the implementation of these MMs, impacts resulting from the construction of the new trunk sewer infrastructure would be reduced to a less-than-significant level.

Operation

Once operational, the new trunk sewer infrastructure would involve limited and non-substantial ground-disturbing activities that would have limited potential to impact to paleontological resources. Therefore, there would be a less-than-significant impact.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM GEO-2 and MM GEO-3
Level of Significance After Mitigation: Less-than-Significant

Impact GEO-6 Findings

Impact GEO-6 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact GEO-6 Mitigation Required: MM GEO-2 and MM GEO-3

Impact GEO-6 Overall Level of Significance After Mitigation: Less-than-Significant

Impact GEO-7: Potential to 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.

Impact GEO-7 Analysis

Program Impacts: North and South Merced Major and Minor Sewer Improvements and WWTF Expansion

Construction and Operation

The Program Study Area is not located in a designated MRZ, which is a land classification created by the CGS that is used to designate sites with known deposits of commercially viable mineral or aggregate material. Therefore, the potential for the loss of availability of known mineral resources resulting from the implementation of the Program is not anticipated. Additionally, construction and placement of Program components, including the new pipelines and the WWTF expansion, would largely occur within developed roads, or roads easements that are planned for future development. Therefore, installation of these features would not be expected to limit access to any mineral resources that are of value to the region or the residents of the state. Implementation of the Program would not require a substantial amount of imported fill material, a type of mineral resource, because many Program components would be placed in the subsurface. Specifically, underground wastewater sewer systems typically require minimal fill material to cover pipes and structures, as these components are designed to be installed at depths that reduce the need for extensive backfilling. This limited requirement for fill material means that the disruption to the local mineral resource availability would be minimal, mitigating potential impacts to resources valuable to the region and the residents of the state. Therefore, no impact would occur.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Project Impacts: CIPs 1-6

Construction and Operation

The Program Study Area is not located in a designated MRZ, which is a land classification created by the CGS that is used to designate sites with known deposits of commercially viable mineral or aggregate material. Therefore, the potential for the loss of availability of known mineral resources resulting from the implementation of the CIPs 1-6 is not anticipated. Additionally, construction and placement of CIPs 1-6 components, including the new pipelines, would largely occur within developed roads, or roads

easements that are planned for future development. Therefore, installation of these features would not be expected to limit access to any mineral resources that are of value to the region or the residents of the state. Implementation of the CIPs 1-6 would not require a substantial amount of mineral resources that would 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. Therefore, no impact would occur.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Impact GEO-7 Findings

Impact GEO-7 Overall Level of Significance Prior to Mitigation: No impact

Impact GEO-7 Mitigation Required: None Required

Impact GEO-7 Overall Level of Significance After Mitigation: No Impact

Impact GEO-8: Potential to 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.

Impact GEO-8 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

Similar to Impact GEO-7, there are no local-important mineral resource recovery sites delineated within the Program Study Area (City of Merced 2012) and the Program would not involve substantial amounts of locally important mineral resources. Thus the Program would not result in the loss of a recovery site delineated on a local General Plan, specific plan, or other land use plan or substantial amounts of locally important mineral resources. There are no other aspects of construction or operation of the Program that would prevent access to a resource recovery site in the region. Therefore, the Program would have no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Measure: None Required
Level of Significance After Mitigation: No Impact

Project Impacts: CIPs 1-6

Construction and Operation

Similar to Impact GEO-7, there are no local-important mineral resource recovery sites delineated within the Program Study Area (City of Merced 2012) and the Interim Collection System Improvements (CIPs 1- 6) would not involve substantial amounts of locally important mineral resources. Thus the CIPs 1-6 would not result in the loss of a recovery site delineated on a local General Plan, specific plan, or other land use plan or substantial amounts of locally important mineral resources. There are no other aspects

of construction or operation of the CIPs 1-6 that would prevent access to a resource recovery site in the region. Therefore, the Program would have no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Measure: None Required
Level of Significance After Mitigation: No Impact

Impact GEO-8 Findings

Impact GEO-8 Overall Level of Significance Prior to Mitigation: No Impact

Impact GEO-8 Mitigation Required: None Required

Impact GEO-8 Overall Level of Significance After Mitigation: No Impact

3.6.5 Geology, Soils, and Minerals Mitigation

Mitigation Measure GEO-1: Prepare an Erosion Control Plan and SWPPP

To reduce the potential for erosion and sedimentation resulting from construction activities, the City shall require that the selected contractor prepare an Erosion Control Plan and SWPPP prior to the start of construction. The SWPPP would include a risk-level determination based on sediment transport and receiving water risk, in addition to specifications for BMPs that would be implemented during construction of Program facilities to reduce or eliminate impacts to surface water. BMPs have been defined by the RWQCB in the California Quality Association Construction Handbook, and include erosion and sediment control, non-stormwater and materials management, and waste management and materials pollution control. Additionally, the SWPPP would describe the effluent limits and sampling and analysis requirements during construction (if applicable) and post-construction measures to prevent or control runoff degradation once construction is complete.

The Erosion Control Plan shall provide, at a minimum, measures and BMPs to trap sediment, stabilize excavated soil, and stabilize and revegetate any disturbed areas with native plants. Straw bales, coir rolls, hydroseeding, and other BMPs shall be used in areas of bare soil to prevent long-term land scarring and in drainages near all areas of disturbance to reduce surface runoff velocities and to prevent sediment from entering drainages. Maintenance of erosion and sediment control measures shall be conducted on a weekly basis, at minimum, during active construction activities. The revegetation of all graded and disturbed areas of bare soil shall be completed within six months after construction is complete. Seed mixes shall be used to replicate the naturally occurring vegetation, with the exception of any irrigated areas associated with the WWTF operations. These plans shall be implemented and inspected by the City accordingly throughout the construction process.

The contractor under the City's authority shall apply for coverage under California's General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit), SWRCB Order No. 2009-0009-DWQ for construction activities that will disturb more than one acre. The General Permit requires that a SWPPP shall be prepared before construction begins.

Mitigation Measure GEO-1 Implementation

Responsible Party: The contractor and the City's Qualified SWPPP Developer.

Timing: Prior to, during, and post-construction activities.

Monitoring and Reporting Program: SWPPP inspections.

Standards for Success: No SWPPP violations.

Mitigation Measure GEO-2: Pre-Construction Worker Environmental Awareness Training (Paleontological Resources)

The purpose of a WEAP is to educate personnel (i.e., construction workers) about the existing onsite and surrounding resources and the measures required to protect these resources as well as avoidance and potential hazards within these sites. The WEAP, developed by the City, shall include materials and information on potentially sensitive biological and cultural resources, paleontological resources, air quality protection measures, and potential hazards resulting from construction within the Program Study Area and applicable precautions personnel should take to reduce potential impacts.

The WEAP presentation shall be given to all personnel who may harm sensitive environmental resources as identified within the WEAP MMs (i.e., paleontological resources,). The WEAP presentation shall be given prior to the start of construction and as necessary throughout the life of the Project as new personnel arrive onsite. The City and the contractor are responsible for ensuring that all onsite personnel attend the WEAP presentation, receive a summary handout, and sign a training attendance acknowledgement form to indicate that the contents of the program are understood and to provide proof of attendance. Each participant of the WEAP presentation shall be responsible for maintaining their copy of the WEAP reference materials and making sure that other onsite personnel are complying with the recommended precautions. The contractor shall keep the sign-in sheet onsite and submit copies of the WEAP sign-in sheet to the City's Project Manager, who shall keep it on file at City offices.

For the paleontological materials portion of the WEAP presentation, the following information and implementation steps shall be prepared, presented, and executed prior to and during construction to prevent exposure and raise awareness of potential impacts to unknown paleontological resources:

- The City shall retain a qualified Geologist or Paleontologist to conduct the pre-construction paleontological resource and/or unique geologic feature portion of the construction worker awareness training; and
- Construction personnel shall be informed of the possibility of such resources within the Program Area and the protocol to be followed if a resource is encountered as detailed in MM GEO-3.

Mitigation Measure GEO-2 Implementation

Responsible Party: The City and contractor

Timing: Prior to construction activities and throughout construction activities as new personnel arrive on a Project construction site

Monitoring and Reporting Program: Development of a WEAP presentation and handout packet in accordance with this mitigation measure and any other resource-specific WEAP requirements. A sign-in sheet shall be completed for all workers on the construction site and kept on file at the proposed Project construction site, and copies shall be submitted to the City's Project Manager to be kept on file at City offices.

Standards for Success: The prevention of paleontological resources from being disturbed or destroyed by Project construction without proper documentation and recordation.

Mitigation Measure GEO-3: Proper Handling of the Unanticipated Discovery of Paleontological Resources or Unique Geologic Features

If paleontological resources (i.e., fossils) and/or unique geologic features are encountered during construction, compliance with federal regulations (16 USC Chapter 1C sections 470aa through 470aaa- 11) and guidelines (SVP guidelines) regarding the treatment of such resources shall be required. If paleontological resources or unique geologic features are encountered during ground-disturbing activities, work within 100 feet of the discovery shall be halted until the City notifies a qualified geologist or paleontologist to evaluate the significance of the find. If the find is determined to be significant, the City shall determine the appropriate avoidance measures or other appropriate mitigation in consultation with a qualified geologist or paleontologist and landowner, such as site salvage. Significant paleontological resources recovered shall be subject to scientific analysis, professional museum curation, and a report prepared by the qualified paleontologist according to current professional standards. The SVP provides guidelines on assessment and mitigation of adverse impacts to paleontological resources.

Mitigation Measure GEO-3 Implementation

Responsible Party: The City and selected contractor

Timing: During all ground-disturbing activities

Monitoring and Reporting Program: If any find is determined to be significant, representatives of the City shall document consultation with the qualified geologist or paleontologist and document the determination of recommended protection and avoidance measures or other appropriate mitigation. The City shall prepare a brief memorandum incorporating notes and records from the Contractor and qualified geologist or paleontologist to document steps taken to comply with the avoidance measures or other appropriate mitigation. The memorandum shall be kept on file at the City's offices.

Standards for Success: The evaluation and recording of any newly identified paleontological resources and unique geologic features, and treatment by avoidance, protection, or documentation of any discovered resource that qualify as significant**.**

3.7 GREENHOUSE GASES AND ENERGY RESOURCES

3.7.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.
- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation.
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts related to GHG emissions or energy resources that may result from implementation of the Program, identifying mitigation for significant impacts, where feasible.

3.7.2 Regulatory Framework

This section discusses the federal, state, and local regulations related to GHGs and energy resources that may be relevant to the Program.

3.7.2.1 Federal

Greenhouse Gas Endangerment Finding

On April 2, 2007, in *Massachusetts v. USEPA*, 549 US 497, the Supreme Court found that GHGs are air pollutants covered by the FCAA. The Supreme Court held that the Unites States Environmental Protection Agency (USEPA) must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On April 17, 2009, the USEPA Administrator signed proposed “endangerment” and “cause or contribute” findings for GHGs under Section 202(a) of the FCAA. USEPA held a 60-day public comment period, considered public comments, and issued final findings. USEPA found that six GHGs taken in combination endanger both the public health and the public welfare of current and future generations. USEPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under FCAA Section 202(a).

National Energy Conservation Policy Act

The National Energy Conservation Policy Act (42 U.S. Code [USC] §§ 8201 et seq.) serves as the underlying authority for federal energy management goals and requirements and is the foundation of most federal energy requirements. The National Energy Conservation Policy Act also established fuel

economy standards for on-road motor vehicles in the United States. The National Highway Traffic Safety Administration (NHTSA) is responsible for establishing additional vehicle standards and for revising existing standards.

Vehicle Emissions Standards

The Energy Policy and Conservation Act of 1975 (EPCA) mandated that the NHTSA establish and implement a regulatory program for motor vehicle fuel economy, known as the corporate average fuel economy (CAFE) program, to reduce national energy consumption. The CAFE program establishes average fuel economy standards for passenger cars and light trucks (49 USC § 32901 et seq.). The Energy Independence and Security Act amended the CAFE program requirements by providing the Department of Transportation (USDOT) additional rulemaking authority and responsibilities. In June 2024, NHTSA finalized CAFE standards for model years 2027 to 2031. The standards will bring the average light-duty vehicle fuel economy to approximately 50.4 miles per gallon by model year 2031. In addition, heavy-duty pickup truck and van fuel efficiency will increase to an average of approximately 35 miles per gallon by model year 2035. NHTSA projects that the foregoing standards will avoid the consumption of almost 70 billion gallons of gasoline through 2050, preventing more than 710 million metric tons of carbon dioxide emissions ($MMTCO_2e$) by 2050 (NHTSA 2024).

Inflation Reduction Act of 2022

The Inflation Reduction Act of 2022 is a multi-faceted, landmark federal law intended to reduce GHG emissions, help build a clean economy, reduce energy costs for Americans, and advance environmental justice. With funding from the IRA, the USEPA has launched a network of clean energy financing and provided grant funding for climate pollution reduction programs, and will continue to implement programs to put more clean vehicles on the transportation network (USEPA 2024c).

3.7.2.2 State

Executive Order S-3-05

Executive Order (EO) S-3-05, issued in June 2005, set forth the following target dates by which statewide GHG emissions shall be progressively reduced:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32

In line with EO S-3-05, AB 32 the “Global Warming Solutions Act,” passed in 2006, required that GHGs emitted in California be reduced to 1990 levels by the year 2020.GHG, as defined under AB 32, include CO_2, methane (CH_4), nitrogen oxides (NO_X), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The CARB is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

> *Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.*

CARB approved the 1990 GHG emissions level of 427 $MMTCO_2e$ on December 6, 2007. Therefore, to meet the state's target, emissions generated in California in 2020 were required to be equal to or less than 427 $MMTCO_2e$. In order to set a framework for the state to meet this target, CARB was tasked with creating a Scoping Plan (as described below). California announced in July 2018 that the state emitted 427 $MMTCO_2e$ in 2016 and achieved AB 32 goals (CARB 2022c).

Executive Order B-30-15

EO B-30-15, issued in April 2015, established a statewide GHG reduction goal of 40 percent below 1990 levels by 2030. The emission reduction target acts as an interim goal between the AB 32 goal (i.e., achieve 1990 emission levels by 2020) and EO S-3-05 goal of reducing statewide emissions 80 percent below 1990 levels by 2050.

Senate Bill 32

Senate Bill (SB) 32 is an amendment to the California Global Warming Solutions Act (AB 32) and was signed into law on September 8, 2016. SB 32 states that "In adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions authorized by this division, the state [air resources] board shall ensure that statewide GHG emissions are reduced to at least 40 percent below the statewide GHG emissions limit no later than December 31, 2030." In other words, SB 32 codified the interim goal established in EO B-30-15 of reducing statewide emissions to 40 percent below 1990 levels by 2030.

Assembly Bill 1279 – The California Climate Crisis Act

On September 16, 2022, AB 1279, also known as the California Climate Crisis Act, codified the carbon neutrality goal established by EO B-55-18. AB 1279 establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045, and maintain net negative GHG emissions thereafter. AB 1279 would also ensure that by 2045 the statewide anthropogenic GHG emissions are reduced by at least 85 percent below 1990 levels. The bill would require CARB to ensure that an updated Scoping Plan identifies and recommends measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO_2 removal and carbon capture, utilization, and storage technologies to complement AB 1279's emissions reduction requirements.

2022 Climate Change Scoping Plan

The 2022 Climate Change Scoping Plan (2022 Scoping Plan) was approved in December 2022 and assesses progress toward achieving the interim 2030 Target and laying out a path to achieve carbon neutrality no later than 2045. The 2022 Scoping Plan focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology, energy deployment, natural and working lands, and

others, and is designed to meet the state's long-term climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities (CARB 2022a).

Cap-and-Trade Program

CARB administers the state's Cap-and-Trade Program, which covers GHG sources that emit more than 25,000 metric tons CO_2e ($MTCO_2e$) per year, such as refineries, power plants, and industrial facilities. This market-based approach to reducing GHG emissions provides economic incentives for achieving GHG emission reductions.

The governor signed AB 398 on July 25, 2017, to extend the Cap-and-Trade Program to 2030. The legislation includes provisions to ensure that offsets used by sources are limited to four percent of their compliance obligation from 2021 to 2025 and six percent of their compliance obligation from 2026 through 2030. AB 398 also prevents air districts from adopting or implementing emission reduction rules from stationary sources that are also subject to the Cap-and-Trade Program (CARB 2022b).

Senate Bill 375: The Sustainable Communities and Climate Protection Act of 2008

SB 375 was signed into law on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits more than 40 percent of the total GHG emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

CARB has prepared the Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets. The update includes an increase in the 2035 target for Merced County from 10 percent to 14 percent.

Assembly Bill 1493: Pavley Regulations and Fuel Efficiency Standards

AB 1493, enacted on July 22, 2002, required CARB to develop and adopt regulations and fuel efficiency standards that reduce GHGs emitted by passenger vehicles and light-duty trucks.

The standards were phased in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards resulted in an approximately 22 percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards resulted in about a 30 percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation, rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for AB 1493 was incorporated into Amendments to the Low-Emission Vehicle Program, referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Cars program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation would reduce GHGs from new cars by 34 percent from 2016 levels by 2025. The rules would reduce pollutants from gasoline and diesel-powered cars and would deliver increasing numbers of zero-emission technologies,

such as full battery electric cars, newly emerging plug-in hybrid electric vehicles, and hydrogen fuel cell cars. The regulations would also ensure that adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

Senate Bill 1368: Emission Performance Standards

In 2006, the State Legislature adopted SB 1368, which was subsequently signed into law by the governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant.

Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law effectively prevents California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the state. The California Public Utilities Commission adopted the regulations required by SB 1368 on August 29, 2007. The regulations implementing SB 1368 establish a standard for baseload generation owned by, or under long-term contract to publicly owned utilities, of 1,100 pounds of CO_2 per megawatt-hour (MWh).

Senate Bill 1078: Renewable Electricity Standards

On September 12, 2002, Governor Gray Davis signed SB 1078, requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed EO S-14-08, which established an RPS target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Governor Schwarzenegger signed EO S-21-09, which directed CARB to adopt a regulation by July 31, 2010, requiring the state's load serving entities to meet a 33 percent renewable energy target by 2020. CARB approved the Renewable Electricity Standard on September 23, 2010, by Resolution 10-23. In 2011, the State Legislature adopted this higher standard in SB X1-2. Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas.

Senate Bill 350: Clean Energy and Pollution Reduction Act of 2015

The legislature approved and the governor then signed SB 350 on October 7, 2015, which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the RPS, higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations.

Senate Bill 100: California Renewables Portfolio Standard Program.

The Governor approved SB 100 on September 10, 2018. The legislation revised the RPS goals to achieve the 50 percent renewable resources target by December 31, 2026, and to achieve a 60 percent target by December 31, 2030. The bill would require that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt hours of those products sold to their retail end-use customers achieve 44 percent of

retail sales by December 31, 2024; 52 percent by December 31, 2027; and 60 percent by December 31, 2030.

Executive Order S-01-07: Low Carbon Fuel Standard

The governor signed EO S 01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the EO established a Low Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, CARB, the UC, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the SIP for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to CARB for consideration as an "early action" item under AB 32. CARB adopted the LCFS on April 23, 2009.

The LCFS was subject to legal challenge in 2011. Ultimately, CARB was required to bring a new LCFS regulation for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-carbon fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. The Office of Administrative Law approved the regulation on November 16, 2015. The regulation was last amended in 2018.

Executive Order S-13-08

EO S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the EO, the 2009 California Climate Adaptation Strategy was adopted, which is the "… first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order B-55-18

EO B-55-18 issued by Governor Brown on September 10, 2018 establishes a new statewide goal to achieve carbon neutrality as soon as possible, but no later than 2045, and to achieve and maintain net negative emissions thereafter. The EO directs CARB to work with relevant state agencies to develop a framework for implementation and accounting that tracks progress toward this goal.

Airborne Toxic Control Measures

CARB established Airborne Toxic Control Measures (ATCM) to address various sources of air pollution. ATCMs established by CARB are legally enforceable and aim to reduce emissions of toxic air contaminants from various sources, including diesel engines, asbestos, hexavalent chromium, perchloroethylene, and formaldehyde. One significant ATCM is the regulation that limits idling for these vehicles to facilitate diesel PM control.

Californian Green Buildings Standards Code

The California Green Building Standards Code, commonly known as CALGreen, is a comprehensive set of regulations aimed at promoting sustainable building practices in California. It is part of the CCR, Title 24, Part 11. It is the first state-mandated green building code in the United States. CALGreen sets mandatory requirements for both residential and non-residential buildings since CALGreen applies to the planning, design, construction, use, and occupancy of all newly constructed buildings in California. It also covers additions and alterations to existing buildings that increase the building's conditioned area, interior volume, or size. CALGreen has regulations to enhance energy performance in buildings, promote conservation, use sustainable materials, and improve indoor air quality and reduce water usage, waste, and environmental impact.

California Energy Code

Compliance with the California Energy Code (Title 24, Part 6, of the CCR, California's Energy Efficiency Standards) and Title 20, Public Utilities and Energy, standards must occur for all new buildings constructed in California. These efficiency standards apply to new construction of both residential and non-residential (i.e., maintenance buildings and pump station buildings associated with the Program) buildings, and they regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The building efficiency standards are enforced through the local building permit processes, and local government agencies may adopt and enforce energy standards for new buildings provided that these standards meet or exceed those provided in the Title 24 Guidelines.

3.7.2.3 Local

San Joaquin Valley Air Pollution Control District

The SJVAPCD's Guidance for Valley Land use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA presents a tiered approach to analyzing project significance with respect to GHG emissions. Project GHG emissions are considered less-than-significant if they can meet any of the following conditions, evaluated in the order presented (SJVAPCD 2009):

- Project is exempt from CEQA requirements;
- Project complies with an approved GHG emission reduction plan or GHG mitigation program;
- Project implements Best Performance Standards (BPS); or
- Project demonstrates that specific GHG emissions would be reduced or mitigated by at least 29 percent compared to Business-as-Usual (BAU), including GHG emission reductions achieved since the 2002-2004 baseline period.

Merced Vision 2030 General Plan

The City of Merced (City) Vision 2030 General Plan's (2030 General Plan) Chapter 8 Sustainable Development, adopted January 3, 2012 (City of Merced 2012a) contains policies that directly or indirectly pertain to GHG emissions and energy resources, including the following:

Goal Area SD-1: Air Quality and Climate Change

- **Policy SD-1.1** Accurately determine and fairly mitigate the local and regional air quality impacts of projects proposed in the City of Merced.
- **Policy SD-1.3** Integrate land use planning, transportation planning, and air quality planning for the most efficient use of public resources and for a healthier environment.
- **Policy SD-1.4** Educate the public on the impact of individual transportation, lifestyle, and land use decisions on air quality.
- **Policy SD-1.5** Provide public facilities and operations which can serve as a model for the private sector in implementation of air quality programs.
- **Policy SD-1.7** Develop and implement a Climate Action Plan for the City.
- **Policy SD-1.8** Implement policies in other General Plan chapters to address air quality and greenhouse gas emissions reduction goals.

Goal Area SD-3: Energy Resources

- **Policy SD-3.1.** Promote the use of solar energy technology and other alternative energy resources.
- **Policy SD-3.2.** Encourage the use of energy conservation features, low-emission equipment, and alternative energy sources for all new residential and commercial development.

Other

- **Policy UE-1.2** Foster compact and efficient development patterns to maintain a compact urban form.
- **Policy T-1.6** Minimize adverse impacts on the environment from existing and proposed road systems.
- **Policy OS-5.2** Protect soil resources from the erosive forces of wind and water.

City of Merced Climate Action Plan

The City's Climate Action Plan (CAP) was adopted in 2012 and includes goals, strategies, and actions to reduce local community GHG emissions to 1990 levels by the year 2020. Although the CAPs planning timeframe predates the start of construction for the Program which would occur in 2026 at the earliest, certain goals and strategies would continue to be carried forward as the City contemplates next steps in its climate action planning. Specific goals and strategies that are presented in the Merced CAP that are relevant to the Program are included below (City of Merced 2012b):

Goal 4. Protect Air Resources

- **Strategy AR 4.2:** Clean Trips - Clean Vehicles
    - Action Strategy AR 4.2.4: Reduce Idling. Identify actions that result in win-win outcomes for the community and community members, and implement through

feasible and reasonable means, which may or may not include an ordinance amendment.

- Action Strategy AR 4.2.9: Explore methods, and implement where appropriate, actions to reduce heavy-duty diesel emissions. For example, support clean heavy-duty fleets by facilitating the conversion of heavy-duty trucks to clean fuels while also encouraging the provision of alternative fuel infrastructure and operational requirements.

Goal 6: Increase the Use of Renewable Energy Sources

- **Strategy RE 6.1:** Renewable Energy Systems
  - Action Strategy RE 6.1.3: Explore methods to encourage new commercial and industrial land uses greater than a certain size to utilize onsite renewable energy systems to offset a minimum percentage of the projected building energy use. Renewable energy systems may include energy generated by solar, wind geothermal, water, or bio-based energy capture systems.
  - Action Strategy RE 6.1.5: Install methane-powered electric generators at the City's WWTP when feasible. Take interim steps necessary to achieve this goal.

Goal 7: Building Energy Conservation

- **Strategy BE 7.1:** Green City Facilities and Infrastructure
  - Action Strategy BE 7.1.3: Consider use of renewable energy systems on City-owned facilities, providing assessment and options for City Council review and discussion.
  - Action Strategy BE 7.1.6: Improve energy efficiency when replacing equipment, renovating, or constructing.

3.7.3 Environmental Setting

3.7.3.1 Greenhouse Gases

GHGs and climate change are cumulative global issues. CARB and USEPA regulate GHG emissions within California and the U.S., respectively. While CARB has the primary regulatory responsibility within California for GHG emissions, local agencies can also adopt policies for GHG emission reduction. Additionally, the Program Study Area is located within the SJVAB and within the jurisdiction of the SJVAPCD.

To fully understand global climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the GHGs that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space, and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. GHGs, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this

radiation that would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect.

The principal climate change gases resulting from human activity that enter and accumulate in the atmosphere are listed below:

- **Carbon Dioxide:** CO_2 is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. CO_2 enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and chemical reactions (e.g., the manufacture of cement). CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane:** CH_4 is a colorless and odorless gas. CH_4 is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and agricultural practices and the decay of organic waste in municipal solid waste landfills.
- **Nitrous Oxide:** N_2O is a clear, colorless gas with a slightly sweet odor. N_2O is emitted during agricultural and industrial activities as well as during combustion of fossil fuels and solid waste. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests.
- **Fluorinated Gases:** Hydrofluorocarbons, perfluorinated chemicals, and sulfur hexafluoride are synthetic, powerful climate change gases that are emitted from a variety of industrial processes. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but remain in the atmosphere for extended periods of time.

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), which weigh each gas by its global warming potential. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. Based on a 100-year time horizon, CH_4 traps over 25 times more heat per molecule than CO_2; and N_2O absorbs roughly 298 times more heat per molecule than CO_2.

Sources of Greenhouse Gas Emissions

On a global scale, GHG emissions are predominantly associated with activities related to energy production from fossil fuel sources; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. Worldwide, energy production including the burning of coal, natural gas, and oil for electricity and heat is the largest single source of global GHG emissions.

United States of America

In 2021, net GHG emissions in the United States totaled 5,586 $MMTCO_2e$. Within the United States, the largest contributor to GHG emissions is the transportation sector (28 percent). The next largest contributors are from electricity production (25 percent) and industry (23 percent), followed by the commercial and residential sector (13 percent) and the agricultural sector (10 percent). Transportation emissions primarily come from burning fossil fuels for cars, trucks, ships, trains, and planes. Over 90

percent of the fuel used for transportation is petroleum-based, which includes primarily gasoline and diesel. The bulk of emissions generated from energy production come from burning fossil fuels, mostly coal and natural gas. Industry emissions are also primarily generated from fossil fuels burned for heat, the use of certain products that contain GHGs, and the handling of waste. Similar to industry sector emissions, commercial and residential uses arise primarily from fossil fuels for heat, the use of certain products that contain GHGs, and the handling of waste. Agricultural emissions come from livestock such as cows, agricultural soil, and rice production. The land use and forestry sector within the United States serves as a carbon sink. Carbon sinks absorb CO_2 from the atmosphere. Land areas across the United States absorbed approximately 12 percent of the 2021 GHG emissions (USEPA 2024b).

California

In 2021, GHG emissions within California totaled 381.3 $MMTCO_2e$. Similar to national emissions, in California, the transportation sector is the largest contributor. Transportation emissions account for approximately 38 percent of the total statewide GHG emissions. The majority of transportation emissions are derived from passenger vehicles and heavy-duty trucks. Emissions associated with industrial uses are the second largest contributor, totaling roughly 19 percent. Industrial emissions are driven by fuel combustion from sources that include refineries, oil and gas extraction, cement plants, and the portion of cogeneration emissions attribution to thermal energy output. Electricity generation (in-state and imports) totaled roughly 16 percent. Emissions from the electricity generation sector have declined over the years due to the increase in renewable generation that continues to replace fossil power (CARB 2023).

3.7.3.2 Energy

Within the City of Merced, energy is provided in the form of petroleum fuel (gasoline and diesel), electricity, and natural gas. MID provides electricity, and Pacific Gas and Electric (PG&E) provides natural gas services to the Project area. Utility companies within California are regulated by the California Public Utilities Commission (CPUC). CPUC was created to ensure consumers within California have access to safe, reliable utility services and infrastructure at reasonable rates.

Petroleum

According to the U.S. Energy Information Administration (EIA), California used approximately 605 million barrels of petroleum in 2021. This total annual consumption equates to a daily use of approximately 1.66 million barrels of petroleum in the state. By sector, 85 percent (511,318 thousand barrels) of the state's petroleum was used by transportation, 11 percent from industrial uses (69,022 thousand barrels), 3 percent from commercial uses (18,123 thousand gallons), and 1 percent from residential uses (6,468 thousand barrels) (EIA 2021a).

Electricity

According to the EIA, California utilities sold approximately 247,249,865 megawatt hours (MWh) of electricity in 2021. By sector in 2021, 44 percent (108,761,594 MWh) of the state's electricity was used by commercial uses, 37 percent (90,284,143 MWh) for residential uses, 19 percent (47,583,329 MWh) for industrial uses, and 0.3 percent (620,799 MWh) for transportation (EIA 2022). In 2021, Merced County consumed approximately 3,036 gigawatt hours (GWh) of electricity (CEC 2022a).

Natural Gas

Natural gas is used for cooking, space heating, generating electricity, and as an alternative transportation fuel. The majority of California's natural gas customers are residential and small commercial customers. According to the EIA, California used approximately 2,101 billion cubic feet of natural gas in 2021. Residential and commercial uses accounted for approximately 33 percent (689 billion cubic feet) of the natural gas delivered by California utilities in 2021. Other large consumers of natural gas within California include electric power generators, which account for approximately 31 percent (646 billion cubic feet) of the natural gas use in 2021. The remaining natural gas use comes from the industrial sector which accounts for 34 percent (719 billion cubic feet), and the transportation sector which accounts for two percent (47 billion cubic feet) (EIA 2021b). In 2021, Merced County consumed approximately 13.1 billion cubic feet of natural gas (CEC 2022b).

3.7.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to GHGs and energy resources. When an impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.7.4.1 Methodology

Under CEQA, establishing significance thresholds is at the discretion of the lead agency. Outside of adopting their own thresholds, lead agencies often look to guidance provided by expert resource agencies such as the CARB or the applicable air pollution control district whose purpose is to provide technical guidance on the resources they oversee.

The Program Study Area falls within the jurisdiction of SJVAPCD. SJVAPCD guidance on determining impact significance recommends three conditions in which a project's impacts would be less-than-significant:

1. If the project complies with an approved GHG reduction plan:
2. CAPs are typically the most applicable GHG reduction plans to the SJVAPCD criteria. Merced's CAP was adopted in 2012; however, the 2020 emission reduction targets to 1990 levels it sets forth have since been superseded by SB 32, which sets reduction targets for the year 2030, and AB 1279, which sets a carbon neutrality target for the year 2045. Since 2012, The City has been in the process of updating the CAP with the preparation of a Programmatic CAP. A draft of the Programmatic CAP was released in 2015, but to date it has not been finalized, and similar to the 2012 CAP, the Programmatic CAP only considers 2020 emission reduction targets. Since the CAPs present targets that would occur before Program construction activities are initiated, this negates the Program's ability to meet the goals of the CAP in the first place. As such, the City's CAP is not considered to be an applicable approved GHG reduction plan.
3. If the project implements BPS:
4. The second criteria for evaluating significance, BPS, is intended for stationary sources and development projects. The SJVAPCD has established BPS for certain stationary sources and has provided draft BPS for development projects but not for construction emissions associated with

those types of projects. Impacts resulting from implementation of the Program, including project components, would be largely construction-related and, thus, BPS standards would not apply.

5. The project reduces operational GHG emissions by at least 29 percent over BAU conditions (demonstrated quantitatively).
6. The final criteria, BAU, calls for an assessment of the statewide GHG emissions reduction from the BAU emission condition. In other words, an assessment of the reduction of GHG emissions at a future date that would be based on a percentage decrease of historic GHG levels (typically levels in the year 1990). Establishing the methodology for determining what BAU conditions and what targets should be has been the subject of recent legislation and legal proceedings. The Newhall Ranch (*Center For Biological Diversity, et al. v. California Department of Fish and Wildlife* [The Newhall Land and Farming Company, Real Party in Interest] [2015] 62 Cal.4th 204) decision affirmed that "thresholds only define the level at which an environmental effect 'normally' is considered significant; they do not relieve the lead agency of its duty to determine the significance of an impact independently." The court went on in the decision to suggest approaches in which the lead agency could undertake to establish significance thresholds. Of the recommended approaches, establishment of a quantitative threshold is the most applicable to assessment of the Program's impacts since they are mainly construction based. As a result, the 29 percent reduction in emissions as compared to a BAU standard are outdated and were not used for this analysis.

Establishment of Quantitative Thresholds

Air districts often set specific quantitative limits for emissions. These limits are based on the best available data. If emissions exceed these limits, they are considered to have a significant impact within the applicable jurisdiction. SJVAPCD has not adopted quantitative thresholds, so the City looked to adjacent and similarly situated air districts to identify quantitative thresholds that would best evaluate the potential significance of the Program's GHG emissions. A review of air districts with established quantitative thresholds shown in **Table 3.7-1** identified the Sacramento Metropolitan Air Quality Management District (SMAQMD) as having the most applicable and conservative construction and operational thresholds.

Table 3.7-1: Adopted GHG CEQA Quantitative Significance Thresholds in California

Agency	Construction Threshold ($MTCO_2e$)	Operational Threshold ($MTCO_2e$)
East Kern Air Pollution Control District	N/A	Stationary: 25,000
Monterey Bay Unified Air Pollution Control District	N/A	Stationary: 25,000
Santa Barbara County Air Pollution Control District	N/A	Stationary: 10,000
San Luis Obispo Air Pollution Control District	N/A	Project: 1,150 Stationary: 10,000
South Coast Air Quality Management District	N/A	Commercial Project: 1,400 Mixed-Use Project: 3,000 Residential Project: 3,500 Stationary: 10,000
SMAQMD	1,100[1]	Project: 1,100 Stationary: 10,000

Notes:
1. SMAQMD states in its CEQA guidance that "Lead agencies may decide to amortize the level of short-term construction emissions over the expected (long-term) operational life of a project."
Key:

The methodology for assessing the Program's impacts, including its components compared to the SMAQMD quantitative thresholds, was completed following current industry guidance. This includes SMAQMD's CEQA Guidance and the California Association of Environmental Professionals Climate Change Committee's guidance for assessing GHG impacts in the post-2020 timeframe and post-Newhall Ranch. The guidance is detailed in the "Final White Paper Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California," published in October 2016 (AEP 2016).

The 1,100 $MTCO_2e$ threshold (depicted in **Table 3.7-1**, above) is used to determine whether the Program's GHG emissions may have a significant impact on the environment or conflict with an applicable GHG plan, policy, or regulation.

Additionally, the Program's compliance with applicable measures from the City's CAPs and the CARB's 2022 Scoping Plan will be used to determine potential conflicts with GHG reduction plans.

3.7.4.2 Impact Analysis

Impact GHG-1: Generate greenhouse gas emissions, either directly, or indirectly, that may have a significant impact on the environment.

Impact GHG-1 Analysis Program Impacts: North and South Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

The City's 2030 General Plan and 2030 General Plan Draft EIR assessed GHG emissions associated with reasonable build-out of the SUDP/SOI for construction and operational activities associated with that reasonable build-out, finding that potential GHG emissions would result in a cumulatively considerable, and significant and unavoidable impact. As described further in the following subheadings, the Program was considered as a part of the 2030 General Plan build-out and are consistent with the plans and policies of the 2030 General Plan. Although the 2030 General Plan Draft EIR found that General Plan build-out would result in cumulatively considerable, and significant and unavoidable impacts related to GHG emissions, the 2022 WCSMP Program requires assessment based on considerations of most recent plans, policies, and regulations.

Construction

Direct GHG emission impacts were assessed for construction activities associated with the Program by looking at the CO_2 equivalent. The primary sources of Program-related GHG emissions would occur temporarily from combustion of fossil fuels from the use of internal combustion engines (portable equipment, off-road equipment, and vehicles) during construction activities. **Table 3.7-2** shows the estimated construction emissions associated with the Program for 2026 through 2029, and compares the annual emissions to the threshold of significance.

Table 3.7-2: Estimated Program Construction GHG Emissions

Year	Program Component	GHG Emissions ($MTCO_2e$/yr)
2026	WWTF Expansion Projects	262
	Annual Total	262
2027	North Merced Major Improvements	266
	South Merced Major Improvements	216
	WWTF Expansion Projects	148
	Annual Total	630
2028	North Merced Major Improvements	365
	South Merced Major Improvements	365
	Annual Total	730
2029	North Merced Major Improvements	249
	South Merced Major Improvements	13
	Annual Total	262
Threshold of Significance		1,100
Exceeds Thresholds for Any Year?		No

As shown in **Table 3.7-2**, even when assuming construction of portions of the Program overlap, each year of construction would generate GHG emissions that do not exceed the 1,100 $MTCO_2e$/yr threshold of significance used in this analysis. Additionally, as required by MM AIR-3, all construction activities associated with the Program would minimize emissions, including CO_2. Based on the estimated GHG emissions associated with construction of the Program, the impact would be less-than-significant.

This EIR analyzes the incremental increases to take the WWTF from 20 to 27.2 Mgal/d in 3- to 4-Mgal/d projects, as needed. The model run for the WWTF Expansion Projects represent one 3- to 4-Mgal/d increment. Conservatively assuming that three rounds of WWTF Expansion Projects would occur throughput Program build-out and adding 10 percent emissions to account for the Program Minor Improvements included as part of the overall Program, total Program construction emissions are estimated to be 2,974 $MTCO_2e$. Further construction equipment and durations associated with the Program Minor Improvements were conservatively estimated to represent 10 percent of the total construction emissions associated with the proposed Projects modeled in **Table 3.7-2** since projects implemented subsequent to the proposed Projects would have smaller footprints, be shorter in duration, and require less equipment. Total emissions amortized over 30-year Program planning horizon would be approximately 99 $MTCO_2e$/yr. The amortized emissions are added to operational emissions, discussed further below.

Operation

GHG emissions during operation of the Program and are expected to be similar to existing operations, largely consisting of mobile source related emissions (i.e., worker commute trips and periodic facility maintenance visits). Indirect source emissions associated with the operation of the new or upgraded Program facilities would be generated from electrical consumption to power pump stations and additional

equipment from the upgrades to the WWTF; however, the energy consumption would be minimal and as such is not included in the emissions estimate.

The expanded WWTF facilities would increase biosolids generation and would require additional annual truck trips associated with biosolids handling and disposal. It is anticipated that current practices of land-applying biosolids to agricultural areas within the WWTF footprint would continue, and increased generation of biosolids would not require a substantial increase in the number of haul trips since they would continue to be applied to agriculture lands at the WWTF and surrounding City agricultural properties. However, there is the potential that land application may not be a viable option for biosolids disposal in the future, in which case, biosolids would require transport to an offsite disposal site approximately 22 miles away from the WWTF. These additional truck trips would equate to approximately 621 truck trips per year, or two truck trips per day. In addition, the operation of the facilities such as pump stations and the WWTF would require backup generator(s) for unexpected power failures that could result in operational GHG emissions; however, the generator(s) would only be run during power outages and for intermittent routine maintenance. As a SJVAPCD-permitted low use engine, the hours of the generator(s) would be limited to a maximum of 100 hours for the year and thus would not result in substantial generation of GHG emissions. **Table 3.7-3** presents the summary of the estimated total GHG emissions associated with the Program including the proposed Projects.

Table 3.7-3: Estimated Program Operational GHG Emissions

Program Component	GHG Emissions ($MTCO_2e/yr$)
Amortized Construction Emissions	99.1
Operational – Mobile	39.2
Operational – Stationary	45.8
Total	184.1
Threshold of Significance	1,100
Exceeds Threshold?	No

As shown in **Table 3.7-3**, the Program's long-term emissions would be 184.1 $MTCO_2e/yr$ and would be substantially less than the 1,100 $MTCO_2e$ threshold of significance applied in this analysis. As such, GHG emissions associated with the Program would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None required.
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Collection Sewer Improvements (CIPs 1-6)

Construction

Construction GHGs would be emitted by the off-road construction equipment and vehicle travel by workers and material deliveries to the site of each CIP. The estimated construction GHG emissions are shown in **Table 3.7-4.** As shown in the table below, even when assuming that CIPs 1-6 all occur during the same time period, GHG emissions associated with construction of the CIPs 1-6 could be well below the threshold of significance used in this analysis.

Table 3.7-4: Estimated Project Construction GHG Emissions

Year	Project Component	GHG Emissions ($MTCO_2e/yr$)
2026	CIPs 1-6	554
2027	CIPs 1-6	203
Threshold of Significance		1,100
Exceeds Thresholds for Any Year?		No

Operation

Operations associated with the CIPs 1-6 are not expected to generate GHG emissions that differ substantially from existing conditions, and the impact would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None required.
Level of Significance After Mitigation: Less-than-Significant

Impact GHG-1 Findings

Impact GHG-1 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact GHG-1 Mitigation Required: None Required

Impact GHG-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing the emissions of greenhouse gases.

Impact GHG-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

Implementation of the Program would have a significant impact if it conflicted with the emission reduction goals set forth by AB 32, SB 32, and AB 1279. As discussed above, the GHG reductions in the City's CAP only address 2020 GHG emission levels for the City and are not applicable to the Program. The Program's consistency with applicable goals and strategies is discussed in further detail below.

CARB approved the 2022 Scoping Plan in December 2022. The 2022 Scoping Plan builds upon previous iterations of state scoping plans to achieve carbon neutrality and reduce anthropogenic GHG emissions 85 percent below 1990 no later than 2045, as directed by AB 1279. The specific goals included in the 2022 Scoping Plan are not applicable to the Program. For example, a key goal of the 2022 Scoping Plan is to reduce driving demand and increase the use of zero-emission vehicles. The Program, as a sewer infrastructure improvement project, would not affect driving demand. In addition, the progressive improvements to the City's sewer system would incorporate more efficient technology over time, and operational emissions of GHGs are minimal. Therefore, implementation of the Program would not interfere with the long-term goals of the 2022 Scoping Plan, resulting in a less-than-significant impact. The Program's consistency with applicable City CAP measures is provided in **Table 3.7-5**.

Table 3.7-5: Program Consistency with City of Merced Climate Action Plan

Goal/Strategies	Consistency Determination
Goal 4. Protect Air Resources (AR) Strategy AR 4.2: Clean Trips-Clean Vehicles Action Strategy AR 4.2.4: Reduce Idling. Identify actions that result in win-win outcomes for the community and community members, and implement through feasible and reasonable means, which may or may not include an ordinance amendment. Action Strategy AR 4.2.9: Explore methods, and implement where appropriate, actions to reduce heavy-duty diesel emissions. For example, support clean heavy-duty fleets by facilitating the conversion of heavy-duty trucks to clean fuels while also encouraging the provision of alternative fuel infrastructure and operational requirements.	Consistent. Vehicles associated with biosolids hauling would be subject to existing regulations prohibiting idling, including the CARB's 5-minute idling limit and the Advanced Clean Fleet regulation. The Program would not conflict with the City's ability to change out its fleet of vehicles for alternative fueled vehicles or new model vehicles resulting in fewer emissions associated with diesel PM. Furthermore, MM AIR-3, as discussed further in Section 3.3, Air Quality, would also reduce vehicle idling associated with construction.
Goal 6: Increase the Use of RE Strategy RE 6.1: Renewable Energy Systems Action Strategy RE 6.1.3: Explore methods to encourage new commercial and industrial land uses greater than a certain size to utilize onsite renewable energy systems to offset a minimum percentage of the projected building energy use. Renewable energy systems may include energy generated by solar, wind geothermal, water, or bio-based energy capture systems. Action Strategy RE 6.1.5: Install methane-powered electric generators at the City's WWTP when feasible. Take interim steps necessary to achieve this goal.	Not Applicable. Action Strategy 6.1.3 is not applicable as the Program, including its components, is not a new commercial or industrial land use. The Program would not conflict with the City's ability to implement Action Strategy RE 6.1.5. Green infrastructure, including low wattage lighting and solar and wind energy, are currently being implemented where possible throughout City facilities, including the wastewater collection system facilities.
Goal 7: Building Energy Conservation Strategy BE 7.1: Green City Facilities and Infrastructure Action Strategy BE 7.1.3: Consider use of renewable energy systems on City-owned facilities, providing assessment and options for City Council review and discussion. Action Strategy BE 7.1.6: Improve energy efficiency when replacing equipment, renovating, or constructing.	Consistent. The Program would not preclude the City's ability to implement renewable energy infrastructure. Equipment installed under the Program would be more energy efficient than current equipment.

Source: City of Merced CAP 2012.

Level of Significance Prior to Mitigation: Less-than-Significant Impact
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant Impact

Project Impacts: CIPs 1-6

Construction and Operation

As with the Program, the specific goals included in the 2022 Scoping Plan are not applicable to the CIPs 1-6. Similarly, the goals set forth in the City's CAP are not applicable to the CIPs 1-6. The CIPs 1-6 would be limited to construction activities, which emit short-term GHG emissions that cease upon completion of

the project. Nevertheless, implementation of the CIPs 1-6 would not interfere with the long-term goals of the 2022 Scoping Plan or the City's CAP, resulting in a less-than-significant impact.

Level of Significance Prior to Mitigation: Less-than-Significant Impact
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant Impact

Impact GHG-2 Findings

Impact GHG-2 Overall Level of Significance Prior to Mitigation: Less-Than-Significant Impact

Impact GHG-2 Mitigation Required: None Required

Impact GHG-2 Overall Level of Significance After Mitigation: Less-Than-Significant Impact

Impact GHG-3: Result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

Impact GHG-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Energy efficiencies would be incorporated into Program construction, as specified by the federal, state, and local policies, and regulations pertaining to energy standards (Section 3.7.2, Regulatory Framework). This would ensure that natural resources are conserved to the maximum extent possible (i.e., Energy Independence and Security Act of 2007, Title 10 CFR, Part 431, Energy Efficiency Program for Certain Commercial, and Industrial Equipment, including Subpart B, Paragraph 431.25 for Electric Motors; and Subpart K, Paragraph 431.196 for Distribution Transformers).

During construction of the Program components, energy resources would be consumed in the form of diesel and gasoline fuel from the use of off-road equipment (i.e., tractors, excavators, cranes) and on-road vehicles (i.e., construction employee commutes, haul trucks). Construction is not anticipated to require electricity or natural gas. **Table 3.7-6** provides a summary of the anticipated construction energy use associated with implementation of the Program.

Table 3.7-6: Program Construction Fuel Consumption

Program Component	Construction Activity	Fuel Consumption (gallons)
North Merced Major Improvements	Off-Road Equipment	30,558
	On-Road Vehicles	50,889
	Total	81,447
South Merced Major Improvements	Off-Road Equipment	23,390
	On-Road Vehicles	31,384
	Total	54,774
	Off-Road Equipment	12,461

Program Component	Construction Activity	Fuel Consumption (gallons)
WWTF Expansion Projects 3- to 4-Mgal/d	On-Road Vehicles	25,868
	Total	38,329

For comparison, in 2022, 67 million gallons of diesel fuel were purchased in Merced County, in addition to 120 million gallons of gasoline (CEC 2023). If it was conservatively assumed that all fuel consumed during construction is diesel fuel, and all modeled components were to occur within one year, then construction of the Program would consume less than 0.06 percent of Merced County's annual diesel consumption. If all fuel consumed during construction is gasoline, all other things being equal, then the Program would consume less than 0.03 percent of Merced County's annual gasoline consumption.

Construction activities associated with the Program components would be similar to other construction activities occurring throughout the City's SUDP/SOI in that it would use typical construction equipment described in Chapter 2.0, Project Description. Based on system capacity and review, the power and energy system within the Program Study Area is considered adequate to handle the limited and sporadic demand throughout construction of the Program, which would be similar to existing conditions from surrounding operations throughout the Program Study Area. Additional short-term construction-related energy consumption would be required intermittently over the time that reasonable build-out is expected to occur. As shown in **Table 3.7-6** and noted above, the amount of petroleum fuel that would be consumed would not represent a substantial fraction of the available gasoline and diesel fuel supply in Merced County. Based on this, the Program would not result in wasteful, inefficient, or unnecessary consumption of energy resources.

Operation

Implementation of the Program includes reasonable build-out of the City's 2030 General Plan, which would result in increased demand for wastewater conveyance and treatment within the Program Study Area. The new and upgraded wastewater collection system as well as the improvements to the existing WWTF would require minimal energy consumption beyond what currently exists due to the use of a gravity-fed system, to the extent feasible. Energy efficiencies would be incorporated into Program operations, as specified by the federal, state, and local policies, and regulations pertaining to energy standards (Section 3.7.2, Regulatory Framework). This would ensure that natural resources are conserved to the maximum extent possible (i.e., Energy Independence and Security Act of 2007, Title 10 CFR, Part 431, Energy Efficiency Program for Certain Commercial, and Industrial Equipment, including Subpart B, Paragraph 431.25 for Electric Motors; and Subpart K, Paragraph 431.196 for Distribution Transformers).

Specific components of the Program such as pump stations and trunk sewers would likely require an increase in energy consumption beyond what currently exists. Operations associated with additional structures, treatment processes, and equipment, among other design features required for the expansion of the WWTF from current capacity to reasonable build-out of 27.2 Mgal/d, would also likely require the consumption of additional energy beyond current demands. Energy usage at the WWTF would vary daily depending on flows into the system, and as the WWTF Expansion Projects are constructed periodically, various energy conservation features and efficiencies are anticipated as part of the WWTF Expansion Projects, which would reduce the total overall energy demands from those estimated. Further, all new

structures would include Title 24 standards and would comply with all federal, state, and local standards governing energy usage.

Any operational traffic increases associated with the Program would be nominal since the WWTF is an existing facility, and pipelines and other infrastructure would require limited O&M trips. Operation of the wastewater collection system would maintain similar, if not improved, energy efficiency with implementation of energy reduction technology. Operation of pipelines would be gravity-fed wherever feasible, requiring minimal amount of energy use associated with wastewater conveyance. Where force mains and pump stations are required because gravity systems would not be feasible, there would be a slight increase in energy demand. This increase is not anticipated to constitute a significant impact to energy consumption since energy conserving operational equipment for the operation of any pump stations would be incorporated to meet Title 24 standards. Therefore, implementation of the Program would not result in wasteful, inefficient, or unnecessary consumption of energy, and the impact would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Table 3.7-7 provides a summary of the anticipated construction energy use associated with implementation of the CIPs 1-6.

Table 3.7-7: Project Construction Fuel Consumption

Project Component	Construction Activity	Fuel Consumption (gallons)
CIPs 1-6	Off-Road Equipment	43,806
	On-Road Vehicles	28,023
	Total	71,829

For comparison, in 2022, 67 million gallons of diesel fuel were purchased in Merced County, in addition to 120 million gallons of gasoline (CEC 2023). If it was conservatively assumed that all fuel consumed during construction is diesel fuel, and all modeled components were to occur within one year, then construction of the CIPs 1-6 would consume 0.1 percent of Merced County's annual diesel consumption. If all fuel consumed during construction is gasoline, all other things being equal, then the CIPs 1-6 would consume less than 0.06 percent of Merced County's annual gasoline consumption. Additionally, construction and earth-moving equipment used for the CIPs 1-6 would be in compliance with Assembly Bill 1493: Pavley Regulations and Fuel Efficiency Standards and CARB off-road construction equipment requirements, including the 2022 In-Use Off-Road Diesel-Fueled Fleets (Off-Road Regulation). CARB's Off-Road Regulation contains a limit on unnecessary idling and requires contractors to develop and follow an idling policy. The Off-Road Regulation states: "No vehicle or engines subject to this regulation may idle for more than five consecutive minutes" (CARB 2022c). This limit applies to all off-road diesel vehicles subject to the regulation, unless the vehicle is idling for specific circumstances as defined in the regulation or a waiver granted. The Off-Road Regulation also requires that all medium and large fleets create a

written idling policy that informs operators of the fleets' vehicles that idling is limited to five consecutive minutes or less. The contractors for the CIPs 1-6 may also utilize Best Available Control Technology to satisfy performance requirements. Based on this, the Project would not result in wasteful, inefficient, or unnecessary consumption of energy resources.

Operation

Operations of the CIPs 1-6 are not expected to result in a notable increase in energy consumption as compared to existing conditions, and the impact would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact GHG-3 Findings

Impact GHG-3 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact GHG-3 Mitigation Required: None Required

Impact GHG-3 Overall Level of Significance After Mitigation: Less-than-Significant

Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Impact GHG-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction and Operation

The City's General Plan EIR concluded that implementing policies aimed at reducing GHG emissions would align the General Plan's build-out with relevant GHG reduction plans, policies, and regulations. The Program is consistent with several of these General Plan policies, referenced in Section 3.7.2.3, Local. For instance, the Program, where feasible, would utilize gravity-fed sewers to use the natural slope of the land to passively transport wastewater from homes and businesses to the WWTF without the need for pumping (which takes energy and produces emissions). This would be in alignment with Policy SD-3.2. Encourage the use of energy conservation features, low-emission equipment, and alternative energy sources for all new residential and commercial development.

Since the City's General Plan EIR was prepared in 2010, it predates several relevant plans, policies, and regulations outlined in Section 3.7.2.3. While there are currently no established protocols or significance thresholds for assessing future-year consistency with SB 32 (which aims for a 40 percent reduction in GHG emissions from 1990 levels by 2030) and EO S-3-05 (which targets an 80 percent reduction by 2050), CARB has expressed confidence in achieving these goals. The 2022 update from CARB emphasizes that California is well-positioned to meet its near-term GHG emissions targets and continues to progress toward the longer-term goals set by AB 32, SB 32, and EO S-3-05. The 2022 Climate Change Scoping Plan further outlines California's comprehensive strategy to meet the 2030 GHG reduction target while also establishing a pathway to a low- to zero-carbon economy by 2050. It highlights the importance

of maintaining momentum to achieve the 2050 target and details the policies necessary for meeting both mid-term and long-term objectives.

Implementation of the Program would also follow pre-established energy conservation plans, such as the City's CAP's goals and strategies related to the protection of air resources and incentives for the use of renewable energy sources and green energy building standards, as further described in **Table 3.7-5**: Program Consistency with City of Merced CAP. These goals and strategies have been taken into consideration, in conjunction with federal and state regulations (i.e., CCR Title 24, Parts 6, 11, and 20), during the design of the different components of the Program and would be incorporated into design of future Program components. The Program would also include implementation of Program design features to minimize energy consumption (such as gravity-fed sewers).

In addition, the Program would include MM GHG-1, which requires future individual projects that tier under this programmatic REIR to include energy conserving features for construction and operation (where feasible and relevant). With the implementation with MM GHG-1, the Program's potential to conflict with state or local plans for renewable energy or energy efficiency would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM GHG-1
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction and Operation

As noted for the Program above, the CIPs 1-6 are subject to the City's CAP and would not conflict with any pre-existing energy conservation plans such as the CAP. All improvements associated with CIPs 1-6 would comply with all application federal, state, and local regulations governing energy efficiency. Therefore, the Project would not conflict with state or local plans for renewable energy or energy efficiency.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact GHG-4 Findings

Impact GHG-4 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact GHG-4 Mitigation Required: MM GHG-1

Impact GHG-4 Overall Level of Significance After Mitigation: Less-than-Significant

3.7.5 Greenhouse Gases and Energy Resources Mitigation

Mitigation Measure GHG-1: Energy Conservation Standards for Future Projects

Description: Future individual projects that tier under this programmatic REIR shall incorporate energy conserving features during both the construction and operational phases. This measure is intended to reduce energy consumption and greenhouse gas emissions, aligning with state energy efficiency goals. All future projects shall adhere to the latest California Building Standards Code (Title 24) and any

subsequent updates. Projects shall incorporate energy efficient building materials, design techniques, and appliances, such as high-performance insulation and glazing, energy efficient HVAC systems, or LED lighting and advanced lighting controls.

Where feasible, projects shall include provisions for onsite renewable energy generation (e.g., solar panels), aiming for a minimum of 20 percent of the project's energy demand to be met through renewable sources.

During construction, projects shall utilize energy efficient construction practices, including use of energy efficient machinery and equipment, implementation of construction schedules to minimize energy use during peak hours, and waste reduction practices to limit energy expenditure associated with material transport and disposal.

Upon project completion, energy use shall be monitored and evaluated against established benchmarks to ensure ongoing compliance with energy conservation standards. Projects shall implement a maintenance plan that includes regular assessment of energy systems to optimize efficiency throughout the operational lifespan.

Each future project shall include a detailed Energy Conservation Plan, demonstrating compliance with this MMs and outlining specific energy efficient features to be implemented. The plan shall be submitted to the lead agency for review and approval prior to project construction. The City of Merced, as the lead agency, shall establish a monitoring program to ensure compliance with the Energy Conservation Plan. This may include periodic reviews, inspections during construction, and follow-up evaluations post-occupancy.

By integrating this MM into future individual projects, the programmatic REIR will support significant energy conservation efforts, contributing to environmental sustainability and compliance with CEQA requirements.

3.8 HAZARDS, HAZARDOUS MATERIALS, AND WILDFIRE

3.8.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues for hazards and hazardous materials would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. In 2018, a single wildfire checklist question was included within Section IX Hazards and Hazardous Materials and will remain in this section to follow the 2018 NOP and also include the up-to-date Section XX Wildfire checklist questions. The following Appendix G checklist questions are evaluated further in this EIR.

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- 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.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and as a result, would create a significant hazard to the public or the environment.
- 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 or private airport or public use airport, would the project result in safety hazard or excessive noise for people residing or working in the Project area.
- Impair implementation of, or physically interfere with an adopted emergency response plan, or emergency evacuation plan.
- Expose people or structures, either directly or indirectly, 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.
- If located in or near state responsibility areas or lands classified as very high fire hazard severity zones:
    - Would the project impair an adopted emergency response plan or emergency evacuation plan?
    - Would the project exacerbate wildfire risks due to slope, prevailing winds, and other factors, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?
    - Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

- Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts describing the potential impacts to hazards, hazardous materials, and wildfires that may result from implementation of the Program and identifies mitigation for potentially significant impacts, where feasible.

3.8.2 Regulatory Framework

This section discusses the federal and state regulations as well as local policies and objectives that relate to hazards, hazardous materials, and wildfires and are relevant to the Program.

3.8.2.1 Federal

Resources Conservation and Recovery Act

The Resources Conservation and Recovery Act (RCRA) established the federal regulatory program for hazardous substances and gives the USEPA the authority to regulate the generation, transport, treatment, and disposal of hazardous substances in a “cradle to grave” system. Under RCRA, USEPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. This regulatory system includes tracking all generators of hazardous waste.

1984 Hazardous and Solid Waste Amendment Act

RCRA was amended by the 1984 Hazardous and Solid Waste Amendment Act, which prohibited the use of certain techniques for the disposal of certain hazardous wastes (USEPA 2024a). The Emergency Planning and Community Right-to-Know Act of 1986 imposes safety requirements to protect local communities in the event of accidental release of hazardous substances. The requirements provide measures to mitigate or prevent the risks from interaction with hazardous materials, such as handling, storage, and disposal. This law protects human health and the environment by minimizing the present threat and if the unintended release of hazardous materials were to occur (USEPA 2024b). USEPA has delegated fulfillment of many of RCRA’s requirements to the California Department of Toxic Substances Control (DTSC).

Clean Air Act

Regulations under the Clean Air Act (CAA) (42 USC 7401 et seq. as amended) are designed to prevent accidental releases of hazardous materials. The regulations require facilities that store a threshold quantity or greater of listed regulated substances to develop a risk management plan, including hazard assessments and response programs to prevent accidental releases of listed chemicals.

Hazardous Materials Transportation Act

The transport of hazardous materials is regulated by the United States Department of Transportation under the Hazardous Materials Transportation Act. To accomplish this, the Federal Aviation Administration, Federal Motor Carrier Safety Administration, Federal Railway Administration, Pipeline and

Hazardous Materials Safety Administration, and United States Coast Guard have been given authority to enforce hazardous material transport regulations.

Occupational Safety and Health Administration

The Occupational Safety and Health Act of 1970 created the OSHA, which is responsible for protecting the health of workers in events such as during the handling of hazardous materials. OSHA has created regulations to set federal standards of workplace safety including exposure limits, mandatory workplace training, accident and injury reporting, and safety procedures. These regulations are recorded in the CFR Title 29.

Federal Aviation Administration

The Federal Aviation Administration (FAA) has jurisdiction over navigable airspace in the public interest as necessary to ensure the safety of aircraft use. Federal Aviation Regulation (FAR), Title 14, Part 77 includes provisions to promote safe and efficient use and preservation of navigable airspace. The FAA FAR Part 77 includes specific requirements for proposed construction or alterations of structures within the vicinity of an airport. Consultation with the FAA would be required for any project that would place structures or construction equipment (i.e., a crane) over 200 feet in height within navigable airspace. Any object of construction equipment more than 200 feet would not necessarily be incompatible with this regulation but would be subject to FAA notification and an aeronautical study to determine whether the prosed structures would constitute a hazard to air navigation. Form 7460-1 (Notice of Proposed Construction or Alteration) would be required 45 days prior to the start date of any proposed construction activities (Title 14 CFR Part 77) to initiate FAA consultation.

3.8.2.2 State

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state's hazardous waste management program. It is similar to but more stringent than the RCRA. The act is implemented by regulations contained in Title 26 of the CCR, which describes the following required aspects for the proper management of hazardous waste: identification and classification; generation and transportation; design and permitting of recycling treatment, storage and disposal facilities; operation of facilities and staff training; and closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the DTSC.

California Environmental Protection Agency and Department of Toxic Substances Control

The California Environmental Protection Agency (CalEPA) is responsible for creating and enforcing environmental regulations within California. Within CalEPA is the DTSC, which was formed under the Hazardous Waste Control Act. DTSC is responsible for regulating hazardous waste, remediating existing contamination, and identifying ways to reduce production of hazardous wastes. DTSC can delegate enforcement responsibilities to local jurisdictions.

Unified Program

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) is a unified hazardous materials management program that was established by California's Secretary for Environmental Protection following Senate Bill 1082 (1993). The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the following programs:

- Hazardous Materials Release Response Plans and Inventories
- California Accidental Release Prevention Program
- Underground Storage Tank Program
- Above-Ground Petroleum Storage Act Program
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements

These six environmental programs are implemented at the local government level by Certified Unified Program Agencies (CUPAs). CUPAs provide a central permitting and regulatory agency for permits, reporting, and compliance enforcement. California PRC Section 21151.4 sets special requirements for environmental impact reports and negative declarations for projects that involve the construction or alteration of a facility within 0.25 mile of a school that creates the following conditions:

- The project might reasonably be anticipated to emit hazardous air emissions;
- The project would handle an extremely hazardous substance or a mixture containing extremely hazardous substances in a quantity equal to or greater than the state threshold quantity specified in Section 25532(j) of the Health and Safety Code; or
- The project may pose a health or safety hazard to persons who would attend or would be employed at the school.

As part of the CEQA process, the lead agency preparing the EIR must consult with the appropriate school district regarding the potential impact of the project on the school, and the school district must be notified about the project in writing at least 30 days before the proposed certification of the EIR or adoption of the mitigated negative declaration PRC section 21151.4; 14 CCR Section 15186(b)).

Government Code Section 65962

Government Code Section 65962 was enacted in 1985 and was amended in 1992. Originally, the Cortese List was used as a planning tool to comply with CEQA and requires information about locations of hazardous materials release sites. It states that through the combined efforts of the DTSC, the Department of Health Services, the SWRCB, and local enforcement agencies, a list of potentially hazardous areas and sites will be compiled and remain up-to-date (at a minimum, updated annually). The Cortese List was consolidated by the Secretary for Environmental Protection and is distributed to each city and county in which sites on the list were located. CalEPA no longer maintains a single Cortese List. Instead, CalEPA uses the following databases and lists to meet the requirements of Government Code Section 65962.5:

- List of Hazardous Waste and Substances sites from DTSC EnviroStor database;
- List of Leaking Underground Storage Tank (LUST) Sites from the state Water Board's GeoTracker database;
- List of solid waste disposal sites identified by state or Regional Water Board with waste constituents above hazardous waste levels outside the waste management unit;
- List of "active" CDO and CAO from State Water Board; and
- List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by DTSC.

California Department of Transportation

Caltrans manages inter-regional transportation, including the management and construction of the California highway system. In addition, Caltrans is responsible for the permitting and regulation of state roadways and requires that permits be obtained for transportation of oversized loads and certain materials such as hazardous materials, and for construction-related traffic disturbance.

California PRC

PRC Section 21151.4. (a) An EIR shall not be certified or a negative declaration shall not be approved for any project involving the construction or alteration of a facility within one-fourth of a mile of a school that might reasonably be anticipated to emit hazardous air emissions, or that would handle an extremely hazardous substance or a mixture containing extremely hazardous substances in a quantity equal to or greater than the state threshold quantity specified pursuant to subdivision (j) of Section 25532 of the Health and Safety Code, that may pose a health or safety hazard to persons who would attend or would be employed at the school, unless both of the following occur:

1. The lead agency preparing the EIR or negative declaration has consulted with the school district having jurisdiction regarding the potential impact of the Project on the school.
2. The school district has been given written notification of the Project not less than 30 days prior to the proposed certification of the EIR or approval of the negative declaration.

As used in this section, the following definitions apply:

1. "Extremely hazardous substance" means an extremely hazardous substance as defined pursuant to paragraph (2) of subdivision (g) of Section 25532 of the Health and Safety Code.
2. "Hazardous air emissions" means emissions into the ambient air of air contaminants that have been identified as a TAC by the State Air Resources Board or by the air pollution control officer for the jurisdiction in which the Project is located. As determined by the air pollution control officer, hazardous air emissions also means emissions into the ambient air of a substance identified in subdivisions (a) to (f), inclusive, of Section 44321 of the Health and Safety Code. [Amended by Stats. 2008, Ch. 148, Sec. 1. Effective January 1, 2009].

Division of Occupational Safety and Health

The Division of Occupational Safety and Health (DOSH or CalOSHA) is responsible for enforcing workplace safety regulations and requirements in California, including hazardous materials requirements

recorded under CCR Title 8. These regulations include requirements for safety training, availability of safety equipment, accident and illness prevention programs, warnings about hazardous substance exposure (such as asbestos), and preparation of emergency action and fire prevention plans.

DOSH also enforces hazard-communication program regulations that contain training and information requirements. Such requirements include procedures for identifying and labeling hazardous substances, communicating information about hazardous substances and their handling, and preparing health and safety plans to protect workers and employees at hazardous waste sites. Under the hazard-communication program, employers must make Material Safety Data Sheets available to employees and document employee information and training programs.

California Emergency Services Act

The California Emergency Services Act provides the basic authority for conducting emergency operations following a proclamation of emergency by the governor or appropriate local authorities. Local government and district emergency plans are considered to be extensions of the California Emergency Plan, established in accordance with the Emergency Services Act.

The California Office of Emergency Services (Cal OES) is the state agency responsible for establishing emergency response and spill notification plans related to hazardous materials accidents. al OES regulates businesses by requiring specific businesses to prepare an inventory of hazardous materials (CCR Title 19). Cal OES is also the lead state agency for emergency management and is responsible for coordinating the state-level response to emergencies and disasters.

Fire Protection

California state fire safety regulations apply to state responsibility areas (SRAs) during the time of year designated as having hazardous fire conditions. The California Department of Forestry and Fire Protection (Cal FIRE) has developed a fire hazard severity scale that considers vegetation, climate, and slope to evaluate the level of wildfire hazard in all SRAs. An SRA is defined as the part of the state where Cal FIRE is primarily responsible for providing basic wildland fire protection assistance. Areas under the jurisdiction of local fire protection services are considered to be local responsibility areas, and areas on federal lands are considered Federal Responsibility Areas.

During the fire hazard season, these regulations include the following: (a) restrict the use of equipment that may produce a spark, flame, or fire; (b) require the use of spark arrestors on any equipment that has an internal combustion engine; (c) specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and (d) specify fire suppression equipment that must be provided onsite for various types of work in fire-prone areas. Cal FIRE has primary responsibility for fire protection within SRAs.

California Fire Code

The California Fire Code (CFC) is a set of regulations designed to enhance fire safety and reduce fire risks across the state. It outlines requirements for fire prevention, building materials, fire suppression systems (like sprinklers and alarms), and emergency procedures in both residential and commercial buildings. The code also addresses wildfire mitigation, especially in high-risk areas, through defensible space, fire-resistant construction, and vegetation management. Regular updates to the code reflect evolving fire risks, technologies, and lessons from past incidents. Enforced by local fire authorities, the

CFC helps ensure buildings comply with safety standards, while promoting public education on fire prevention and emergency response. Ultimately, it aims to protect lives and property from the dangers of fire.

3.8.2.3 Local

Merced Vision 2030 General Plan

The 2030 General Plan Safety Element, adopted January 3, 2012 and amended March 2015 and June 2016 (City of Merced 2016) contains several policies that directly or indirectly pertain to hazards and hazardous materials, including the following:

Goal Area S-4: Fire Protection

- **Policy S-4.2.** Maintain a reasonable level of accessibility and infrastructure support for fire suppression, disaster, and other emergency services.

Goal Area S-5: Airport Safety

- **Policy S-5.2.** Prevent the encroachment of potential hazards to flight within the airport's airspace.

Merced County Airport Land Use Compatibility Plan

The Merced County Airport Land Use Compatibility Plan was developed by the Merced County Airport Land Use Commission and was adopted in 2012 to address compatibility between airports within Merced County and the surrounding land uses. Various safety zones were established based on this plan which include the following:

- Zone A: This zone is the Runway Protection Zone where all structures are prohibited.
- Zone B1: This zone is the Approach/Departure Zone. In this zone, educational facilities, hospitals, and above-ground storage of hazardous materials are prohibited. There is also a 0.2 unit per acre maximum density requirement for this zone.
- Zone B2: This zone is the Extended Approach/Departure Zone. In this zone, educational facilities, hospitals, and above-ground storage of hazardous materials are prohibited. There is a 1.0 unit per acre maximum density requirement for this zone.
- Zone C: This zone is the Common Traffic Pattern zone. In this zone, educational facilities, hospitals, and libraries are prohibited. There is an 8 units per acre maximum density requirement for this zone.
- Zone D: This zone is for Other Airport Environs and is the outermost zone of the airport. There are no development restrictions for this zone, with the exception of objects over 150 feet in height.

Additionally, the Merced County Airport Land Use Compatibility Plan states that construction activities that could occur within the planning area are subject to the following provisions (Merced County Airport Land Use Commission 2012):

> *If a project contains proposed structures or other objects that may exceed the height standards defined in FAR Part 77, Subpart C, as applied to each airport, the project proponent must submit*

notification of the proposal to the FAA where required by the provisions of FAR Part 77, Subpart B, and by the California Public Utilities Code, Sections 21658 and 21659. The FAA will conduct an "aeronautical study" of the object(s) and determine whether the object(s) would be of a height that would constitute a hazard to air navigation. The FAA notification requirements apply to all objects including structures, antennas, trees, mobile objects, and temporary objects such as construction cranes.

Merced County Hazardous Waste Management Plan

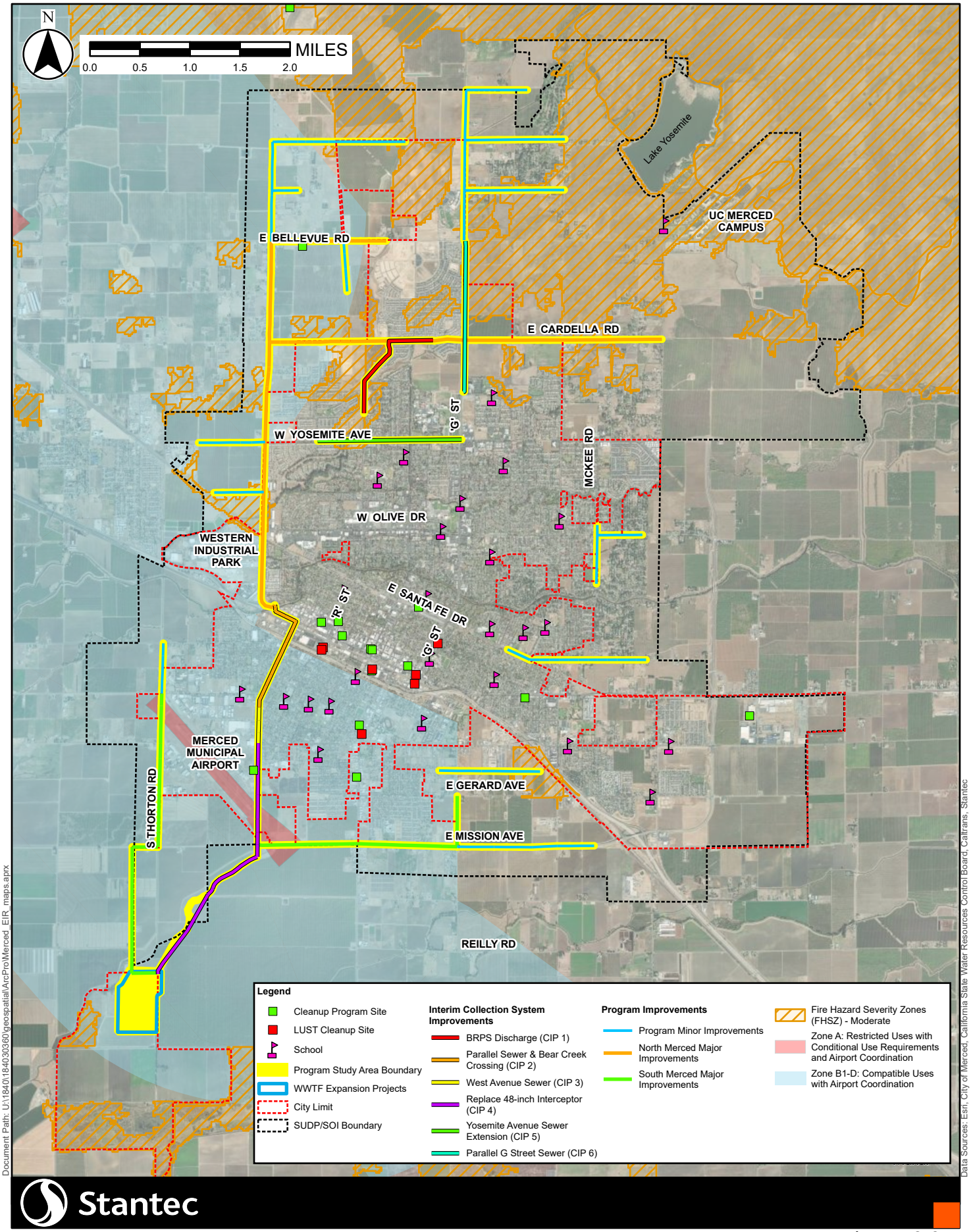
The Merced County Hazardous Waste Management Plan was prepared in 1989 to address waste reduction and onsite treatment, the siting of offsite hazardous waste facilities, transportation of hazardous wastes, cleanup of contaminated sites, and emergency response procedures related to hazards within the Merced County area. The Hazardous Waste Management Plan is enforced by the Merced County Division of Environmental Health in conjunction with the Merced City Fire Department. The Merced County Division of Environmental Health also maintains a list of known hazardous waste sites within the County, which is updated regularly.

City of Merced Local Hazard Mitigation Plan

The City of Merced Local Hazard Mitigation Plan was adopted on March 16, 2015, in an effort to reduce future loss of life and property resulting from disasters, as well as to provide decision-makers with a tool to direct mitigation activities and resources (City of Merced 2015). According to this plan, the City is at the greatest risk from hazardous materials release and flooding, whereas other threats, such as fire exposure, extreme temperatures, and potential dam failures, have a moderate hazard potential within the City (City of Merced 2015).

3.8.3 Environmental Setting

The Program Study Area considered the SUDP/SOI of the City, which includes mixed uses such as residential, commercial, industrial, agricultural, and open spaces. Identified potential hazards from GeoTracker, EnviroStor database, and other hazards or sensitive receptor data sources within the Program Study Area are shown on **Figure 3.8-1.**



Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.8-1
Potential Hazards Within City of Merced SUDP/SOI

3.8.3.1 Definition of Terms

Hazardous Materials and Wastes

For purposes of this section, the term “hazardous materials” refers to both hazardous substances and hazardous wastes. A “hazardous material” is defined in the CFR as, “a substance or material that…is capable of posing an unreasonable risk to health, safety, and property when transported in commerce” (49 CFR 171.8). California Health and Safety Code Section 25501 defines a hazardous material as follows:

> *Hazardous material means any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. “Hazardous materials” include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.*

Hazardous wastes are defined in California Health and Safety Code Section 25141(b) as wastes that:

> *Because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality or an increase in serious illness [, or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.*

Section 25532(j) of the Health and Safety Code defines "regulated substances accident risk" to mean a potential for the accidental release of a regulated substance into the environment that could produce a significant likelihood that persons exposed may suffer acute health effects resulting in significant injury or death.

Section (j) defines "regulated substance" to mean any substance that is either of the following (20 CFR Article 2 Section 25532):

(1) A regulated substance listed in Section 68.130 of Title 40 of the CFR pursuant to paragraph (3) of subsection (r) of Section 112 of the Clean Air Act (42 USC Section 7412[r][3]).

(2) An extremely hazardous substance listed in Appendix A of Part 355 (commencing with Section 355.10) of Subchapter J of Chapter I of Title 40 of the CFR that is any of the following:

   i. A gas at standard temperature and pressure.

   ii. A liquid with a vapor pressure at standard temperature and pressure equal to or greater than 10 millimeters mercury.

   iii. A solid that is one of the following:

      I. In solution or in molten form.

II. In powder form with a particle size less than 100 microns.

III. Reactive with a National Fire Protection Association rating of 2, 3, or 4.

iv. A substance that the office determines may pose a regulated substances accident risk pursuant to subclause (II) of clause (i) of subparagraph (B) or pursuant to Section 25543.3.

Acute Hazardous Wastes

Acute hazardous wastes have been found to be fatal to humans in low doses or, in the absence of data on human toxicity, it has been shown in studies to have an oral lethal dose 50 toxicity (rat) of less than 50 milligrams per kilogram, an inhalation lethal does 50 toxicity (rat) of less than two milligrams per liter, or a dermal lethal dose 50 toxicity (rabbit) of less than 200 milligrams per kilogram or is otherwise capable of causing or significantly contributing to an increase in serious irreversible or incapacitating reversible illness (CFR 40 261.11).

Asbestos

Naturally occurring asbestos is generally found in serpentine soils within the Sierra Nevada foothills of California and is considered a hazardous material due to exposure related public health concerns (Caltrans 2016). The Naturally Occurring Asbestos Hazard Map was reviewed to determine if the Project would involve construction in areas of relative likelihood for the presence of natural occurring asbestos (CGS 2011). The majority of Merced County, and specifically the City, is not known for the occurrence of natural occurring asbestos.

In addition to naturally occurring asbestos, many building materials, including pipelines have the potential to contain asbestos cement (AC) and other hazardous materials that could cause damage to the environmental and to people, if disturbed. If material containing asbestos are disturbed, tiny fibers can become airborne, which could cause respiratory damage that could lead to lung disease or other pulmonary complications.

AC pipe is a material that was commonly used in the middle portion of the 20th Century, prior to much of the federal and state legislation regulating this hazardous material. AC pipe is most commonly encountered where public water systems were developed or extended in the 1940s through 1960s. It is a piping material that is safe if undisturbed. Risk of exposure is limited to activities that disturb the material causing it to become airborne.

Valley Fever

Coccidioidomycosis, more commonly known as “Valley Fever,” is primarily a disease of the lungs caused by the spores of the Coccidioides immitis fungus (“cocci”). The spores can be found in some areas naturally occurring in soils, can become airborne when the soil is disturbed, and can subsequently be inhaled into the lungs. Valley fever is considered endemic in the Central Valley of California, with the highest concentration of known cases of Valley Fever infection occurring in Kern, Kings, San Luis Obispo, Tulare, Madera, and Monterey Counties (Center for Infectious Diseases 2022). Activities or conditions that increase the amount of fugitive dust within these areas, or other regions known to contain the cocci spores, increase the risk of exposure to infection. While Merced County is not listed as one of the top areas of concern for Valley Fever, there have been reported cases of Valley Fever infection within

Merced County in 2020 (estimated 78 cases) and 81 reported cases in 2021, meaning that the cocci spores have the potential to occur with the region (Center for Infectious Diseases 2022).

Hazardous Air Pollutants

The USEPA defines hazardous emissions, also known as Hazardous Air Pollutants (HAPs), as those pollutants that are known or suspected to cause cancer or other serious health effects (USEPA 2023). HAPs can come from sources such as gasoline, motor oils, asbestos, and paint strippers and can be inhaled or ingested. Fuels such as diesel and gasoline required for the operation of construction equipment are considered Class 3 flammable liquid hazardous materials, which can lead to fires or explosions if handled incorrectly. Additionally, oils and lubricants for operation of equipment are also considered Class 3 hazardous materials.

3.8.3.2 Schools

There are four school districts within the City limits, the Merced City School District, Merced Union High School District, Weaver Union School District, and the McSwain Union School District, all of which contain a number of individual schools which are shown on **Figure 3.8-1**. The schools within 0.25-miles of the Program Study Area are listed in **Table 3.8-1**.

Table 3.8-1. Schools Near Program Study Area

Program/Project	Nearest School	Distance
North Merced Major Improvements	El Capitan High School, St. Paul Lutheran Church and School	<100 feet
South Merced Major Improvements	Farmdale Elementary School, Our Lady of Mercy Preschool, Herbert Hoover Intermediate	220 feet, <100 feet, 10 miles
WWTF Expansion Projects	NA	NA
CIP 1	NA	NA
CIP 2	Leontine Gracey Elementary School	0.16 miles
CIP 3	Merced Valley Community School, Merced Scholars Charter School, Margaret Sheehy Elementary School	0.20 miles
CIP 4		
CIP 5	Merced College	<100 feet
CIP 6	Cruickshank Middle School	0.20 miles

3.8.3.3 Government Code Section 65962

As discussed in the regulatory setting above, the lists and databases searched to comply with Government Code Section 65962 provide lists of known locations of hazardous material release sites. The analysis for this section utilized EnviroStor and Geotracker. The results of search of the databases referenced under Government Code Section 65962 in Section 3.8.2.2 State Regulatory Setting for sites within and near the Program Study Area are shown on **Figure 3.8-1** (DTSC 2024; SWRCB 2024). As shown on **Figure 3.8-1**, there is one listed site adjacent to the South Merced Major Improvements; however, there are no currently listed sites with or directly adjacent to the North Merced Improvements, Program Minor Improvements, WWTF Expansion Projects, or CIPs 1-6.

3.8.3.4 Emergency Response and Emergency Evacuation Plans

The City of Merced has developed an Emergency Operations Plan that addresses mitigation, planning, and response activities to be applied in various emergency situations. Emergency evacuation plans and routes depend largely on the type and extent of the emergency; however, the local and major roadways within the City provide access for both emergency response personnel and the general public. Additionally, both the Merced Fire Department and the Merced Police Department operate 24 hours a day, seven days a week and provide small- and large-scale emergency assistance within the City (City of Merced 2016).

3.8.3.5 Airports and Airstrips

There is one airport within the City of Merced, the Merced Regional Airport, which is located in the southwest corner of the City. The Castle Airport, which is located approximately three miles to the west of SR 59, is not directly within the City's SUDP/SOI or Program Study Area, however portions of this airport's designated safety zones overlap with the City's SUDP/SOI and Program Study Area.

The Merced Regional Airport is a publicly owned facility that provides both commercial air and freight air cargo services for the City of Merced, as well as the surrounding areas. The Castle Airport, which was once the location of the Castle Air Force Base, has since been converted for civilian use. The 2030 General Plan land uses surrounding both these airports generally consist of industrial designations in order to be consistent with the Merced County Airport Land Use Compatibility Plan and FAA requirements regarding potential hazards (Merced County Airport Land Use Commission 2012; City of Merced 2016).

3.8.3.6 Fire Hazards

CAL FIRE maintains fire hazard severity zone maps for local responsibility areas and SRAs. Fire hazard is a way to measure physical fire behavior so that people can predict the damage that a fire is likely to cause. The Project is located in a local responsibility area maintained by the City (Cal FIRE 2008). Wildland and urban fires do occur within the City due to the hot, dry summers that occur within the region. According to the Merced Vision 2030 General Plan Draft EIR, the majority of the fires that occur within the City are caused by human activities that involve motor vehicles, equipment, arson, and burning of debris (City of Merced 2010). As shown on **Figure 3.8-1**, areas in the northern portion of the Program Study Area are included within a moderate fire severity zone, but no high fire severity zones occur in the Program Study Area (CAL FIRE 2024).

3.8.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to hazards and hazardous materials. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.8.4.1 Methodology

This section provides a general discussion related to methods and analytical criteria used to analyze potential hazards and hazardous materials described for the Program. This qualitative analysis focuses on the potential to encounter hazardous materials and the potential for their accidental release during

transportation to and from the Program Study Area. Hazardous materials include petroleum products, NOA and metals, and contaminated soil or groundwater. The Program's short-term impacts of exposure or release of hazardous materials, if any, would be limited to the period of time it takes to complete construction activities.

The locations of known existing hazardous materials sites or areas where there is potential for undiscovered NOA or metals in relation to the Program was taken into consideration when establishing the Program components. Where surface disturbance associated with construction is proposed, there is the potential for encountering contaminated soil or groundwater that could result in a release of hazardous materials and a potential threat to public health and safety.

Potential impacts associated with construction-related to emergency evacuation plans for the various state and local emergency management jurisdictions were researched to determine if the Program would conflict with emergency evacuation procedures and construction controls, and MMs were identified where necessary.

The Program Study Area is located in the City of Merced, in Merced County, with commuter and haul truck vehicles traveling north, south, east, and west through the major highways and agricultural roads.

The analysis of impacts related to wildfire, resulting from implementation of the Program, is based on review of available data and information, results of the desktop evaluations performed using GIS and personal communications with CAL FIRE personnel.

3.8.4.2 Impact Analysis

Impact HAZ-1: Potential to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Impact HAZ-1 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Temporary construction activities associated with implementation of the Program would involve the transport and use of gasoline, diesel fuel, hydraulic fuel, solvents, and oils typically associated with operation of construction equipment and vehicles. The use of diesel-powered generators and internal combustion engines to power equipment such as dewatering pumps may also be required under the Program for deep trenching or other excavations. These chemicals would be used and stored on construction sites within the Program Study Area during Program construction activities and would be transported along public roadways throughout the Program Study Area. Use and storage would continue as needed during construction projects until reasonable build-out of the wastewater collection system is met. The use of these materials for their intended purpose would not pose a significant risk to the public or environment; however, discarding these materials can be considered hazardous waste. Hazardous Waste is any product that contains ingredients that are: corrosive, toxic, ignitable (flammable) or reactive. Gasoline, diesel fuel, hydraulic fuel, solvent waste, and waste oils are typically considered hazardous

because they are ignitable (flammable). To keep these items from contaminating the environment, they need to be disposed of properly. Hazardous waste cannot be disposed of at the Highway 59 landfill, which is described in Section 3.13 Public Services and Utilities and Service Systems. Any hazardous waste that cannot be recycled would be transported by a licensed hazardous waste hauler using a Uniform Hazardous Waste manifest and disposed of at an appropriately permitted facility. Federal, state, and local laws governing the handling, storage, and transport of these and other hazardous materials and spill clean ups are discussed in Section 3.8.2, Regulatory Framework, and compliance with these laws would be required for Program activities.

These regulations are designed to prevent the improper use of materials and to reduce the risk of exposure to the public. Impacts associated the accidental and unintended release of hazardous materials during transport, use, or disposal could potentially result in a significant impact to the public or the environment; however, the City and chosen contractor would be required to comply with all relevant and applicable federal, state, and local laws and regulations governing transport, storage, use, and disposal of hazardous materials during construction and implementation of projects under the Program, such as but not limited to the Merced County Hazardous Waste Mitigation Plan and California Hazardous Waste Control Act. Therefore, compliance with these existing regulations would limit the potential for construction-related impacts from hazardous materials transport, use, or disposal, and potential impacts resulting from construction of the Program would be less-than-significant.

Operation

Impacts associated with operation of the Program would be include things such as the storage, transport, and disposal of potentially hazardous materials associated with operation of pump stations and the WWTF as well as the movement of trucks and vehicles for maintenance. For example, ammonia, chlorine, chlorine dioxide, and ozone are often used to decontaminate wastewater. In addition, oil is often used to lubricate mechanical parts in a pump or power machinery. Hazardous materials use would be limited and quantities onsite are not anticipated to be greater than reporting thresholds. Release of chemicals from these operational activities would be limited to accidental spills. However, operational activities would be subject to current regulatory requirements for hazardous materials management associated with the operation of the new and existing infrastructure, such as but not limited to the Merced County Hazardous Waste Mitigation Plan and California Hazardous Waste Control Act (Section 3.8.2, Regulatory Framework) and operations would not change as a result of implementation of the Program. Due to the danger oil spills cause to public health and the environment, Spill Prevention, Control, and Countermeasure (SPCC) plans are used to help facilities prevent a discharge of oil into navigable waters. The City would develop, maintain, and implement an SPCC Plan to prevent an oil spill, as well as control a spill should one occur. Therefore, operational impacts would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

The CIPs 1-6 would result in similar impacts related to hazardous materials as described above. Temporary construction activities associated with implementation of the CIPs 1-6 would involve the transport and use of HDD drilling fluid and subsequent waste, gasoline, diesel fuel, hydraulic fuel, solvents, and oils typically associated with operation of construction equipment and vehicles. The use of diesel-powered generators and internal combustion engines to power equipment such as dewatering pumps may also be required under the CIPs 1-6 for deep trenching or other excavations. These chemicals would be used and stored on construction sites within the Program Study Area during CIPs 1-6 construction activities and would be transported along public roadways throughout the Program Study Area. Use and storage would continue as needed during construction projects until the CIPs 1-6 are complete. The use of these materials for their intended purpose would not pose a significant risk to the public or environment, however discarding these materials can be considered hazardous waste. Hazardous Waste is any product that contains ingredients that are: corrosive, toxic, ignitable (flammable) or reactive. Gasoline, diesel fuel, hydraulic fuel, solvent waste, and waste oils are typically considered hazardous because they are ignitable (flammable). To keep these items from contaminating the environment, they need to be disposed of properly. Hazardous waste cannot be disposed of at the Highway 59 landfill, which is described in Section 3.13, Public Services and Utilities and Service Systems. Any hazardous waste that cannot be recycled would be transported by a licensed hazardous waste hauler using a Uniform Hazardous Waste manifest and disposed of at an appropriately permitted facility. Federal, state, and local laws governing the handling, storage, and transport of these and other hazardous materials and spill clean ups are discussed in Section 3.8.2, Regulatory Framework, and compliance with these laws would be required for Program activities.

These regulations are designed to prevent the improper use of materials and to reduce the risk of exposure to the public. Impacts associated the accidental and unintended release of hazardous materials during transport, use, or disposal could potentially result in a significant impact to the public or the environment; however, the City and chosen contractor would be required to comply with all relevant and applicable federal, state, and local laws and regulations governing transport, storage, use, and disposal of hazardous materials during construction and implementation of projects under the CIPs 1-6, such as but not limited to the Merced County Hazardous Waste Mitigation Plan and California Hazardous Waste Control Act. In addition, MM HYD-1, Avoid/Minimize Potential Impacts from Construction Material Release and MM HAZ-1, Prepare and Implement a Hazardous Materials Release Prevention Plan, would be implemented. These MMs would require the contractor to prepare a SPCC Plan and Hazardous Materials Release and Prevention Plan that would include BMPs to control the accidental release of hazardous materials into the environment and would ensure that spills are appropriately cleaned up and would not result in a release of hazardous materials into the environment. Therefore, compliance with these existing regulations would limit the potential for construction-related impacts from hazardous materials transport, use, or disposal, and potential impacts resulting from construction of the CIPs 1-6 would be less-than-significant with mitigation implemented.

Operation

The CIPs 1-6 would result in similar impacts related to hazardous materials as described above. Impacts associated with operation of the CIPs 1-6 would include things such as the storage, transport, and disposal of potentially hazardous materials associated with operation of BRPS as well as the movement of trucks and vehicles for maintenance. Oil is often used to lubricate mechanical parts at the BRPS. Hazardous materials use would be limited and quantities onsite are not anticipated to be greater than reporting thresholds. Release of chemicals from these operational activities would be limited to accidental spills. However, operational activities would be subject to current regulatory requirements for hazardous materials management associated with the operation of the new and existing infrastructure, such as but not limited to the Merced County Hazardous Waste Mitigation Plan and California Hazardous Waste Control Act (Section 3.8.2, Regulatory Framework) and operations would not change as a result of implementation of the CIPs 1-6. Due to the danger oil spills cause to public health and the environment, SPCC plans are used to help facilities prevent a discharge of oil into navigable waters. The City would develop, maintain, and implement an SPCC Plan to prevent an oil spill, as well as control a spill should one occur. Therefore, operational impacts would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-1, MM HAZ-1
Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-1 Findings

Impact HAZ-1 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HAZ-1 Mitigation Required: MM HYD-1, MM HAZ-1

Impact HAZ-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-2: Potential to 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.

Impact HAZ-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Subsurface utilities would be located during subsurface investigations prior to construction to avoid accidental upset or explosion of natural gas pipelines. The potential for release of hazardous materials into the environment could result from discovery of hazardous materials in the soils (or contaminated soil) excavated during construction or from spills related to construction equipment and activities. There are no notable properties that have historical soil contamination that could be impacted by the construction of the CIPs 1-6; the five LUST sites identified on GeoTracker are all closed as of 2020 (Water Boards 2024). As described in HAZ-1 Impact above, heavy construction equipment requires small amounts of hazardous materials, which, while generally not posing a significant public hazard, carry the risk of accidental release during construction activities that could have potentially significant environmental impacts if not mitigated.

The risk of an explosion from hitting underground utility lines while installing new wastewater collection pipelines is low because utilities would be located prior to construction to identify potential hazards. Additionally, while disturbing contaminated soils could release harmful substances, the controlled nature of the installation process (such as HDD) and the use of appropriate safety measures (MM HYD-1 and MM HAZ-1) further mitigate the risk of ignition or explosion, making such events unlikely. Therefore, impacts related to accidental spills and release of hazardous materials would be less-than-significant with MM HYD-1 and HAZ-1 incorporated.

Valley Fever and Asbestos

During ground-disturbing activities associated with the Program, there is also a possibility that hazardous materials, such as asbestos (naturally occurring or AC) or Valley Fever fungal spores, could be disturbed and released into the air. No documented occurrences of naturally occurring or AC asbestos have been found within the Program Study Area (CGS 2011). Ground-disturbing activities associated with the Program construction could include excavation, grading, and other earth-moving activities that produce dust throughout the Program Study Area. Additionally, although the regularly disturbed WWTF footprint includes agricultural lands and paved facilities that would be at low risk for asbestos and Valley Fever spores exposure, there would still be a possibility for exposure due to new ground-disturbing activities and dust creating a small potential for a significant impact. Valley Fever fungal spores live in the top two to 12 inches of soil, so the risk of exposure during construction of the Program would be high if these hazards are present within the soils; thus, a potentially significant impact prior to mitigation could occur. As part of the WEAP included in MM HAZ-2, Worker Environmental Awareness Program (Hazard), workers would be required to participate in a WEAP prior to being allowed to work on the project. The WEAP would inform workers of the potential hazards within the Program Study Area. If appropriate or requested, workers would be provided the appropriate respiratory equipment to prevent inhalation of dust particles. Additionally, MM AIR-2, Implement Hazardous Materials Measures would be implemented to further reduce potentially hazardous dust within the Program Study Area by requiring regular watering of disturbed soils and excavated material throughout all construction activities. MM AIR-2 and MM HAZ-2 would collectively reduce dust; therefore, would reduce the potential of worker and general public exposure to hazardous air particles and would provide workers with the proper equipment and training necessary to reduce potential impacts related to Valley Fever and asbestos to a less-than-significant level. Therefore, impacts related to the release of asbestos and Valley Fever fungal spores would be less-than-significant with MM AIR-2 and MM HAZ-2 incorporated.

Operation

Operational release of hazardous materials into the environment would not significantly change from existing conditions. Operations of City wastewater facilities would continue as they currently do but would add the new improvement projects to the operational routine that involves the routine testing and maintenance of pump stations and appurtenances, monitoring of pipelines, and inspections of facilities. Similarly, the WWTF Expansion Projects would not result in substantial releases of potentially hazardous materials with the standard procedures for storage and cleanup that currently exist onsite. Operational spills associated with lubricants or other materials and chemicals (i.e., sodium hydroxide, sodium aluminate, sodium hypochlorite, and polyaluminum chloride, amongst others) used during operation of the WWTF, including at pump stations and control facilities that would be contained within the WWTF footprint, would follow standard procedures for storage and cleanup of spilled materials (as required and

enforced by the federal and state regulations regarding hazardous materials, transport, storage, and handling as described in Section 3.8.2, Regulatory Framework and the operational NPDES permit [Chapter 2.0, Project Description] stipulations of the WWTF). No increases in operational release of hazardous materials would occur as a result of operation of the Program. Therefore, operational impacts associated with implementation of the Program would be less-than-significant.

Because the quantity of hazardous materials on any one construction site within the Program Study Area is limited, appropriate prevention and management practices would be in place as required by local and regional regulatory agencies, and because MM HYD-1, MM AIR-2, MM HAZ-1 and MM HAZ-2 would be implemented during construction, the potential for impacts from construction and operational related accidental spills or releases of hazardous materials would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-1, MM AIR-2, MM HAZ-1 and MM HAZ-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

The CIPs 1-6 would also result in similar impacts related to release of hazardous materials as described under the Program discussion above. Therefore, MM HYD- 1, MM HAZ-1, MM HAZ-2, and MM AIR-2 would also be required for the new trunk sewer infrastructure installation. In particular, the new trunk sewer infrastructure would likely require work in overland portions of the Program Study Area, which could produce more dust, and potential hazards than work within previously disturbed areas and within the existing roadways. Therefore, MM HAZ-2 would be required to inform and properly equip construction workers for work with potentially hazardous pollutants. MM AIR-2 would ensure that dust generated during construction is kept at a minimum by including regular watering of disturbed soils and trucks transporting soil material. Additionally, MM HYD-1 and MM HAZ-1 would require the contractor to prepare a SPCC Plan and Hazardous Materials Prevention Plan that would include BMPs to control the accidental release of hazardous materials into the environment, ensuring that spills are appropriately cleaned up and would not result in a release of hazardous materials into the environment. These MMs would be implemented throughout construction areas and activities associated with the new trunk sewer and would reduce potential impacts related to accidental release or exposure to hazardous materials or pollutants to a less-than-significant level. Therefore, impacts related to the release of hazardous materials into the environment from the CIPs 1-6 would be less-than-significant with mitigation incorporated.

Operation

Similar to the Program discussion above, operation of the CIPs 1-6 would not result in a substantial change from existing operations of wastewater collection infrastructure that currently exists in the City. Therefore, operational impacts related to release of hazardous materials into the environment from the CIPs 1-6 would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-1, MM HAZ-1, MM HAZ-2, and MM AIR-2
Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-2 Findings

Impact HAZ-2 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HAZ-2 Mitigation Required: MM HYD-1, MM AIR-2, MM HAZ-1, and MM HAZ-2

Impact HAZ-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-3: Potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.

Impact HAZ-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction of Program facilities have the potential to result in emissions of toxic air contaminants/HAPs in the form of diesel PM emissions from diesel-powered generators and internal combustion engines. Additionally, other potentially hazardous materials present within soils, such as Valley Fever spores or asbestos, could be disturbed during construction activities and could become airborne and adversely affect nearby schools. As shown on **Figure 3.8-1,** there are a number of schools within the Program Study Area and within a 0.25 mile buffer around the Program Study Area. As a result, potentially hazardous materials and emissions could be emitted near existing schools in the region (**Table 3.8- 1**), resulting in a potentially significant impact prior to mitigation. As discussed under Impact HAZ-2, MM AIR-2, Implement Hazardous Materials Measures, would be required during construction to reduce potentially hazardous construction-related dust and the potential for hazardous airborne particles to be released. Additionally, MM HAZ-3, Minimize Construction Emissions, would also include specific instructions for handling construction equipment, such as limiting idling times, which would limit the amount of toxic air contaminants released into the air near schools. Other emission-reducing requirements would include the use of Tier-4-compliant machinery, low-emission diesel products, alternative fuels, and other options as they become available. Further, Program construction is even more temporary than a standard construction project that takes place in a single location because the Program is linear (pipeline infrastructure).

Hazardous materials used during construction would be typical of common construction activities and are discussed in Impacts HAZ-1 and HAZ-2. They would be handled by the contractor in accordance with applicable federal, state, and local regulations for hazardous substances. Thus, it would not be enough to cause a significant hazard to the public or any nearby schools if released.

PRC Section 21151.4 requires that projects within 0.25 miles of a school that could emit hazardous air emissions, handle extremely hazardous substances at or above state threshold quantities, or pose health risks to school attendees or employees must consult with or notify the school in writing, but the Program is not planned to emit emissions at or above state threshold quantities (Section 3.03 Air Quality). Therefore, the construction of the Program would have a less-than-significant impact to schools with MM AIR-2 and MM AIR-3 incorporated.

Operation

Operation of the WWTF would continue to use hazardous materials onsite as a part of the treatment process; however, the potential for release of these chemicals into the air or ground would be limited since the site is designed for proper storage and use of the chemicals as well as the fact that the hazardous materials onsite such as solvents and oils are used in limited quantities. The WWTF is also not within 0.25 mile of a school. Accidental release or upset would not create a potential hazard to any schools. Other components of the Program would not use hazardous materials in its operation. Thus, operational impacts associated with the Program would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AIR-2 and MM AIR-3
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction and Operation

As shown on **Figure 3.8-1**, the CIPs 1-6 would be placed largely on the outer portions of the Program Study Area and largely within existing or planned roadways. **Figure 3.8-1** shows that schools do occur within 0.25 miles of proposed construction activities associated with the CIPs 1-6 and there is potential for the implementation of the CIPs 1-6 to generate hazardous emissions within 0.25 mile of a school during construction. Without mitigation, sensitive populations (schoolchildren) could be exposed to air pollutants of concern (such as CO, NO_2, PM_{10}, P $M_{2.5}$, and PB) caused from diesel-powered generators and internal combustion engines during construction. MM AIR-3 would be incorporated to reduce emissions during construction and potential impacts to nearby schools. No operational activities would generate hazardous emissions within 0.25 miles of a school. With the incorporation of MM AIR-3, the impacts would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM AIR-3
Level of Significance After Mitigation: Less-Than-Significant

Impact HAZ-3 Findings

Impact HAZ-3 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HAZ-3 Mitigation Required: MM AIR-2 and MM AIR-3

Impact HAZ-3 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-4: Potential to be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and, as a result, would create a significant hazard to the public or the environment.

Impact HAZ-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The Program Study Area contains a number of currently active listed sites on the Government Code Section 65962 databases as potentially hazardous (DTSC 2024; SWRCB 2024). As shown on **Figure 3.8-1**, the highest concentration of these sites are located around the central area of the City and along the SR (SR) 99 and SR 59 corridors. Typically, gas stations, autobody shops, and other mechanical and industrial operations contain the highest proportion of hazardous sites, with what are known as leaking underground storage tanks being the most common type of hazardous cleanup site.

Working directly within an active Government Code Section 65962-listed site would be avoided where possible; however, due to the high proportion of active Government Code Section 65962-listed sites within the City and the potential of these sites occurring near Program facilities, a potentially significant impact related to potential release of hazards to the public or the environment could occur prior to mitigation. Therefore, MM HAZ-3, Government Code Section 65962 List Site Coordination, would be required for any construction work that would occur within or in close proximity of an active Government Code Section 65962-listed site. MM HAZ-3 would require review of an updated Government Code Section 65962 list query by a Registered Professional Geologist who would determine if Program activities would impact listed sites and the appropriate actions to take, such as remediation of the site, if Program activities could not avoid a listed site and if construction activities would further exacerbate the potential risk of release of contamination (e.g., through movement of contaminated soils or waters during trenching). Therefore, the potential for construction of Program facilities to result in a significant hazard to the public or the environment to be located on a site defined by Government Code Section 65962.5 would be considered less-than-significant with mitigation incorporated.

Operation

The WWTF site does not have any Cortese sites nearby the facility; the nearest site (Helena Merced Facility T10000010443) is two miles northeast and has a status of Complete – Case Closed. Once operational, the Program components would largely be located underground, in fixed locations, and would not result in any ongoing impacts related to location within a Government Code Section 65962-listed site. Therefore, there would be no operational impacts.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HAZ-3
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Similar to the impacts described for the Program above, the CIPs 1-6 could require work within close proximity to Government Code Section 65962-listed sites, which could result in a significant hazard to the public or the environment if not treated appropriately. However, as shown on Figure 3.8-1, there are no currently active Government Code Section 65962-listed sites that could be affected by the CIPs 1-6 Additionally, as specified in MM HAZ-3, a Registered Professional Geologist would be required to perform an updated query of listed sites prior to the start of construction and determine whether they would impact the environmental condition of proposed construction areas. Therefore, currently listed Government Code Section 65962 sites would not result in a significant hazard to the public or the environment from the

implementation of the new trunk sewer infrastructure. Therefore, with implementation of MM HAZ-3, construction impacts related to location of new trunk sewer infrastructure activities on a Government Code Section 65962 listed site would be less-than-significant.

Operation

Similar to the Program discussion above, once operational the new trunk sewer infrastructure would largely be located underground, in fixed locations, and would not result in any ongoing impacts related to location within a Government Code Section 65962-listed site. Therefore, there would be no operational impacts associated with the new trunk sewer infrastructure.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HAZ-3
Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-4 Findings

Impact HAZ-4 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HAZ-4 Mitigation Required: MM HAZ-3

Impact HAZ-4 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-5: Potential to be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public or private airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the Project area.

Impact HAZ-5 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Implementation of the Program would involve construction and placement of pump stations, pipelines, and expansion of the WWTF within two miles of the Merced Regional Airport and within the safety compatibility zones of both the Castle Airport (Zones C and D) and the Merced Regional Airport (Zones A, B1, B2, C, and D). Merced County's Airport Land Use Compatibility Plan calls for approach protection through land use restrictions in Zone A areas, a maximum occupancy level for commercial/ industrial uses, and density restrictions on residential uses in Zone C and the retention of existing agricultural uses and the discouragement of residential land uses in Zones B1 and B2.

Safety impacts resulting from construction of Program facilities could include the use of construction equipment with a height above 200 feet (i.e., a crane) within airport flight paths, as well as construction worker exposure to increased airport noise for work immediately adjacent to the airport. Additionally, any construction-related nighttime lighting could cause a potential safety risk to pilots if in the direct line-of-sight during take-off or landing of aircraft.

Generally, construction activities near the airport would be temporary, and construction workers would not be exposed to prolonged or excessive noise or hazards from the airport due to the sporadic nature of flights and operational activities of the airport. As shown on **Figure 3.8-1**, the safe zones for the two airports are limited to the western edge of the Program Study Area. Additionally, any nighttime lighting required for the construction of the Program would be limited and would likely not occur directly within the line-of-sight of pilots taking off or landing. Pipeline construction activities would occur within the safety compatibility zones A, B1, B2, C, and D and the WWTF Expansion Projects would occur within Safety Compatibility Zone D for the Merced Regional Airport. Therefore, to reduce potential safety conflicts between construction equipment and airport operations. MM HAZ-4, Coordination with Airports, would be implemented for when construction activities would be within the A or B Safety Compatibility Zone and the FAA notification criteria is met. If necessary, implementation of MM HAZ-4 would reduce potential safety conflicts with the airports to a less-than-significant impact.

Operation

Operation of constructed Program components would not result in safety hazards or have the potential to generate excessive noise exposure (which as described further in Section 3.11, Noise, as less-than-significant). The Program does not propose any residential or commercial uses that would expose people to safety hazards associated with the proximity to airports. Additionally, all above-ground facilities, such as pump stations and structures at the WWTF, would consist of small structures that would be similar in size and scale to a typical residential house and would not be greater than 200 feet tall. Maintenance activities associated with the Program would require occasional work within two miles of the Merced Regional Airport, but this work would occur as needed and would not result in a significant change from existing maintenance activities associated with the wastewater collection system in the City. Therefore, operational activities associated with the Program do not trigger mitigation and the impacts would be less-than-significant.

Therefore, overall impacts associated with the implementation of the Program during both construction and operations would be less-than-significant with MM HAZ-4 incorporated when there are applicable construction-related activities.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HAZ-4
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

As shown on **Figure 3.8-1**, installation of the new trunk sewer infrastructure, including the CIPs 1-6, would require construction activities within the safety compatibility zones of the Merced Regional Airport. As described for implementation of the Program, construction activities within the A, B1, and B2 Safety Compatibility Zones of the Merced Regional Airport could potentially cause workers to be exposed to temporary excessive noise levels. The Program could also result in safety hazards involving airport operations if construction equipment would exceed 200 feet in height (FAA notification criteria), thus resulting in a potentially significant impact prior to mitigation. Therefore, implementation of MM HAZ-4 would be required to coordinate with the Merced Regional Any construction activities outside of the safety

compatibility zones of these airports (i.e., in the eastern portions of the Program Study Area) would not require any consultation with the airports and would result in a less-than-significant impact related to safety hazards. Therefore, with implementation of MM HAZ-4, construction impacts would be less-than-significant.

Operation

Once the new trunk sewer infrastructure is operational, it would largely be located underground and would have no effect on the airports in the region. Therefore, operational impacts reacted to the new trunk sewer infrastructure would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HAZ-4
Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-5 Findings

Impact HAZ-5 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HAZ-5 Mitigation Required: MM HAZ-4 and MM HAZ-2

Impact HAZ-5 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-6: Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Impact HAZ-6 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction of the Program would involve work within and adjacent to the City's ROW but not within any dedicated emergency access roads. Construction within the ROW could potentially slow and hinder emergency response vehicles traveling along roadways or access to roadways and driveways for emergency vehicles, and thus, could potentially impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan prior to mitigation. Therefore, MM TRA- 1, Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan, would be required to allow for adequate emergency ingress and egress throughout construction activities that would use public ROWs. The Traffic Control Plan would include coordination and proper notification of emergency response agencies (i.e., the Merced Fire Department and the Merced Police Department) of any detours or road closures that may be required during construction. Therefore, with implementation of MM TRA-1, potential construction impacts to emergency access would be reduced to less-than-significant.

Operation

Operation of the Program components would not impair or physically interfere with an adopted emergency response plan or emergency evacuation plan because once constructed, the majority of the Program components would be located below ground with access that would not impede emergency

vehicle movement. The new Program components, including above-ground facilities such as pump stations, would be consistent with existing wastewater collection system infrastructure in the City, and operation of these facilities would not interfere with traffic flow beyond periodic maintenance requirements. These maintenance activities would be sporadic and would require minimal trips on the local roadways within the Program Study Area. Therefore, operational impacts related to an adopted emergency plan would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Similar to the Program discussion above, the CIPs 1-6 would require construction within the ROW that could potentially slow and hinder emergency response vehicles traveling along roadways or access to roadways and driveways for emergency vehicles. New trunk sewer infrastructure would largely occur around the outer edges of the Program Study Area, where traffic is slightly reduced and overall residential densities are lower, which would mean that impacts to emergency response and evacuations would likely be slightly less for construction of these new trunk sewer improvements. Specifically, West Avenue, West Yosemite Avenue, Cardella Road, and G Street, would be used for the majority of the proposed CIP projects and require temporary restricted access along these ROWs for pipeline placement. However, none of these streets are emergency evacuation routes or access roads. A such, in order to allow for adequate flow for emergency personnel, MM TRA-1 would be required to allow for adequate emergency ingress and egress throughout construction activities along public ROWs. Therefore, construction impacts associated with new trunk sewer infrastructure would be less-than-significant with mitigation incorporated.

Operation

Similar to the Program discussion, once operational, the new trunk sewer infrastructure would largely be located underground and would have an inconsequential effect to emergency response or evacuation during access to manholes or other below-ground infrastructure. Therefore, there would be no operational impacts associated with the CIPs 1-6.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1
Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-6 Findings

Impact HAZ-6 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HAZ-6 Mitigation Required: MM TRA-1

Impact HAZ-6 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-7: Potential to expose people or structures either directly or indirectly, to a significant loss, injury or death involving wildland fires.

Impact HAZ-7 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The urban and rural areas within the Program Study Area would be subject to limited risk of wildfires resulting from Program construction activities due to the built-up nature of these areas (i.e., limited fuels that could cause a wildfire). Construction of the Program would involve the use of construction equipment that could cause the unintentional release of sparks or heat from construction equipment into nearby flammable material, such as brush or grasses. However, all Program facilities, would be constructed in compliance with all applicable local, state, and federal requirements, including the CFC, which limits the potential for construction equipment to spark a wildland or urban fire by requiring the implementation of fire protection systems, means of adequate ingress and egress of construction equipment and personnel, and implementation of fire-resistive construction equipment. Additionally, the majority of construction activities would occur within existing paved ROWs and within existing disturbed areas and built-up areas (with gravel, concrete, pavement, and asphalt) where groundcover vegetation is minimal and less prone to flammability. This would limit the potential for construction of Program components to expose people or structures to risks from wildfires. Compliance with existing fire safety regulations during Program construction would result in than significant impact related to wildland fires.

Operation

The infrastructure-related nature of the Program limits operational use to employees at the WWTF and performing operations and maintenance activities on pump stations, pipelines, and appurtenances. The majority of facilities themselves would be located underground and would not be subject to risk of damage due to wildfires. The above-ground facilities would on occasion have people located within them but would not regularly provide habitation or work accommodation shelter. Above-ground features, such as pump stations or new structures at the WWTF, would be constructed in compliance with CFC specifications related to structural fire safety, including installation of fire sprinklers, where necessary, and use of flame-resistant building materials. As noted for the construction impacts, wildfire sensitivity is and would continue to be low within Program facilities due to the vegetation free paved or gravel operational sites. While the overall fire risk in Merced is moderate, the Program components would limit risk of exposing people or structures to wildfires by use of inflammable materials such as pavement and gravel during site design and CFC compliance. Therefore, operational impacts related to exposure of structures to significant loss from wildfires would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction of the CIPs 1-6 would involve similar impacts related to wildfires as described in the Program discussion above. However, because the new trunk sewer infrastructure would largely occur

within the outer portions of the Program Study Area, the potential for construction activities to occur within areas with brush or other flammable groundcover would be more likely because there is less built-up environment (i.e., areas consisting of pavement, concrete, and other non-flammable materials) and more open grass lands and areas with more vegetation (i.e., agricultural fields). As discussed in the Program discussion above, the contractors chosen for the Program would be required to comply with the CFC, and construction equipment would be operated, stored, and maintained in accordance with these regulations to prevent fires. Specifically, the CFC requires implementation of fire protection systems, means of adequate ingress and egress of construction equipment and personnel, and implementation of fire-resistive construction equipment, which would limit the possibility of construction-related fires to occur throughout construction activities. Therefore, construction of the new trunk sewer infrastructure would result in a less-than-significant impact related to loss from wildfires.

Operation

As discussed in the Program discussion above, any new structures would be constructed in accordance with the CFC requirements and would install fire sprinklers and use flame-resistant building materials when needed to reduce the flammability potential of the new structure with limited potential to expose people or structures to risk of wildfire. Therefore, operational impacts associated with the new trunk sewer infrastructure would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact HAZ-7 Findings

Impact HAZ-7 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact HAZ-7 Mitigation Required: None Required

Impact HAZ-7 Overall Level of Significance After Mitigation: Less-than-Significant

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Impact HAZ-8: If located in or near a state responsibility area or lands classified as very high fire hazard severity zones:
Impair an adopted emergency response plan or emergency evacuation plan;
Exacerbate wildfire risks due to slope, prevailing winds, and other factors, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
Expose people or structures to significant risks, including downslope downstream flooding or landslides, as a result of, runoff, post-fire slope stability, or drainage change.

Impact HAZ-8 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The City limits are not located within an SRA or in a region that is considered to have a very high fire severity zone. Some smaller portions of the Program Study Area are located in moderate fire severity zones, as designated by CAL FIRE (**Figure 3.8-1**) within largely undeveloped areas near the outskirts of the City (CAL FIRE 2008). Construction activities associated with the Program may take place in these moderate severity areas and could involve work that could cause sparks from operation of machinery. However, as discussed under Impact HAZ-7, all construction activities would be required to comply with the CFC specifications; standard construction safety precautions; and local, state, and federal regulations governing fire suppression. These regulations would be implemented throughout construction activities associated with the Program and would reduce the potential for construction equipment to cause fires from sparks. Specifically, the CFC requires implementation of fire protection systems, means of adequate egress of construction equipment and personnel, and implementation of fire-resistant construction equipment, which would limit the possibility of construction-related fires to occur through construction activities. Therefore, impacts related to fire hazards as they relate to construction would be less-than-significant.

Operation

The City limits are not located within an SRA or in a region that is considered to have a very high fire severity zone. Once the Program is constructed, the majority of the Program components would be located underground and would not be affected by any potential fires in the area, nor would they contribute to increased risk for fire. Therefore, operational impacts related to fire hazards would be considered less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction of the new trunk sewer infrastructure would involve similar impacts related to fire hazards as described in the Program discussion above. The City limits are not located within an SRA or in a region that is considered to have a very high fire severity zone. As discussed under Impact HAZ-7, all construction activities would be required to comply with the CFC specifications; standard construction safety precautions; and local, state, and federal regulations governing fire suppression. These regulations would be implemented throughout construction activities associated with the CIPs 1-6 and would reduce the potential for construction equipment to cause fires from sparks. Specifically, the CFC requires implementation of fire protection systems, means of adequate egress of construction equipment and personnel, and implementation of fire-resistant construction equipment, which would limit the possibility of construction-related fires to occur through construction activities Therefore, impacts related to fire hazards as they relate to construction would be less-than-significant.

Operation

The City limits are not located within an SRA or in a region that is considered to have a very high fire severity zone. Once the CIPs 1-6 are constructed, the majority of the CIPs 1-6 would be located underground and would not be affected by any potential fires in the area, nor would they contribute to increased risk for fire. Therefore, operational impacts related to fire hazards would be considered less-than-significant.

Impact HAZ-8 Findings

Impact HAZ-8 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact HAZ-8 Mitigation Required: None Required

Impact HAZ-8 Overall Level of Significance After Mitigation: Less-than-Significant

3.8.5 Hazards and Hazardous Materials Mitigation

Mitigation Measure TRA-1: Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan

See MM TRA-1, Section 3.15, Transportation.

Mitigation Measure AIR-2: Implement Hazardous Materials Measures

See MM AIR-2, Section 3.3, Air Quality.

Mitigation Measure AIR-3: Minimize Construction Emissions

See MM AIR-3, Section 3.3, Air Quality.

Mitigation Measure HYD-1: Avoid/Minimize Potential Impacts from Construction Material Release

See MM HYD-1, Section 3.9, Hydrology and Water Quality.

Mitigation Measure HAZ-1: Prepare and Implement a Spill Prevention, Control, and Countermeasure Plan and Hazardous Materials Release and Prevention Plan

The City shall create and implement a SPCC Plan and a Hazardous Materials Release and Prevention Plan (HMRP Plan) to reduce the risk of sensitive receptors from being exposed to hazardous materials during construction. The HMRP Plan shall identify control measures to prevent the release of hazardous materials, as well as a detailed action plan outlining how to respond to an incidental spill in compliance with all local, state, and federal regulations relating to the handling of hazardous materials. The HMRP Plan shall be incorporated into the SWPPP and consistent with the BMPs identified under the Hydrology and Water Quality Section and required under MM HYD-1 to reduce the impact of spilled hazardous materials. The HMRP Plan must meet containment details as identified in MM HYD-1 and identify spill containment materials necessary to adequately respond to a hazardous materials spill as set forth in MM HYD-1.

Mitigation Measure HAZ-1 Implementation

Responsible Party: The City is responsible for verifying and documenting that the HMRP Plan meets all applicable requirements. The selected construction contractor is responsible for following the HMRP Plan and implementing the actions in the event of a spill.

Timing: HMRP Plan preparation is required prior to construction. The HMRP Plan shall be implemented throughout construction.

Monitoring and Reporting Program: The HMRP Plan shall be developed by the construction contractor and is required to be kept onsite during construction. Additionally, the contractor must provide the City a copy and copies must be available for quick reference and review at the project site and at the City offices. The contractor must ensure that all construction workers involved in the operation and movement of construction equipment are familiar with the HMRP Plan and that the HMRP Plan is appropriately followed throughout construction.

Standards for Success: Hazardous materials release prevention and adherence to HMRP Plan conditions and release prevention practices.

Mitigation Measure HAZ-2: WEAP (Hazards)

The purpose of a WEAP is to educate personnel (i.e., construction workers) about the existing onsite and surrounding resources, the measures required to protect these resources, and strategies for avoidance of potential hazards within these sites. The WEAP, developed by the City, shall include materials and information on potentially sensitive biological and cultural resources, air quality protection measures, and potential hazards resulting from construction within the Project area, and applicable precautions that personnel should take to reduce potential impacts.

The WEAP presentation shall be given to all personnel who may be exposed to site hazards or may harm sensitive environmental resources as identified within the WEAP MMs (e.g., exposure to dust-generating or ground-disturbing activities, work within non-biologically cleared areas, or equipment operators who may encounter sensitive species). The WEAP presentation shall be given prior to the start of construction and as necessary throughout the life of the Project as new personnel arrive onsite. The City and the contractor are responsible for ensuring all onsite personnel attend the WEAP presentation, receive a summary handout, and sign a training attendance acknowledgement form to indicate that the contents of the program are understood and to provide proof of attendance. Each participant of the WEAP presentation shall be responsible for maintaining their copy of the WEAP reference materials and for making sure that other onsite personnel are complying with the recommended precautions. The contractor shall keep the sign-in sheet onsite and shall submit copies of the sign-in sheet to the City's Project Manager, who will keep it on file at City offices.

For the hazards and hazardous materials portion of the WEAP presentation, the following information and implementation steps shall be prepared, presented, and executed prior to and during construction to prevent exposure and raise awareness of potential site hazards:

- Inform personnel about potential hazards within the Project area, including but not limited to, both naturally occurring and man-made asbestos, including AC, present within soils as well as Valley Fever spores (*Coccidioides immitis*) and the likelihood of presence within site-specific soils. Information given should include the following:

  - Providing context as to where these hazards could occur during construction and how to handle them if they are encountered (such as in the case of encountering AC pipelines or other structures with AC);
  - Outlining ways to prevent exposure (outlined below);
  - Informing personnel that the appropriate respiratory equipment can be provided upon request to further prevent exposure to dust particles;
  - Informing personnel about the symptoms of exposure to potential hazards, including asbestos and Valley Fever. Symptoms of Valley Fever exposure could include but are not limited to fever, cough, chills, and night sweats, which appear one to three weeks after exposure. Symptoms of asbestos exposure (i.e., Asbestosis) occur over a much longer period of time (10 to 40 years after exposure) and could include but are not limited to shortness of breath, tightness in chest, chest pain, and appetite loss;
  - Informing personnel about appropriate actions to take if symptoms of exposure occur, including regular doctor checkups (i.e., for personnel working regularly within the construction or industrial settings where exposure to asbestos is high), and seeking emergency medical care if symptoms for Valley Fever persist or get worse;
- Inform personnel about potentially hazardous sites within the Project areas and how to identify hazardous materials sites. Signs of potential contamination within soils could include stained soils, discolored or oily water, previously unknown underground storage tanks, etc. Work should be stopped if any of these signs are identified within the Project area, and MM HAZ-3 should be implemented before work shall resume.

Mitigation Measure HAZ-2 Implementation

Responsible Party: The City and chosen contractor

Timing: Prior to construction and throughout construction activities as new personnel arrive on the Project site

Monitoring and Reporting Program: Development of a WEAP presentation and handout packet in accordance with this MMs and any other resource-specific WEAP requirements. A sign-in sheet completed for all workers on the construction site shall be kept on file at the Project site, and copies shall be submitted to the City's Project Manager to be kept on file at City offices.

Standards for Success: Limit exposure of personnel to potential hazards during construction through prescribed safety precautions. If exposure cannot be avoided, education of personnel for immediate recognition of health symptoms to act quickly and seek appropriate medical or emergency care to limit long-term harm.

Mitigation Measure HAZ-3: Updated Active Government Code Section 65962 Site Identification and Hazardous Site Remediation

The City shall conduct a review of the Government Code Section 65962 databases within 30 days of the start of construction to identify sites within 0.5 mile of Project activities to identify Government Code

Section 65962 sites designated as 'Active'. A qualitied professional (i.e., a Registered Professional Geologist) shall conduct a review of these active sites to determine if the specific contaminants of the active site would interfere with Project construction activities or if construction workers could be exposed to contaminants of the active site. If, based on the educated opinion of the qualified professional, hazardous sites would not be encountered by construction activities, then no further action is required. If it is determined by the qualified professional that an active site has potential to be present in the location of proposed construction activities, then the City shall implement the following steps:

The qualitied professional (i.e., a Registered Professional Geologist) shall examine the active site and work with the City to determine the site's potential for interactions with Project activities.

If the site has the potential to interfere with construction activities, the City shall contact, as applicable, the USEPA or regulating authority, Merced County Environmental Health Department, the site owner, and/or the responsible party to identify the cleanup measures being undertaken and the timeline for cleanup. The qualified professional shall then make recommendations on the appropriate course of action, such as personal protection equipment for construction workers, further project-specific site investigations, project site remediation, or other methods that would limit the potential for human or environmental exposure to active hazardous materials contamination sites;

These recommendations shall then be submitted to the applicable agency(s). This course of action shall be evaluated and approved by the appropriate regulatory agency (e.g., Merced County Environmental Health Department);

The appropriate course of action (i.e., further investigation, remediation, or other methods) shall take place prior to the start of any construction activities within the area;

Once the hazardous site is determined by the qualified professional and the Health Department to no longer pose a threat to human health or the environment, then construction work can begin or continue;

The City shall be responsible for appropriate notification of regulatory agencies such as the CVRWQCB and the DTSC if new sites are discovered or if previously known sites result in a status change (i.e., site is cleaned up).

Mitigation Measure HAZ-3 Implementation

Responsible Party: The City.

Timing: The updated Government Code Section 65962 list query shall be performed no more than 30 days prior to the start of construction and updated query searches shall be performed throughout construction if construction were to be delayed for a duration greater than one year or new sites are reasonably foreseeable to intact with the Project site.

Monitoring and Reporting Program: The Registered Professional Geologist shall submit a technical memorandum to the City to be kept on file that includes the updated query list of Active Government Code Section 65962-listed sites and the potential for interaction with Project construction. If previously unknown hazardous materials sites are encountered during construction, then a Registered Professional Geologist shall be retained to analyze the site and report necessary further action steps. The City shall submit appropriate documentation of any

hazardous sites encountered to the CVRWQCB and the DTSC for updating of the Government Code Section 65962-listed sites database.

Standards for Success: Project construction activities shall not interact with hazardous sites such that release of hazardous materials that could impact human health or the environment could occur.

Mitigation Measure HAZ-4: Coordination with Airports

The City shall coordinate with the FAA at least 45 days prior to the start of construction activities for any construction activities that would occur within an airport compatibility zone that have the potential to result in construction equipment (i.e. a crane) that would potentially exceed 200 feet. The City shall submit Form 7460-1, "Notice of Proposed Construction or Alteration" to the FAA to obtain a no hazard determination from the FAA. If the FAA responds with a hazard determination, the City will work with the FAA to remedy the potential hazard before the start of construction. If the FAA response is a no hazard determination, then no further action is required. If the FAA does make a hazard determination, additional precautions and measures as required by FAA will be obtained to comply with FAA requirements. Additional ongoing coordination may be required to ensure that proposed construction activities within a compatibility zone of the airports (specifically Merced Regional Airport) do not disrupt airport operations and appropriate notice is provided to aviators within the airport.

Mitigation Measure HAZ-4 Implementation

Responsible Party: The City.

Timing: 45 days prior to the start of construction.

Monitoring and Reporting Program: The City shall prepare and submit Form 7460-1 to the FAA and follow-up with the FAA in order the receive either a no hazard or hazard determination.

Standards for Success: Result in no hazards during construction or operations of the Project to either Merced Regional Airport or Castle Airport.

3.9 HYDROLOGY AND WATER QUALITY

3.9.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues for Hydrology and Water Quality would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Violate any water quality standards or WDRs or otherwise substantially degrade surface or groundwater quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    - Result in a substantial erosion or siltation on- or offsite;
    - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
    - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
    - Impeded or redirect flood flows.
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts. Potential impacts to hydrology and water quality that may result from implementation of the Program are described, and mitigation for significant impacts, where feasible, is identified.

3.9.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives related to hydrology and water quality that are relevant to the Program.

3.9.2.1 Federal

Federal Clean Water Act

The Federal CWA (33 USC Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the WOTUS. The CWA requires states to set standards to protect, maintain, and restore water

quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the NPDES permit process (CWA Section 402). Section 401 of the CWA regulates surface water quality and a Water Quality Certification is required for federal actions (including construction activities) that may result in impacts to surface water. In California, NPDES permitting authority is delegated to and administered by the nine RWQCBs. The City of Merced (City) and Program Study Area are located within Region 5 regulated by the CVRWQCB.

NPDES Construction Permit

The CWA prohibits certain discharges of stormwater containing pollutants except in compliance with an NPDES permit. The federal statutes and regulations require discharges to surface waters comprised of stormwater associated with construction activity, including demolition, clearing, grading, and excavation, and other land disturbance activities (except operations that result in disturbance of less than one acre of total land area and discharges to municipalities with combined stormwater and sewer systems) to obtain coverage under an NPDES permit. The NPDES permit must require implementation of Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology to reduce or eliminate pollutants in stormwater runoff.

National Flood Insurance Act

The Federal Emergency Management Agency (FEMA) is responsible for managing the National Flood Insurance Program (NFIP), which makes federally backed flood insurance available for communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage.

The NFIP, established in 1968 under the National Flood Insurance Act, requires that participating communities adopt certain minimum floodplain management standards, including restrictions on new development in designated floodways and a requirement that new structures in the 100-year flood zone be elevated to or above the 100-year flood level, known as base flood elevation. To facilitate identifying areas with flood potential, FEMA has developed Flood Insurance Rate Maps (FIRMs) that can be used for planning purposes, including floodplain management, flood insurance, and enforcement of mandatory flood insurance purchase requirements.

3.9.2.2 State

Porter-Cologne Water Quality Control Act

The State of California established the SWRCB, which oversees the nine RWQCBs, through the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). Through the enforcement of the Porter-Cologne Act, the SWRCB determines the beneficial uses of the waters (surface and groundwater) of the state, establishes narrative and/or numerical water quality standards, and initiates policies relating to water quality. The SWRCB and, more specifically, the RWQCB, are authorized to prescribe WDRs for the discharge of waste, which may impact WOTS. Furthermore, the development of water quality control plans, or Basin Plans, are required by the Porter-Cologne Act to protect water quality. The City and the Program Study Area are both within the jurisdiction of the 2018 Water Quality Control Plan for the Sacramento and San Joaquin River Basins (2018 Basin Plan). Table 2-1 of the 2018 lists six surface water bodies specific to the Merced River with varying types of beneficial uses. While the Program Study Area is within the Merced River watershed, there are no water bodies that would be associated with

Program components. As a tributary to the San Joaquin River, the Merced River and its tributaries are the SWRCB issues both general construction permits and individual permits under the auspices of the federal NPDES program.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA), passed in 2014 and amended in 2015, creates a framework for sustainable, local groundwater management. The act defines sustainable groundwater management as the "management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results," such as land subsidence and water quality degradation. The Merced Groundwater Subbasin is one of 21 basins in the State of California identified by the California Department of Water Resources as critically overdrafted and one of 46 basins considered high priority (Merced SGMA 2024).

3.9.2.3 Local

Merced Vision 2030 General Plan

The City's Merced Vision 2030 General Plan (2030 General Plan) was adopted January 3, 2012 (City of Merced 2012). The public services (P) Element was amended May 2017, the Open Space element was amended June 2016, and the Safety (S) Element was amended March 2015 and June 2016. These chapters contain several policies that directly or indirectly pertain to hydrology and water quality, including the following:

Goal Area P-3: Water

- **Policy P-3.1.** Ensure that adequate water supply can be provided within the City's service area, concurrent with service expansion and population growth.

Goal Area OS-1: Open Space for the Preservation of Natural Resources

- **Policy OS-1.5.** Preserve and enhance water quality.

Goal Area OS-5: Conservation of Resources

- **Policy OS-5.1.** Promote water conservation throughout the planning area.

Goal Area S-3: Flooding

- **Policy S-3.3.** Maintain essential City services in the event of flooding or dam failure.
- **Policy S-3.4.** Locate and design essential facilities to minimize flood risk.

Merced Municipal Code

Chapter 17.48 (Flood Damage Prevention) of the City's Municipal Code includes several regulations that promote public health, safety, and general welfare of the community. Methods for reducing flood loss within this chapter include the following:

- Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective biers, which help accommodate or channel floodwaters;
- Controlling fill, grading, dredging, and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers, which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

A development permit is required for any construction that would occur within a special flood hazard zone, as identified by the Federal Insurance Administration of FEMA.

Merced Integrated Regional Water Management Plan

The Merced Integrated Regional Water Management Plan (IRWMP) program is a collaborative effort between the City and County of Merced, the MID, the City of Atwater, and the City of Livingston to identify water management issues, needs, objectives, and actions to meet long-term water needs within Merced County (east of the San Joaquin River). The first Merced IRWMP was completed in August 2013 and is currently being updated to comply with state guidelines released in 2016. The updated Merced IRWMP will identify programs and projects needed to address regional water needs (Merced IRWMP 2018). The objectives within the Merced IRWMP include the following:

- Correct groundwater overdraft conditions.
- Manage flood flows and stormwater runoff (including those caused by climate change) for public safety, water supply, recharge, and natural resource management.
- Meet demands for all uses, including agriculture, urban, and environmental resource needs.
- Improve coordination of land use and water resources planning.
- Effectively address climate change adaptation and/or mitigation in water resources management and infrastructure.
- Maximize water use efficiency, including expanding in-lieu recycled water projects where feasible.
- Protect and improve water quality for all beneficial uses, consistent with the Basin Plan.
- Protect, restore, and improve natural resources.
- Address water-related needs of disadvantaged communities.
- Protect and enhance water-associated recreation opportunities.
- Establish and maintain effective communication among water resource stakeholders in the Region.
- Enhance public understanding of water management issues and needs.

City of Merced Urban Water Management Plan

Urban Water Management Plans (UWMPs) are required under the California Water Code (CWC) to be completed every five years by urban water suppliers within the state. These UWMPs are designed to maintain efficient use of urban water supplies, to continue to promote conservation programs and policies, to ensure that sufficient water supplies are available for future beneficial use, and to provide a mechanism for response during water drought conditions. The 2020 UWMP for the City was completed in August 2021.

Merced Groundwater Subbasin Groundwater Sustainability Plan

The Groundwater Sustainability Plan was written to bring the Merced Groundwater Basin, a critically overdrafted basin located within the San Joaquin Valley, into sustainable groundwater management by 2040 (Merced SGMA 2024). The Merced Groundwater Subbasin is heavily reliant on groundwater, and users recognize the Subbasin has been in overdraft for a long period of time. SGMA requires that all high and medium priority groundwater basins be managed by one or more GSAs. The GSAs have the authority to develop one or more groundwater sustainability plans (GSPs) to identify and implement solutions for the long-term sustainable management of local groundwater resources. The County of Merced and water purveyors and cities within the Merced Subbasin formed three GSAs in accordance with SGMA: Merced Irrigation-Urban Groundwater Sustainability Agency, Merced Subbasin Groundwater Sustainability Agency, and Turner Island Water District Groundwater Sustainability Agency #1 (TIWD GSA-1). The GSAs coordinated efforts to develop this GSP for the Subbasin. The GSP details how the Merced Groundwater Basin will become sustainable over a 20-year timeframe through a combination of projects and management of groundwater pumping (Merced SGMA 2024b). One of the priorities listed on page 6-7 of the GSP was “Project focuses on recharge” (Merced SGMA 2022). The Program is within the Merced Irrigation-Urban Groundwater Sustainability Agency and Merced Subbasin Groundwater Sustainability Agency jurisdictions.

Merced Groundwater Basin Groundwater Management Plan

The Groundwater Management Plan (GWMP) provides the framework to implement a groundwater management strategy for the Merced groundwater basin. The purpose of the GWMP is to identify and implement a number of actions to preserve and increase the quantity of groundwater resources within the Merced groundwater basin. MID and the City prepared the original Final Draft GWMP in 1997 to comply with the legislative requirements, and in December of 1997, water purveyors within the Merced groundwater basin signed a memorandum of understanding that created the association known as MAGPI. This GWMP was then updated on July 29, 2008, to incorporate new data and comply with update legislative requirements (MAGPI 2008). Applicable goals and elements within the GWMP include the following:

- **Goal 1** – Protect and maintain groundwater quality within the Merced Groundwater basin to satisfy current and future beneficial use.
- **Goal 3** – Protect and Maintain groundwater recharge areas within the Merced groundwater basin.
- **Element 1** – Control of Saline Water intrusion. Saline water can slowly degrade groundwater quality, limiting its range of potential use.

- Potential source of saline intrusion in the Merced groundwater basin includes downward seepage of sewage, agricultural, or industrial waste (potential widespread problem associated with municipal waste water treatment plants, application of fertilizers, and dairies).

3.9.3 Environmental Setting

3.9.3.1 Regional Setting

The Program Study Area is located within the San Joaquin River/Merced River basin or "watershed". The San Joaquin Valley basin extends over 11,000 square miles from the City of Stockton to the north, the City of Fresno in the south, the Sierra Nevada on the east, and the Coastal Ranges to the west. The San Joaquin River is the principal river within the area, and other major tributaries to the San Joaquin River include the Stanislaus, Tuolumne, and the Merced Rivers. Water flowing through the San Joaquin River drains toward the delta. The Merced Subbasin is one of the 11 distinct subbasins within the larger San Joaquin Valley Groundwater Basin.

Climate within the Program Study Area includes hot, dry summers and cool, humid winters, with average daily temperatures from 47 to 76 degrees Fahrenheit. Precipitation within the Program Study Area averages about 11 to 12 inches per year during the winter (City of Merced 2010).

3.9.3.2 Local Setting

Within the San Joaquin Valley Groundwater Basin lies the smaller Merced groundwater subbasin. The Merced subbasin includes lands south of the Merced River between the San Joaquin River to the west and the crystalline basement rock of the Sierra Nevada foothills to the east, as well as the Chowchilla River to the south. Water-bearing formations within the Merced subbasin consist of consolidated rocks and unconsolidated deposits. In particular, in the eastern portions of the Merced subbasin, consolidated rocks result in lower yields in water to wells, with the exception of the Mehrten formation. Other consolidated rock formations with the Merced subbasin include the Ione Formation and the Valley Springs Formation. Unconsolidated deposits within the area include continental deposits, lacustrine and marsh deposits, older and younger alluvium, and floodplain deposits. The lacustrine, marsh, and floodplain deposits result in lower water yields, while the younger alluvium is more likely to yield moderate water. Additionally, there are three groundwater water bodies within the Merced subbasin, including an unconfined water body, a confined water body, and the waterbody located within the consolidated rocks.

Generally, topography within the Program Study Area is relatively flat with elevations ranging from 200 feet above mean sea level (amsl) to 150 feet amsl, with a general trend of higher elevations in the southeast and lower elevations in the southwest.

Flooding

FEMA oversees the delineation of flood zones and the provision of federal disaster assistance. FEMA manages the NFIP and publishes the FIRMs, which show the expected frequency and severity of flooding by area. Floodplains are divided into flood hazard zones designated by the potential for an area to flood. Zone X may include those areas that are located within the 100-year flood plain but are adequately

protected by levee systems, while Zones A, AE, and AO are designated as areas inundated by a 100-year storm event.

Flooding within the Program Study Area is typically caused by infrequent, severe winter storms that combine with snowmelt runoff into the rivers from the Sierra Nevada foothills. Flat topography within the Program Study Area can cause stream and riverbanks to become easily overtopped by flood waters and spread over large areas. As such, more than half of the Program Study Area (which has similar limits as the City's SUDP/SOI) is located within a FEMA-designated 100-year flood plain, as shown on **Figure 3.9- 1.**

Additionally, as discussed in the 2030 General Plan Draft EIR, the Program Study Area has two inundation zones (**Figure 3.9-2)**, resulting from potential failure of the Bear Reservoir Dam (east of the Program Study Area) and the Lake Yosemite Dam. The inundation zones from these two dams are shown in **Figure 3.9-2** and cover a majority of the northern portion of the Program Study Area. The Department of Water Resources (DWR) is responsible for completing annual inspections of each of these dams for the purpose of safeguarding life and destruction of property. Risk of the dam failure from either of these dams is low (City of Merced 2010).

Surface Water

Local surface water sources within the Program Study Area include the Merced River, Black Rascal Creek, Bear Creek, Cottonwood Creek, and Fahrens Creek, in addition to numerous human-made channels that are included in MID's system of canals (such as the Hartley Slough), levees, and ditches. Due to the increase in the area of impervious surfaces (i.e., roadways, sidewalks, and buildings), runoff and associated pollution concentrations has increased within the Program Study Area. Pollution levels are highest during November, during initial rain events, and often contain substances such as oil, battery acid, and engine coolant. Additionally, surface water quality is also affected by pesticides and fertilizers that are used in the areas surrounding the urban area of the City (within the Program Study Area). The pollutants are often washed into stream channels during storm events, thus affecting the water quality of the streams and other surface water bodies within the Program Study Area.

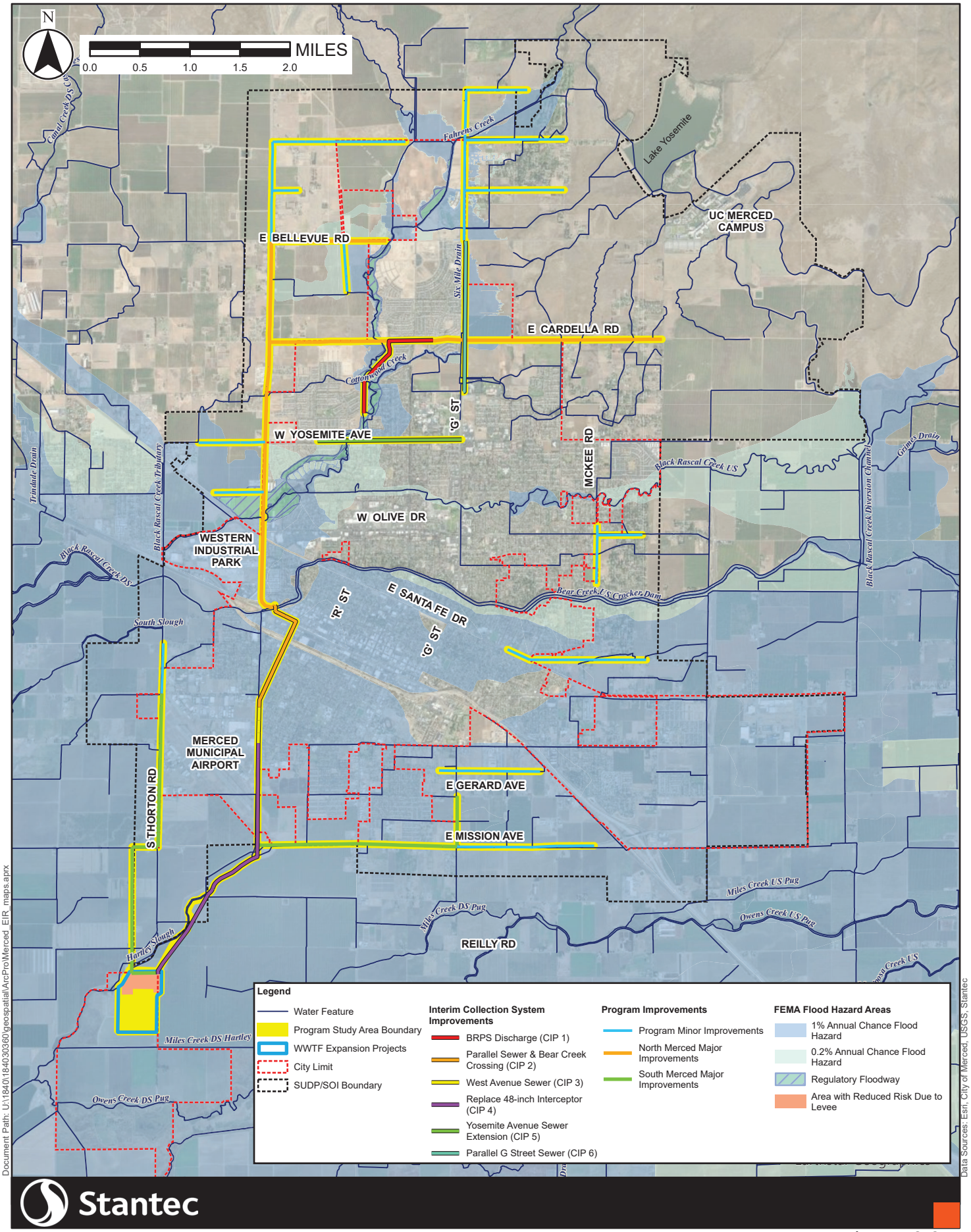
In regard to water supplies, according to the City UWMP, the largest use of water supplies within the City's SUDP/SOI are from single- and multi-family residences, which collectively contribute to 67.5 percent of the water supply demand (City of Merced 2021). Additionally, the demand for both potable and recycled water is continuing to increase over time. The projected demand for these water resources is estimated to rise from 20,0776 acre-feet (af) in 2020 to about 31,825 af by 2040 (City of Merced 2021).

Groundwater

The Program Study Area is located within the Merced Groundwater Subbasin. Groundwater within the Program Study Area is supplied by the runoff from the Sierra Nevada foothills, where it then flows in to the 2,665 square mile Middle San Joaquin-Lower Chowchilla watershed (USGS Hydrologic Unit 18040001) and the San Joaquin River groundwater basin. As discussed in the regional setting above, the San Joaquin River is the largest river within this system, which eventually drains into the delta and San Francisco Bay.

Groundwater within the Program Study Area generally tends to flow northeast to southwest; however, pumping and other human actions can cause these flows to be variable over time. Groundwater levels

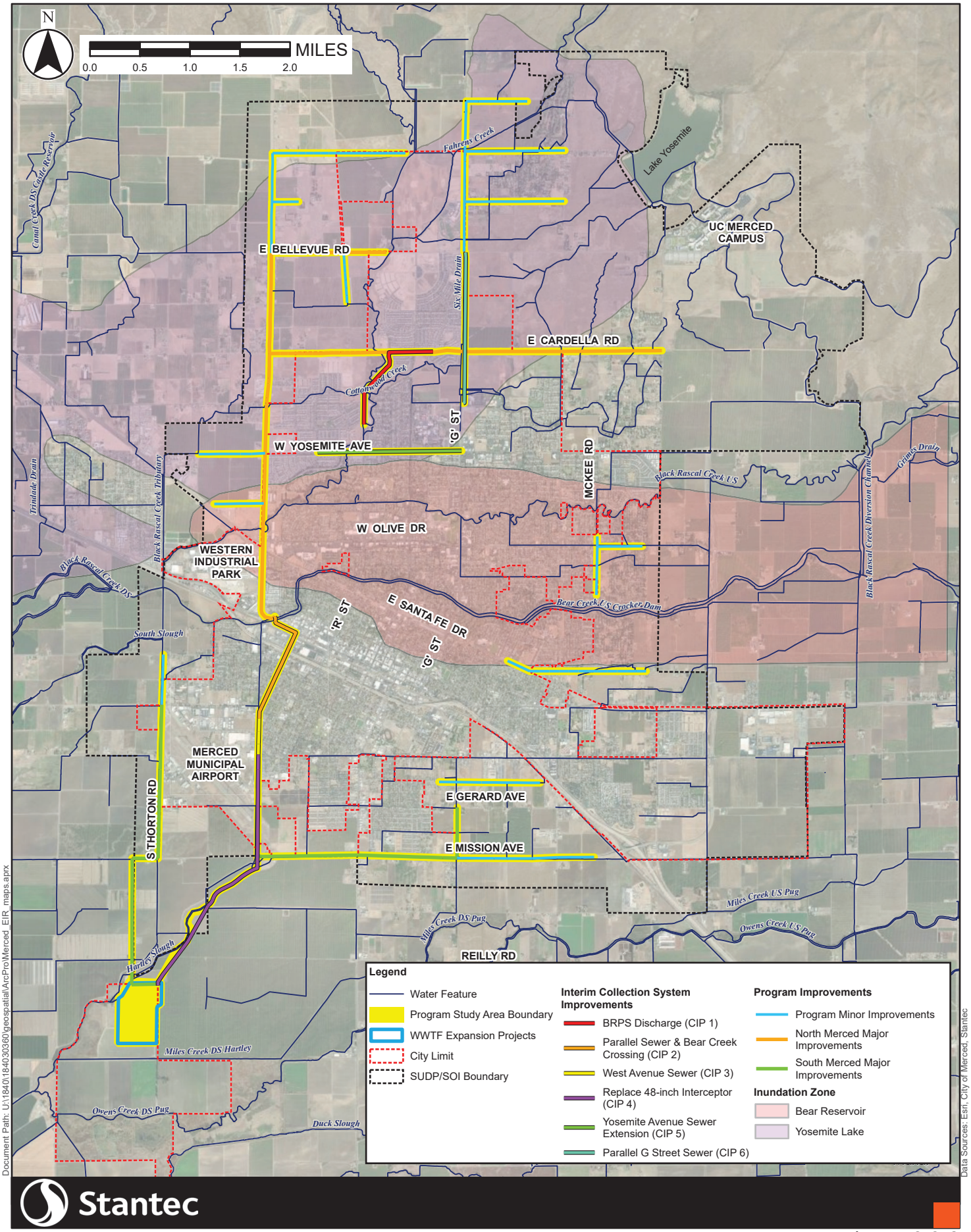
are saturated with fresh groundwater within the Program Study Area at a depth of about 1,200 feet, and overall quality of this groundwater tends to be moderate to good. However, shallower aquifers within the Program Study Area are impacted from contamination sources such as nitrates from wastewater disposal and agriculture, thus resulting in an overall decline in groundwater quality over time.



Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.9-1
Flood Hazards Within City of Merced SUDP/SOI



Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.9-2
City of Merced Dam Failure Inundation Zones

Groundwater supplies within the Program Study Area have been closely monitored for more than 30 years and have shown a decline in water levels. From 1978 to 1985, water usage ranged from 313 to 396 gallons per day per capita. From 2005 to 2012, water usage ranged from 255 to 271 gallons per day per capita. The City has instituted water conservation measures in recent years in response to the prolonged drought and the Governor's Executive Order to reduce water consumption (City of Merced 2020).

The most recent Groundwater Recharge Project completed construction in 2022. The Merced Groundwater Subbasin GSA facilitated the Southern Merced Subbasin Groundwater Recharge Project, which included the enlargement of four siphons in the El Nido area, designed to increase conveyance capacity at the end of the system and provide additional capacity for groundwater recharge (MIUGSA 2024a). The El Nido area is approximately eight miles south of the WWTF. The Merced Groundwater Subbasin GSA is also constructing a pilot groundwater recharge facility near the town of Planada, a community identified as a Severely Disadvantaged Community approximately 11 miles northeast of the WWTF, in the Merced Groundwater Subbasin. Two downwells, or Vadose Zone Recharge Wells, and one monitoring well were installed in 2022 (MIUGSA 2024b).

3.9.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to hydrology and water quality. When an impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.9.4.1 Methodology

Potential impacts to hydrology and water quality have been assessed based on the Program's level of physical impacts on hydrology and water quality resources in the Program Study Area. Information for the assessment of impacts on hydrology and water quality resources is based on available data from site-specific plans, water quality protection measures required by the City, SWRCB and the CVRWQCB, and additional guidance provided in local plans and regulations, related to hydrology and water quality resources.

3.9.4.2 Impact Analysis

Impact HYD-1: Violate any water quality standards or WDRs or otherwise substantially degrade surface or groundwater quality.

Impact HYD-1 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction of the Program would require site preparation, mobilization of equipment to construction sites, installation of new infrastructure, and site restoration. These construction activities have the potential to degrade surface water quality by introducing sediment to surface waters and adversely affecting both surface and groundwater quality by introducing pollutants to receiving waters throughout

the Program Study Area. Construction activities could also generate hazardous wastes that if improperly managed, could enter both surface- and groundwater sources.

Construction activities, including those associated with the Program and any future Program construction, can generate loose soils that if not properly managed, can run offsite and increase sediment loads to waterways. Runoff risk is highest during the rainy season when soils can get washed away into nearby waterways. Sedimentation to the waterways degrades water quality by increasing suspended sediment, reducing the channel's flood capacity, and potentially adversely affecting associated aquatic and riparian habitats, thus resulting in a potentially significant impact prior to mitigation. As such, implementation of MM GEO-1, Prepare and Implement an Erosion Control and SWPPP, would ensure that disturbed soils during construction activities are properly stored and managed throughout the duration of construction activities, thus protecting water quality. The City and the SWRCB requires that a SWPPP is prepared for all construction activities disturbing greater than one acre, which includes year-round BMPs designed to prevent impacts to water quality. Implementation of MM GEO-1 would reduce water quality impacts from construction-related runoff and erosion to a less-than-significant level.

Construction activities from Program construction could also generate chemical waste products such as adhesives, solvents, and petroleum lubricants, which have the potential to be accidentally released during construction. Chemicals associated with construction could adhere to soil particles and be washed into surface water sources, potentially further degrading the quality of surface water sources. As such, implementation of MM HYD-1, Avoid/Minimize Potential Impacts from Construction Material Release, would reduce potential impacts to water quality from construction materials release into waterways. MM HYD-1 includes the development and implementation of a Spill Prevention and Contingency Plan, which would effectively minimize impacts related to release of chemicals into waterways by limiting refueling distances from waterways, maintaining construction equipment, and including measures to be followed should an accidental spill occur within the Program Study Area during construction activities. Therefore, impacts to water quality resulting from construction material release would be less-than-significant with mitigation incorporated.

The majority of Program components, including the new pipelines, would be located within existing or future public roadway ROWs, with smaller portions located within overland and undeveloped areas. Installation of the Program, including current and future Program components (i.e., pipelines) requires crossing of streams, smaller tributaries, culverts. and canals. Water crossings are anticipated to be completed using trenchless piping methods (i.e., HDD, jack-and-bore, or microtunneling) to avoid direct impacts to water features. However, in the event that trenchless methods are infeasible, traditional open trenching may be required. Impacts to the water quality associated with construction would occur from runoff and loose sediment on construction sites if it were to escape into waterways or drainages, typically during storm events or other times water runs offsite. If drainages and waterways are not avoided by installation methodologies, the rules and regulations specified in Section 3.9.2, Regulatory Framework, would need to be strictly adhered to, and all necessary permits would need to be obtained to ensure that no water quality violations occur. Federal and state permits requiring strict water quality standards, such as Section 401 of the CWA and compliance with the Porter-Cologne Act would require implementation of BMPs and potential monitoring of stream crossings, which would limit the potential impacts to waterways to less-than-significant levels or the Program and proposed Projects would face permit violations. State permits requiring strict water quality standards also includes a California FGC Section 1602 LSAA from

CDFW because CDFW has jurisdiction over aquatic features including adjacent wildlife habitat, which would be triggered with the use of HDD under creeks.

In the event that groundwater is encountered (not uncommon with deep excavations in the Central Valley during the wet season) during trenching or other construction activities, there is the potential for violations of water quality standards. Implementation of MM HYD-2, Construction Dewatering Management Plan, would ensure that water infiltrates the soil rather than results in runoff into receiving waters or storm drains. MM HYD-2 includes the preparation and implementation of a dewatering management plan to protect the existing water quality of the surrounding waterways. Additionally, if a permit, such as a RWQCB Low Threat Discharge Permit or WDR permit, were required, temporary onsite storage of water removed from trenches, excavations, etc. would be obtained, and water removed at drainage crossings or creeks may be temporarily stored onsite and allowed to settle prior to discharge back to the waterway, as specified in MM HYD-2. Therefore, potential impacts related to water quality from construction activities would be less-than-significant.

Operation

Operational impacts associated with water and groundwater quality could result from land application of biosolids and effluent discharges if not appropriately permitted, applied, and discharged and if pollutants are allowed to enter the surface- or groundwater system. As described in Section 2.3.2.3, Existing WWTF Projects, the City currently applies Class A B biosolids around the WWTF property. The City is required to comply with Title 40 CFR Part 503 (as amended) for Class A biosolids applications as well as the CVRWQCB WDRs Order No. R5-2014-0096 and NPDES No. CA0079219 (as amended). Additional land application of biosolids would require an amended or new land application permit to apply additional biosolids that could result from the Program. If the City were to apply all the biosolids via land application, the City would continue to apply and monitor these biosolids in accordance with 40 CFR Part 503 as well as in accordance with CVRWQCB Order No R5-2014-0096 and NPDES No. CA0079219. This would enforce specific application restrictions, which would ensure that chemical balance of nitrogen and phosphorus is achieved by rotation of crops and application of biosolids seasonally as dictated by the permit requirements. This would restrict timing and application sufficiently to ensure that impacts to waters, habitats, and floodways do not occur. If the City were not able to obtain a permit, biosolids would require disposal at a facility permitted to accept biosolids.

Effluent discharges to water or land also require WDR orders or a NPDES discharge permit. Similar to the requirements for biosolids, effluent discharges would require an amendment to or issuance of the City's current NPDES permit (NPDES No. CA0079219, WDRs Order No. R5-2014-0096). This would ensure that any potential impacts to groundwater quality would remain at a less-than-significant level, even with the addition of further land application.

Construction and operational impacts to water quality resulting from implementation of future Program activities would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-1, HYD-2, and MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction of the CIPs 1-6, including project components would require site preparation, mobilization of equipment to construction sites, installation of new infrastructure, and site restoration. These construction activities have the potential to degrade surface water quality by introducing sediment to surface waters and adversely affecting both surface and groundwater quality by introducing pollutants to receiving waters throughout the Program Study Area. Construction activities could also generate hazardous wastes that if improperly managed, could enter both surface- and groundwater sources.

Construction activities, including those associated with the CIPs 1-6 construction, can generate loose soils that if not properly managed, can run offsite and increase sediment loads to waterways. Runoff risk is highest during the rainy season when soils can get washed away into nearby waterways. Sedimentation to the waterways degrades water quality by increasing suspended sediment, reducing the channel's flood capacity, and potentially adversely affecting associated aquatic and riparian habitats, thus resulting in a potentially significant impact prior to mitigation. As such, implementation of MM GEO-1, Prepare and Implement an Erosion Control and SWPPP, would ensure that disturbed soils during construction activities are properly stored and managed throughout the duration of construction activities, thus protecting water quality. The City and the SWRCB requires that a SWPPP is prepared for all construction activities disturbing greater than 1 acre, which includes year-round BMPs designed to prevent impacts to water quality. Implementation of MM GEO-1 would reduce water quality impacts from construction-related runoff and erosion to a less-than-significant level.

Construction activities from the CIPs 1-6 could also generate chemical waste products such as adhesives, solvents, and petroleum lubricants, which have the potential to be accidentally released during construction. Chemicals associated with construction could adhere to soil particles and be washed into surface water sources, potentially further degrading the quality of surface water sources. As such, implementation of MM HYD-1, Avoid/Minimize Potential Impacts from Construction Material Release, would be required to reduce potential impacts to water quality from construction materials release into waterways. MM HYD-1 includes the development and implementation of a Spill Prevention and Contingency Plan, which would effectively minimize impacts related to release of chemicals into waterways by limiting refueling distances from waterways, maintaining construction equipment, and including measures to be followed should an accidental spill occur within the Program Study Area during construction activities. Therefore, impacts to water quality resulting from construction material release would be less-than-significant with mitigation incorporated.

The majority of CIPs 1-6 components, including the new pipelines, would be located within existing or future public roadway ROWs, with smaller portions located within overland and undeveloped areas. Installation of the CIPs 1-6, including current and future Program components (i.e., pipelines) requires crossing of streams, smaller tributaries, culverts. and canals. Water crossings are anticipated to be completed using trenchless piping methods (i.e., HDD, jack-and-bore, or microtunneling) to avoid direct impacts to water features. However, in the event that trenchless methods are infeasible, traditional open trenching may be required. Impacts to the water quality associated with construction would occur from runoff and loose sediment on construction sites if it were to escape into waterways or drainages, typically during storm events or other times water runs offsite. If drainages and waterways are not avoided by

installation methodologies, the rules and regulations specified in Section 3.9.2, Regulatory Framework, would need to be strictly adhered to, and all necessary permits would need to be obtained to ensure that no water quality violations occur. Federal and state permits requiring strict water quality standards, such as Section 401 of the CWA and compliance with the Porter-Cologne Act would require implementation of BMPs and potential monitoring of stream crossings, which would limit the potential impacts to waterways to less-than-significant levels or the CIPs 1-6 would face permit violations. State permits requiring strict water quality standards also includes a California FGC Section 1602 LSAA from CDFW because CDFW has jurisdiction over aquatic features including adjacent wildlife habitat, which would be triggered with the use of HDD under creeks.

In the event that groundwater is encountered (not uncommon with deep excavations in the Central Valley during the wet season) during trenching or other construction activities, there is the potential for violations of water quality standards. Implementation of MM HYD-2, Construction Dewatering Management Plan, would ensure that water infiltrates the soil rather than results in runoff into receiving waters or storm drains. MM HYD-2 includes the preparation and implementation of a dewatering management plan to protect the existing water quality of the surrounding waterways. Additionally, if a permit, such as a RWQCB Low Threat Discharge Permit or WDR permit, were required, temporary onsite storage of water removed from trenches, excavations, etc. would be obtained, and water removed at drainage crossings or creeks may be temporarily stored onsite and allowed to settle prior to discharge back to the waterway, as specified in MM HYD-2. Therefore, potential impacts related to water quality from construction activities would be less-than-significant.

Operation

Operational impacts associated with water and groundwater quality could result from effluent discharges if not appropriately permitted, applied, and discharged and if pollutants are allowed to enter the surface- or groundwater system. Effluent discharges to water or land require WDR orders or a NPDES discharge permit. Effluent discharges would require an amendment to or issuance of the City's current NPDES permit (NPDES No. CA0079219, WDRs Order No. R5-2014-0096). This would ensure that any potential impacts to groundwater quality would remain at a less-than-significant level, even with the addition of further land application. Operational impacts to water quality resulting from implementation of future CIPs 1-6 would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-1, HYD-2, and MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Impact HYD-1 Findings

Impact HYD-1 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HYD-1 Mitigation Required: MM HYD-1, HYD-2, and MM GEO-1

Impact HYD-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HYD-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

Impact HYD-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Program construction activities have the potential to adversely affect groundwater if excavation depth would reach the local groundwater table, and thus result in a potentially significant impact related to interreference with groundwater management prior to mitigation. If this were to occur, dewatering would be required to allow for installation of facilities or foundations. Excavations would be required for the majority of project components, including pipelines, pump stations, and improvements at the WWTF. As such, implementation of MM HYD-2, Construction Dewatering Management Plan, would be required for any excavation activities that have the potential to encounter groundwater. The construction dewatering plan would include designation of discharge disposal sites as well as implementation of BMPs to control discharges. The contractor would also be required to obtain a dewatering permit through the CVRWQCB. Therefore, impacts associated with construction dewatering or groundwater discharges would be less-than-significant with mitigation incorporated.

Operation

The majority of above-ground Program components would be located in previously disturbed areas where feasible. However, some above-ground facilities may be located in previously undisturbed areas, especially for placement of some of the pipelines and pump stations, which could create impervious areas where groundwater recharge from stormwater runoff may potentially be restricted or reduced. Pump station sites would create the potential to prevent groundwater recharge if pump stations were to occur on actively used water infrastructure sites (which is anticipated). Site and drainage plans of future pump station sites would include specifications on how site drainage would be collected and directed to nearby to the storm drain system, where it would eventually return flow to a nearby water source or be allowed to percolate into the groundwater table. The BRPS and H59PS improvements would include site drainage that would flow into roadside drainages. It is not anticipated that the addition of pump stations (i.e., with an approximate maximum size of a 2,000-square-foot structure) and associated features would substantially decrease groundwater supplies by slightly altering the course of the site's stormwater runoff. Active groundwater charging projects in El Nido and Planada are unlikely to be affected as the El Nido is far south (approximately eight miles) from the most-southern part of the Program improvements WWTF and the groundwater recharge facility near the town of Planada is approximately 11 miles northeast of the WWTF and the groundwater does not usually flow from the southwest to the northeast.

Expansions at the existing WWTF would require the addition of permanent above-ground structures, which would result in an increase in impervious surfaces within the WWTF boundaries. These upgrades would include new treatment facilities, buildings, and roadways for access within the 133-acre impact area (much less of which would be converted to impervious areas), which would be less than 1 percent of the overall 1,332-acre WWTF site. Although these upgrades and improvements would increase the amount of impervious surfaces within the WWTF boundaries, the actual impervious footprint would be much less than the entire 133-acre of the total impact area (estimated to be about 10 to 20 acres of impervious services). Additionally, the facilities would be designed to allow for adequate drainage for stormwater and thus would continue to allow for adequate groundwater recharge in the area. Therefore,

permanent above-ground features associated with the expansions of the WWTF would result in a less than 1 percent increase of impervious surfaces and would not substantially affect groundwater supplies, groundwater table levels, or groundwater recharge, and the impact would be less-than-significant. Therefore, permanent WWTF features would not substantially affect groundwater supplies, groundwater table levels, or groundwater recharge, and the direct impact would be less-than-significant.

There could be the potential for indirect impacts to occur if a substantial amount of surface or groundwater were removed from North Merced and redirected into a different groundwater basin. However, the Program does not involve development or management of water supplies. Water supply impacts associated with build-out of the 2030 General Plan were evaluated and considered in the 2030 General Plan Draft EIR and the 2020 Urban Water Master Plan and are incorporated by reference into this draft EIR.

The 2016 Water Master Plan Mitigated Negative Declaration and Initial Study proposes a MM calling for the WWTF to use recycled water to mitigate for potentially significant groundwater overdraft as a result of water demands forecasted in the 2016 Water Master Plan. As described in Section 2.3.2.3, Existing WWTF Projects, the 2017 WCSMP evaluated effluent reuse options, determining that the City needed to maintain flexibility in wastewater collection and effluent discharge, and ultimately determining that the use of recycled water at the WWTF is not feasible. Specifically, the 2017 WCSMP determined that recycled water did not maintain the flexibility, and thus, the City evaluated other options to address groundwater overdraft, including through an agreement with MID to supplement water in North Merced, and to allow for reduced pumping, rather than using recycled water. This would help alleviate groundwater pumping impacts in the City, as addressed and further analyzed in the 2017 WCSMP. Additionally, the 2016 Water Master Plan included the MM for recycled water because the potentially significant impact was related to direct growth-inducing impact from reasonable build-out of the 2030 General Plan. The Program itself, as discussed throughout this draft EIR, is growth-accommodating rather than growth-inducing. The Program itself would not result in direct impacts related to groundwater recharge, and therefore, it is not analyzed further in this draft EIR. Therefore, it is not anticipated that there would be an indirect substantial decrease or interference with groundwater recharge such that sustainable groundwater management would be impeded. The impact would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6)

Construction

Construction activities have the potential to adversely affect groundwater if excavation depth would reach the local groundwater table, and thus result in a potentially significant impact related to interreference with groundwater management prior to mitigation. If this were to occur, dewatering would be required to allow for installation of facilities or foundations. Excavations would be required for the majority of project components, including pipelines. As such, implementation of MM HYD-2, Construction Dewatering Management Plan, would be required for any excavation activities that have the potential to encounter groundwater. The construction dewatering plan would include designation of discharge disposal sites as well as implementation of BMPs to control discharges. The contractor would also be required to obtain a

dewatering permit through the CVRWQCB. Therefore, impacts associated with construction dewatering or groundwater discharges would be less-than-significant with mitigation incorporated.

Operation

Above-ground components are not planned. There could be the potential for indirect impacts to occur if a substantial amount of surface or groundwater were removed from North Merced (near CIP 1 and 6) and redirected into a different groundwater basin. However, the Program does not involve development or management of water supplies. Water supply impacts associated with build-out of the 2030 General Plan were evaluated and considered in both the 2030 General Plan Draft EIR and the 2020 Urban Water Master Plan and are incorporated by reference into this draft EIR. The CIPs 1-6 would not result in direct impacts related to groundwater recharge, and therefore, it is not analyzed further in this draft EIR. Therefore, it is not anticipated that there would be an indirect substantial decrease or interference with groundwater recharge such that sustainable groundwater management would be impeded. The impact would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-2
Level of Significance After Mitigation: Less-than-Significant

Impact HYD-2 Findings

Impact HYD-2 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HYD-2 Mitigation Required: MM HYD-2

Impact HYD-2 Overall Level of Significance After Mitigation: Less-than-Significant

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Impact HYD-3: Potential to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner which would: Result in a substantial erosion or siltation on- or offsite; Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or Impede or redirect flood flows.

Impact HYD-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction activities associated with the Program, such as trenching, excavation, or earthwork, would disturb the ground surface and potentially alter drainage patterns if not stabilized properly post-construction. Trenching, excavation, and earthwork would be required for the placement of pipelines,

pump stations, WWTF Expansion Projects, and other associated appurtenances for the proposed Projects components. These activities would occur throughout the Program Study Area over the reasonable build-out, which could cause adverse effects to drainages and flood flows and result in potentially significant impacts. North Merced's G Street Extension 3 and the West Cardella Trunk cross Fahrens Creek while the East Cardella Trunk crosses a canal. In addition, the South Highway 59 Trunk crosses Black Rascal Creek. South Merced's Thorton Road Sewer 1 would be installed along the El Capitan Canal and the Gove Road Sewer crosses the Hartley Slough. Creek crossing locations for the Program are shown in **Figures 2.3-5** through **2.3-6** in Section 2.0, Project Description; however, the crossings are not anticipated to be significantly impacted because projects associated with the Program would use trenchless technologies to avoid direct impacts with creeks while crossing them. Additionally, roadside drainages occur throughout much of the Program Study Area, which may result in impacts associated with equipment and pipe storage as pipelines are constructed.

As discussed under Impact HYD-1 above, MM GEO-1 would be required to prepare and implement an Erosion Control Plan and SWPPP, which would stabilize disturbed soils. As described above, a SWPPP is required for all construction activities that would disturb greater than 1 acre of ground surface and would include year-round BMPs to prevent erosion and sedimentation from occurring. This measure would also include stabilization of disturbed soils post-construction, which would prevent redirecting of flood flows and long-term erosion within the Program Study Area. It is anticipated that creek and culvert crossings for the North and South Merced Major Improvements and Program Minor Improvements would be accomplished by trenchless installation methodologies, (i.e., HDD) which would minimize potential impacts to surface waters by eliminating direct work within the water course and thereby avoiding the potential impact. HDD would require a Section 1602 Lake or Streambed Alteration Agreement if within CDFW jurisdictional waters. However, if crossing were to involve open-cut trenching, stabilization and regrading of disturbed soils required under MM HYD-1 and MM GEO-1 would minimize potential impacts by implementing the BMPs and SWPPP measures described above to contain loose sediment and construction byproducts subject to discharge. Therefore, temporary impacts related to the alteration of drainages or the addition of impervious surfaces that would impede or redirect flood flows or otherwise contribute to runoff within the Program Study Area would be less-than-significant with mitigation incorporated.

Operation

Once constructed, the majority of Program components would be located underground and would not substantially add to the impervious surfaces in the area. Above-ground Program components, such as the H59PS expansion and WWTF facilities would be located on relatively small footprints (i.e., less than about 2,000 square feet for the pump stations) and would be sited and designed to not substantially impede or redirect flood flows. Although the expansion of the WWTF would result in new impervious surfaces, these impacts would occur within the existing WWTF property line in previously disturbed areas and would not result in potentially significant impacts. Any new structures, pathways, or cement surfaces within the expanded WWTF would be graded in such a manner to allow runoff into storm drainages or to the surrounding lands, maintaining groundwater recharge. Therefore, impacts related to the alteration of drainage patterns, the addition of impervious surfaces, or creating or contributing substantially to surface runoff as a result of the WWTF Expansion Projects and pump stations would be less-than-significant.

Therefore, impacts related to the alteration of drainage patterns, the addition of impervious surfaces, or creating or contributing substantially to surface runoff as a result of implementation the Program would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-1 and MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6)

Construction

Construction activities associated with the CIPs 1-6, such as trenching, excavation, or earthwork, would disturb the ground surface and potentially alter drainage patterns if not stabilized properly post-construction. Trenching, excavation, and earthwork would be required for the placement of pipelines and other associated appurtenances for the CIPs 1-6. These activities would occur throughout the Program Study Area over the reasonable build-out, which could cause adverse effects to drainages and flood flows and result in potentially significant impacts. CIP 1 and CIP 6 cross Cottonwood Creek, CIP 2 crosses Bear Creek, CIP 4 crosses the Hartley Slough, and CIP 5 crosses Fahrens Creek. Creek crossing locations for the proposed CIPs are shown in **Figures 2.3-2** through **2.3-12** in Section 2.0, Project Description; however, the crossings are not anticipated to be significantly impacted because the CIPs would use trenchless technologies to avoid direct impacts with creeks while crossing them. HDD would require a Section 1602 Lake or Streambed Alteration Agreement if within CDFW jurisdictional waters. Additionally, roadside drainages occur throughout much of the Program Study Area, which may result in impacts associated with equipment and pipe storage as pipelines are constructed.

As discussed under Impact HYD-1 above, MM GEO-1 would be required to prepare and implement an Erosion Control Plan and SWPPP, which would stabilize disturbed soils. As described above, a SWPPP is required for all construction activities that would disturb greater than 1 acre of ground surface and would include year-round BMPs to prevent erosion and sedimentation from occurring. This measure would also include stabilization of disturbed soils post-construction, which would prevent redirecting of flood flows and long-term erosion within the Program Study Area. It is anticipated that creek and culvert crossings (Figures **2.3-1** through **2.3-7**) for creek crossings) for the North and South Merced Major Improvements and Program Minor Improvements would be accomplished by trenchless installation methodologies (i.e., HDD), which would minimize potential impacts to surface waters by eliminating direct work within the water course and thereby avoiding the potential impact. HDD would require a Section 1602 Lake or Streambed Alteration Agreement if within CDFW jurisdictional waters. However, if crossing were to involve open-cut trenching, stabilization and regrading of disturbed soils required under MM HYD-1 and MM GEO-1 would minimize potential impacts by implementing the BMPs and SWPPP measures described above to contain loose sediment and construction byproducts subject to discharge. Therefore, temporary impacts related to the alteration of drainages or the addition of impervious surfaces that would impede or redirect flood flows or otherwise contribute to runoff within the Program Study Area would be less-than-significant with mitigation incorporated.

Operation

Once constructed, the majority of CIPs 1-6 would be located underground and would not substantially add to the impervious surfaces in the area. Therefore, impacts related to the alteration of drainage patterns, the addition of impervious surfaces, or creating or contributing substantially to surface runoff as a result of implementation the CIPs 1-6 would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM HYD-1 and MM GEO-1
Level of Significance After Mitigation: Less-than-Significant

Impact HYD-3 Findings

Impact HYD-3 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact HYD-3 Mitigation Required: MM HYD-1 and MM GEO-1

Impact HYD-3 Overall Level of Significance after Mitigation: Less-than-Significant

Impact HYD-4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

Impact HYD-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Pipelines would be installed underground, and construction equipment located above ground during pipeline installation would only be present within the Program Study Area temporarily during active construction.

Operation

In addition to the flood risk discussed under Impact HYD-3 above, implementation of the Program and associated above-ground components, such as the pump stations, could be at risk from flood inundation resulting from levee or dam failure. Portions of the Program Study Area boundaries are located within the inundation areas of the Bear Reservoir Dam and Lake Yosemite Dam. Both the Bear Reservoir Dam and Lake Yosemite Dam are earthen dams and are subject to greater variability in embankment materials, therefore these dams are at greater risk from breakage from ground shaking, overtopping, erosion, and other structural design flaws. Breakage of dams is very unlikely due to existing regulations for structural stability of dams, including the regular maintenance and inspection that is required for any jurisdiction that owns and operates a dam. Specifically, FEMA has developed guidelines that encourage strict safety standards of dams including safety risk management protocols, flow requirements, and earthquake design and evaluation (FEMA 2024). Although dam failures are extremely rare, a disaster such as a large earthquake or terrorist attack could still occur, thus requiring special planning and consideration if development or associated utility infrastructure were to be placed in the inundation zone of a dam. Inundation caused by breakage or overtopping of one of these dams could cause increased pollutants in the Program Study Area if inundation flows would mix with or otherwise interact with sewage or materials

present within the wastewater collection system. Once the pipelines are constructed, they would operate entirely underground and would not require staffing, therefore, they would not expose people or structures to impacts associated with failure of a levee or dam. Therefore, impacts related to the of facilities within the Program Study Area that could be subject to inundation zones from levee or dam failure would be less-than-significant.

Pump stations would house operational equipment and materials as described in Section 2.0, Project Description, and Section 3.8, Hazards, Hazardous Materials, and Wildfires. These above-ground Program components could potentially be located within inundation zones from rupture or overtopping of the Bear River Reservoir Dam or Lake Yosemite Dam, as well as be subject to possible inundation from surrounding FEMA-identified flooding zones. These structures and associated equipment and materials could be placed within these flood hazard zones. However, these structures would be relatively small (i.e., a maximum of 2,000 square feet), designed to withstand inundation (similar to existing wastewater collection system facilities in the Program Study Area), and would be built in conformance with California Build Code standards and Chapter 17.48 (Flood Damage Prevention) of the City of Merced Municipal Code standards, which require a development permit to be obtained before any construction within an area of special flood hazard. Conformance with Chapter 17.48 of the City's Municipal Code specifically requires that all new construction of structures within a special flood hazard zone be floodproofed so that the below base flood level of the structure is watertight and with walls that are substantially impermeable to the passage of water, have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy, and be certified by a registered professional engineer or architect so that the standards of the Municipal Code are met. Additionally, materials and equipment of any future Program components would be designed to withstand inundation if within the inundation zone and would ensure that materials are properly stored in accordance with materials safety regulations and run a low-risk of the release of pollutants. Therefore, in the unlikely event that inundation should occur in the vicinity of any proposed Project or future Program facilities, conformance to the CBC and City's Municipal Code standards would result in a less-than-significant impact from release of pollutants.

The Program Study Area is not in the vicinity of an ocean and thus, is not at risk for experiencing tsunamis, and there are no large enough lakes within the Program Study Area to produce seiches that could cause substantial damage to Program components. Therefore, there would be no impact related to tsunamis or seiches from Program-related inundation.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Pipelines would be installed underground, and construction equipment located above-ground during pipeline installation would only be present within the Program Study Area temporarily during active construction.

Operation

In addition to the flood risk discussed under Impact HYD-3 above, implementation of the CIPs 1-6 could be at risk from flood inundation resulting from levee or dam failure. Portions of the Program Study Area boundaries are located within the inundation areas of the Bear Reservoir Dam and Lake Yosemite Dam. Both the Bear Reservoir Dam and Lake Yosemite Dam are earthen dams and are subject to greater variability in embankment materials, therefore these dams are at greater risk from breakage from ground shaking, overtopping, erosion, and other structural design flaws. Breakage of dams is very unlikely due to existing regulations for structural stability of dams, including the regular maintenance and inspection that is required for any jurisdiction that owns and operates a dam. Specifically, FEMA has developed guidelines that encourage strict safety standards of dams including safety risk management protocols, flow requirements, and earthquake design and evaluation (FEMA 2024). Although dam failures are extremely rare, a disaster such as a large earthquake or terrorist attack could still occur, thus requiring special planning and consideration if development or associated utility infrastructure were to be placed in the inundation zone of a dam.

Inundation caused by breakage or overtopping of one of these dams could cause increased pollutants in the Program Study Area if inundation flows would mix with or otherwise interact with sewage or materials present within the wastewater collection system. Once the pipelines are constructed, they would operate entirely underground and would not require staffing, therefore, they would not expose people or structures to impacts associated with failure of a levee or dam. Therefore, impacts related to the of facilities within the Program Study Area that could be subject to inundation zones from levee or dam failure would be less-than-significant.

Additionally, the Program Study Area is not in the vicinity of an ocean and thus, is not at risk for experiencing tsunamis, and there are no large enough lakes within the Program Study Area to produce seiches that could cause substantial damage to Program components. Therefore, there would be no impact related to tsunamis or seiches from Program-related inundation.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact HYD-4 Findings

Impact HYD-4 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact HYD-4 Mitigation Required: None Required

Impact HYD-4 Overall Level of Significance After Mitigation: Less-than-Significant

Impact HYD-5: Potential to conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Impact HYD-5 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Applicable water quality control and sustainable groundwater management plans in the Program Study Area include the Merced IRWMP, the City's UWMP, and the Merced GWMP. Additionally, the Merced Irrigation-Urban GSP submitted to DWR in January 2020 would also apply to the Program Study Area. A conflict would occur if the Program were to conflict with or obstruct any specific goals, policies, or objectives outlined within these plans. Section 3.9.2, Regulatory Framework, discusses the applicable goals, policies, or objectives of these respective plans, which focus on protection of the quality and quantity of water and groundwater resources. As discussed in Impact HYD-1 and Impact HYD-2, implementation of the Program would not result in significant impacts to water quality or groundwater resources with the implementation of mitigation. Impacts from construction of the Program would not substantially affect surface water or groundwater resources within the Program Study Area or surrounding area. Therefore, the potential for the Program to conflict with or obstruct implementation of water quality control plans or sustainable groundwater management plans would be less-than-significant.

Operation

A conflict would occur if the Program were to conflict with or obstruct any specific goals, policies, or objectives outlined within these plans. As discussed in Impact HYD-1 and Impact HYD-2, implementation of the Program would not result in significant impacts to water quality or groundwater resources with the implementation of mitigation. Impacts from operation of the Program would not substantially affect surface water or groundwater resources within the Program Study Area or surrounding area. Therefore, the potential for the Program to conflict with or obstruct implementation of water quality control plans or sustainable groundwater management plans would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Applicable water quality control and sustainable groundwater management plans in the Program Study Area include the Merced IRWMP, the City's UWMP, and the Merced GWMP. Additionally, the Merced Irrigation-Urban GSP submitted to DWR in January 2020 would also apply to the Program Study Area. A conflict would occur if the Program were to conflict with or obstruct any specific goals, policies, or objectives outlined within these plans. Section 3.9.2, Regulatory Framework, discusses the applicable goals, policies, or objectives of these respective plans, which focus on protection of the quality and quantity of water and groundwater resources. As discussed in Impact HYD-1 and Impact HYD-2, implementation of the Program would not result in significant impacts to water quality or groundwater resources with the implementation of mitigation. Impacts from construction of the Program would not substantially affect surface water or groundwater resources within the Program Study Area or surrounding area. Therefore, the potential for the Program to conflict with or obstruct implementation of water quality control plans or sustainable groundwater management plans would be less-than-significant.

Operation

A conflict would occur if the Program were to conflict with or obstruct any specific goals, policies, or objectives outlined within these plans. As discussed in Impact HYD-1 and Impact HYD-2, implementation of the Program would not result in significant impacts to water quality or groundwater resources with the implementation of mitigation. Impacts from operation of the Program would not substantially affect surface water or groundwater resources within the Program Study Area or surrounding area. Therefore, the potential for the Program to conflict with or obstruct implementation of water quality control plans or sustainable groundwater management plans would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact HYD-5 Findings

Impact HYD-5 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact HYD-5 Mitigation Required: None Required

Impact HYD-5 Overall Level of Significance After Mitigation: Less-than-Significant

3.9.5 Hydrology and Water Quality Mitigation

Mitigation Measure GEO-1: Prepare and Implement an Erosion Control and SWPPP

See Section 3.6, Geology, Soils, and Minerals.

Mitigation Measure HYD-1: Avoid/Minimize Potential Impacts from Construction Material Release

Prior to construction, the Contractor shall develop a Spill Prevention and Contingency Plan (SPCP) for the Program. The plan shall include but would not be limited to the following:

- Containment and cleanup equipment (e.g., absorbent pads, mats, socks, granules, drip pans, shovels, and lined clean drums) shall be at the staging areas and construction sites for use, as needed;
- Staging area where refueling, storage, and maintenance of equipment occur shall not be located within 100 feet of drainages to reduce the potential for contamination by spills;
- Construction equipment shall be maintained and kept in good operating condition to reduce the likelihood of line breaks or leakage;
- No refueling or servicing shall be done without absorbent material (e.g. absorbent pads, mats, socks, pillows, and granules) or drip pans underneath to contain spilled material. If these activities result in an accumulation of materials on the soil, the soil shall be removed and properly disposed of as hazardous waste;
- If trenchless methods (i.e., HDD, jack-and-bore, or microtunneling) are infeasible near water features, the applicable federal, state, and local regulations would apply and all necessary permits shall be obtained for work within a waterway prior to the start of construction;

- If a spill is detected, construction activities shall immediately cease in the area, and the procedures described in the SPCP shall be immediately enacted to safely contain and remove spilled materials;
- Spill areas shall be restored to pre-spill conditions, as practicable; and
- Spills shall be documented and reported to the City within and appropriate resource agency personnel.

Mitigation Measure HYD-1 Implementation

Responsible Party: The City shall require the construction Contractor develop and implement the SPCP for all construction activities. This MMs shall be referenced in the Contract Documents bid for the Program.

Timing: The SPCP shall be implemented prior to and during all phases of construction.

Monitoring and Reporting Program: Evaluation of the SPCP shall be conducted by the City, and any spills shall be documented and kept on file at City offices.

Standards for Success: Prevention of construction materials spills in all construction sites.

Mitigation Measure HYD-2: Construction Dewatering Management Plan

Water generated by dewatering activities shall be used where possible for construction activities such as compaction and dust control. This shall ensure that the water infiltrates rather than running offsite to storm drain systems or receiving waters. In order to reduce the potential for water from dewatering activities impacting the water quality of nearby waterways, the City shall require that the selected contractor develop a dewatering management plan prior to construction which shall include the following measures:

- Non-contaminated water shall be discharged to land for infiltration when:
    - The water contains sediment but is not contaminated with other pollutants;
    - The water does not run off from the land to storm drain systems to creek beds (even if dry) or other surface waters;
    - Permission for infiltration is acquired from the property owner;
    - The discharge is authorized or permitted by the Central Valley RWQCB, if applicable; and
    - If a permit, such as a RWQCB Low Threat Discharge Permit, were required, temporary onsite storage of water removed from trenches, excavations, etc. shall be obtained, and water removed at drainage crossings or creeks may be temporarily stored onsite and allowed to settle prior to discharge back to the waterway.
- The dewatering management plan shall outline a dewatering schedule and water quality monitoring process.
- The dewatering management plan shall include emergency contingency plans if unanticipated contaminants are observed in the discharge or flooding occurs resulting in cessation of water pumping.

As required by the State Water Code, all dewatering wells shall be constructed in accordance with the California Well Standards and must be permitted and inspected. After use, each dewatering well shall be properly destroyed in accordance with the California Well Standards and permitted and inspected, as required by the Merced County Environmental Health Department.

Mitigation Measure HYD-2 Implementation

Responsible Party: The City and chosen contractor

Timing: Prior to construction

Monitoring and Reporting Program: City review and approval of monitoring plan

Standards for Success: Compliance with monitoring plan, dewatering permits, and prompt and complete incident reports to the City and RWQCB.

3.10 LAND USE AND PLANNING

3.10.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

1. Physically divide an established community.
2. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to land use and planning that may result from implementation of the Program, identifying mitigation for potentially significant impacts, where feasible.

3.10.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives relating to land use and planning that are relevant to the Program.

3.10.2.1 Federal and State

There are no federal or state requirements related to land use and planning that are applicable to the Program.

3.10.2.2 Local

Merced Vision 2030 General Plan

The City of Merced (City) 2030 General Plan was adopted January 3, 2012 and the Land Use Element (L) was amended in April 2015 and January 2024 and the public services Element (P) was amended May 2017. The General Plan contains several policies that directly or indirectly pertain to land use and planning and the Program, including the following:

Goal Area L-3: Urban Growth and Design

> **Policy L-3.7.** Implement policies and principals to conform to the intent of the San Joaquin Valley Regional Blueprint.

Goal Area P-1: Public Facilities and Services

> **Policy P-1.1.** Provide adequate public infrastructure and services to meet the needs of future development.
> **Policy P-1.2.** Utilize existing infrastructure and public service capacities to the maximum extent possible and provide for the logical, timely and economically efficient extension of infrastructure and services where necessary.

Goal Area P-4: Wastewater

Policy P-4.1. Provide adequate wastewater collection, treatment and disposal capacity for existing and projected future needs.

San Joaquin Valley Blueprint

The San Joaquin Valley Blueprint (SJVB) is an association of local governments in the eight-county San Joaquin region. Its members include the Fresno Council of Governments, the Kern Council of Governments, the Kings County Association of Governments, the Madera County Transportation Commission, the Merced County Association of Governments, the San Joaquin Council of Governments, the Stanislaus Council of Governments, and the Tulare County Association of Governments.

The SJVB is not a policy document and does not approve or prohibit growth in the region, but suggests general land uses and locations for growth. The SVJB analyzes transportation and land use and provides suggestions for how cities and counties should grow based on 12 Smart Growth Principles. The principles that relate to the Program with respect to land use include the following:

- Make development decisions predictable, fair, and cost-effective;
- Preserve open space, farmland, natural beauty, and critical environmental areas; and
- Support actions that encourage environmental resource management.

City of Merced Municipal Code

The City's zoning ordinance includes eleven residential classifications, seven commercial zones, two industrial zones, four reserve zones, one public/government zone, and open space/park zones. The purpose of these zones is to translate the broad 2030 General Plan land use categories into detailed land use classifications that are applied to properties with much greater precision than the 2030 General Plan. Additionally, the zoning ordinance includes a number of special districts that have been established to provide areas for special uses and require special consideration by the Planning Commission and City Council.

Merced County Local Agency Formation Commission

The City's SUDP/SOI is a boundary surrounding the City that is intended to represent the ultimate area into which the City may expand and extend public services. The 2017 2017 WCSMP considered the reasonable build-out conditions within the SUDP/SOI and the 2017 WCSMP Plan Area is aligned with these planning boundaries. The Merced County Local Agency Formation Commission must approve the adoption of a SOI boundary and changes to the exiting sphere boundaries.

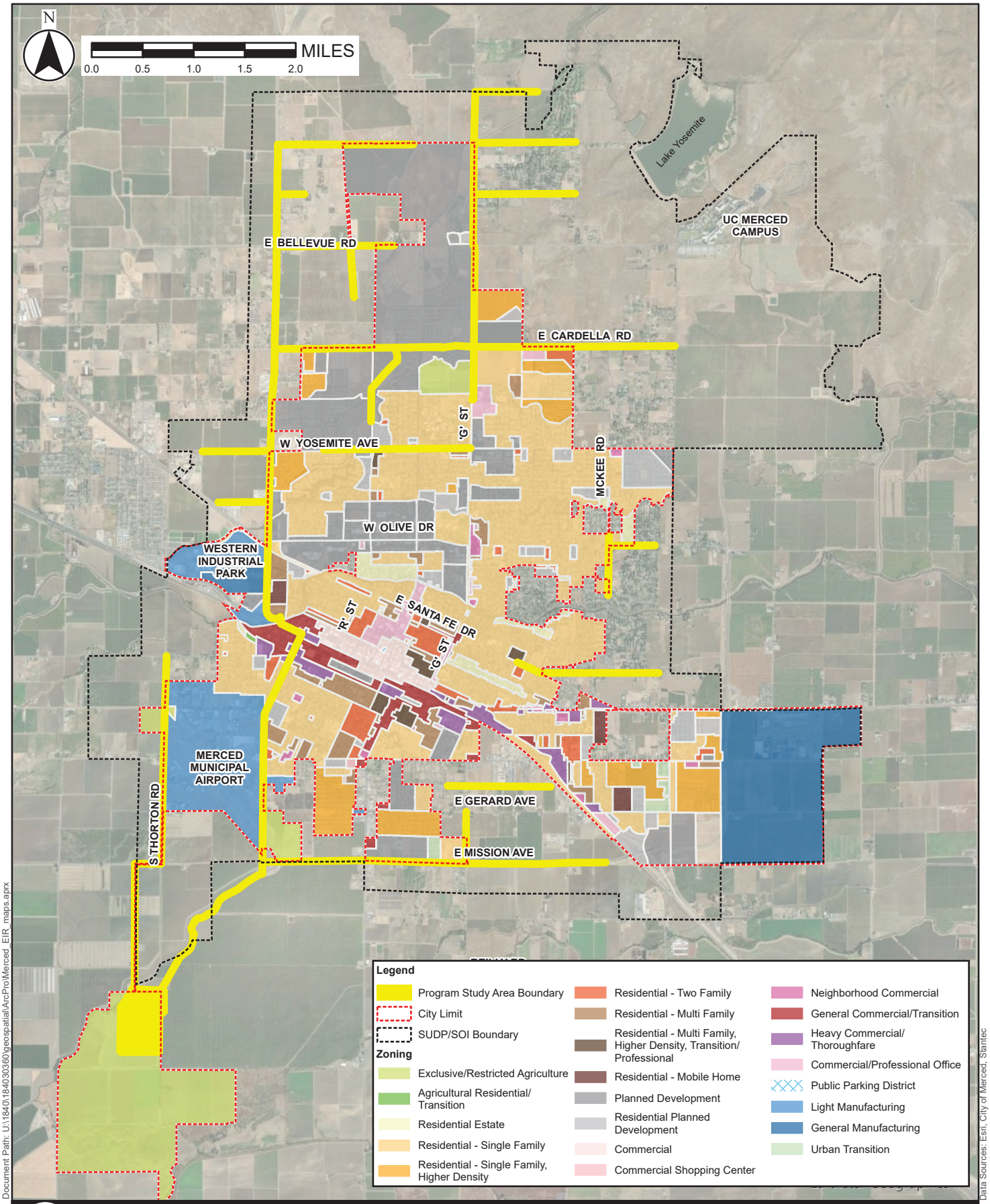
The policies of LAFCO require a development plan and a plan for the extension of services to be submitted with every application for a boundary change, and that would be submitted with any application for annexation. Other policies discourage the annexation of prime agricultural land when significant areas of non-prime agricultural land are already available, and encourage the development of vacant/infill areas within cities before the annexation and development of fringe areas. Additional policies encourage City annexations that reflect a planned, logical, and orderly progression of urban expansion and promote efficient delivery of urban services (City of Merced 2010).

3.10.3 Environmental Setting

The Program Study Area is located within Merced County within the larger Central Valley region of California. The City was incorporated in 1889, and the Program Study Area consists of a mix of residential, commercial, industrial, and public land uses. The City is largely centered around Main Street, which runs northwest to southeast through the City. Agricultural land surrounds much of the Program Study Area around the City limits, with a large portion of open space just to the northeast of the UC Merced campus. Newer development occurs mostly within the northern portion of the City and Program Study Area, while older, more established neighborhoods dominate much of the southern City limits.

The topography of the Program Study Area is characterized by flat land, approximately 155 to 180 feet above mean sea level (amsl) while the climate is typical of the Central Valley with average daily temperatures of 48 degrees Fahrenheit (°F) in January to 95°F in July. Average annual rainfall is approximately 12 inches, with January being the wettest month of year (City of Merced 2010).

Zoning designations within the City include agricultural, residential, planned development, commercial, public parking, manufacturing, and urban transition (**Figure 3.10-1**). Land use designations within the City include agriculture, residential, industrial, commercial, public, school, and open space (**Figure 3.10-2**).



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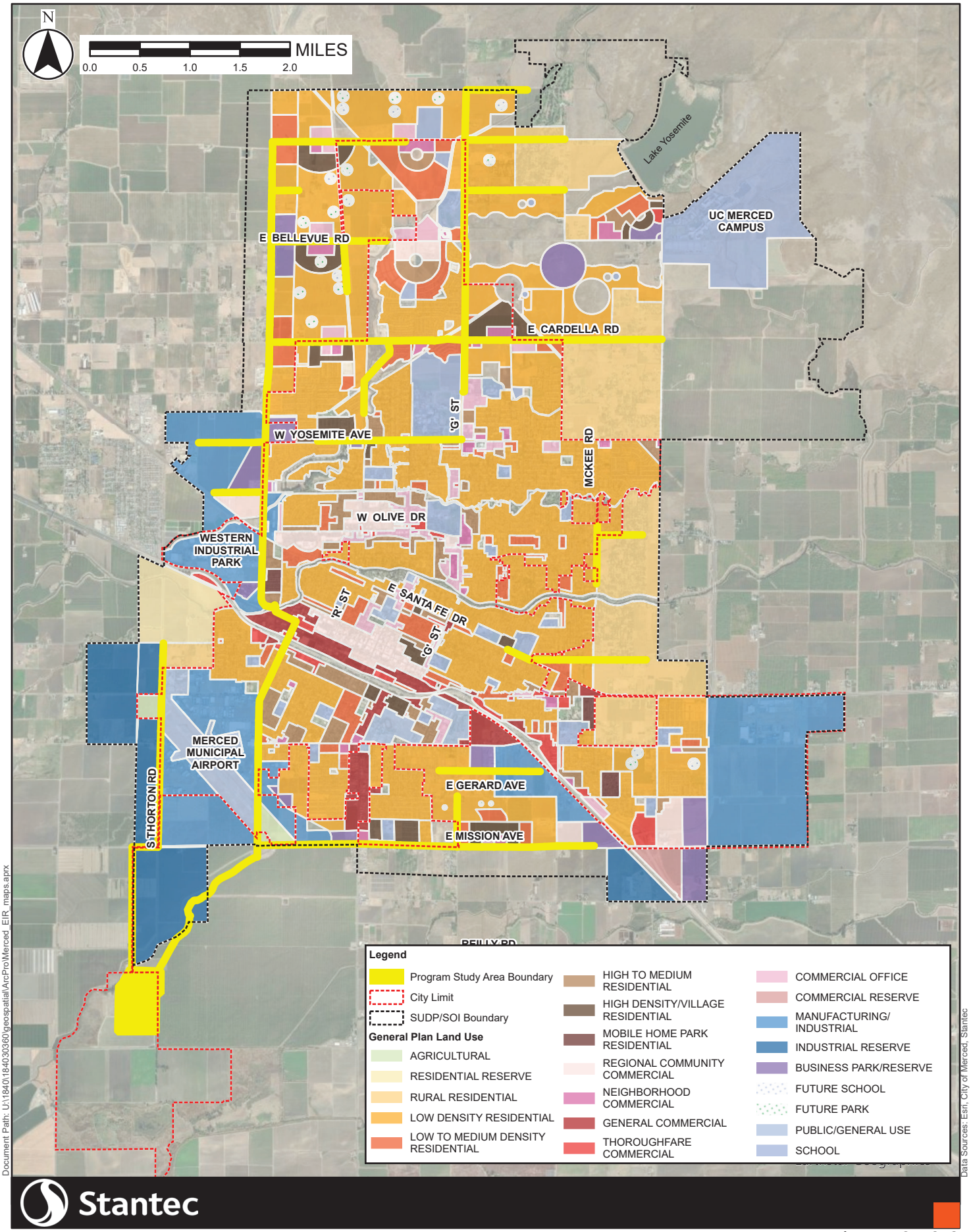
Data Sources: Esri, City of Merced, Stantec

Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.10-1
Zoning



Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.10-2
Merced 2030 General Plan Land Use Designations

3.10.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to land use and planning. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact. The impact analysis of the Program-specific components and the CIPs 1-6 are combined into one description of the Program in the following section to avoid redundancy.

Methodology

The land use analysis in this section evaluates the potential for the Program to cause a significant environmental impact due to a conflict with any applicable plans and policies, including whether the Program would introduce incompatible land uses relative to existing surrounding land uses, which could result in significant environmental impacts. Specifically, the Program was evaluated against the goals, policies and standards of the relevant General Plan policies and zoning ordinance to determine whether land use conflicts or inconsistencies would result, and whether those conflicts or inconsistencies would create significant physical environmental impacts.

Impact Analysis

Impact LAND-1: Potential to physically divide an established community.

Impact LAND-1 Analysis

Combined Program Impacts: North and South Major Improvements, Program Minor Improvements, and WWTF Expansion Projects and Project Impacts: Interim Collection System Improvements (CIP 1-6)

Construction and Operation

Construction and operation of the Program would not require above-ground facilities with the potential to divide an existing or proposed community. Indirectly, the growth-accommodating nature of the Program has the potential to support the planned development of the City's SUDP/SOI, which would involve development of new roadways and communities that if not planned for could potentially physically divide an established community; however, this growth and development was previously analyzed in the 2030 General Plan and found not to be significant. At reasonable build-out, the Program would be located underground and would have little to no affect effect on above-ground communities or roadways. The few above-ground facilities, such as H59PS and/or other potential pump stations or air release valves, would have limited footprints (approximately 2,000 square feet or less) and would be located on undeveloped sites at locations that would not physically divide any established communities. In addition, above-ground features associated with the Program would have architectural finishes to match the surrounding community. The existing communities within the City would continue to be served by improvements identified within the Program and would maintain City services. Therefore, implementation and operation of the Program would not physically divide and established community but would cross through, resulting in a less-than-significant impact.

Level of Significance Prior to Mitigation: Less-Than-Significant
Mitigation Required: None Required

Level of Significance After Mitigation: Less-Than-Significant

Impact LAND-1 Findings

Impact LAND-1 Overall Level of Significance Prior to Mitigation: Less-Than-Significant

Impact LAND-1 Mitigation Required: None Required

Impact LAND-1 Overall Level of Significance After Mitigation: Less-Than-Significant

Impact LAND-2: Potential to cause a significant environmental impact due to a conflict with any land use, plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Impact LAND-2 Analysis

Combined Program Impacts: North and South Major Improvements, Minor Program Improvements, and WWTF Expansion Projects and Project Impacts: Interim Collection System Improvements (1-6)

Construction and Operation

The following analysis considers the Program's potential to conflict with applicable land use plans and policies and regulatory compatibility.

Consistency with the Merced Vision 2030 General Plan

The 2030 General Plan outlines a plan for land use development within the SUDP/SOI that the Program is designed to serve. This planning is done by a series of land use and zoning designations set forth by the City as shown on **Figures 3.10-1** and **3.10-2** (Section 3.10.3, Environmental Setting). The 2022 WCSMP was developed to identify a plan of implementation to meet the wastewater collection system needs of these land uses proscribed by the 2030 General Plan for reasonable build-out conditions. Given that the Program was developed to accommodate implementation of the 2030 General Plan, it is consistent with the overall intent.

Additionally, **Table 3.10-1** provides a cursory review of applicable 2030 General Plan goals and policies and provides a brief evaluation of the Program's consistency with the goal or policy. Resource-specific goals and policies are reviewed and analyzed in more detail, where necessary, in their respective chapters throughout this draft EIR (as referenced within the table). As shown in **Table 3.10-1**, the Program would be consistent with all applicable goals and policies; therefore, impacts would be less-than-significant.

Table 3.10-1: Consistency with the Merced Vision 2030 General Plan Goal and Policies

Policies	Would the Program be Consistent with the Policy?
Goal Area UE-1: Urban Expansion **A Compact Urban Form** **Preservation of Agriculturally Significant Areas** **Efficient Urban Expansion**	
UE-1.1. Designate areas for new urban development that recognize the physical characteristics and environmental constraints of the planning area. The City of Merced is situated in an area which contains physical characteristics and environmental constraints that would be adversely impacted by a poor urban expansion policy. It is in the long-term interest of the City to promote urban expansion policies which protect and promote avoidance of sensitive environmental and resource areas.	Yes. The Program was developed based on the growth projections identified in the Merced Vision 2030 General Plan and is therefore consistent with this policy. No indirect effects related to unplanned development as a result of implementation of the Program would occur.
UE-1.2. Foster compact and efficient development patterns to maintain a compact urban form. Through the promotion of compact urban form, the City of Merced can achieve several important environmental and community planning goals. Through the concentration of urban development within the City's SUDP/SOI, impacts on surrounding agricultural resource lands can be reduced and important prime soils preserved. Additionally, through compact urban development, efficient public transit systems can operate to protect the region's air quality and pedestrian and bicycle use is encouraged. Compact urban development also reduces public infrastructure development and maintenance costs to the City and its residents.	Yes. The Program was developed based on growth projections identified in the Merced Vision 2030 General Plan and is therefore consistent with this policy. No indirect effects related to unplanned development as a result of implementation of the Program would occur.
UE-1.3. Control the annexation, timing, density, and location of new land uses within the City's urban expansion boundaries.	Yes. The Program was developed based on the growth projections identified in the Merced Vision 2030 General Plan and is therefore consistent with this policy. No indirect effects related to unplanned development as a result of implementation of the Program would occur.
UE-1.4. Continue joint planning efforts on the UC Merced and University Community plans. The University Community Plan area is planned as an urban area requiring urban services. Consideration has been given to making this area part of the incorporated City of Merced. Cooperative planning efforts will be necessary to ensure the effective development of this area for all interested and affected parties.	Yes. The Program was developed based on the growth projections identified in the Merced Vision 2030 General Plan and is therefore consistent with this policy. The Program includes the UC Merced planning documents in the growth projections. No indirect effects related to unplanned development as a result of implementation of the Program would occur.
UE-1.5. Promote annexation of developed areas within the City's SUDP/SOI during the planning period. Unincorporated suburban development within the City's SUDP/SOI has resulted in problems of public protection (police and fire) service delivery to residents in addition to posing potential long-term problems to residents with respect to maintenance of onsite water systems and wastewater disposal (septic) systems. Such problems could also threaten the City's future water quality. Also, residents of these areas, while directly impacted by the City's planning decision-making process, have no direct voice in municipal affairs. In the long-term interest of both the City and the residents, these unincorporated suburban areas should be annexed to the City of Merced.	Yes. The Program was developed based on the growth projections identified in the Merced Vision 2030 General Plan and evaluated the SUDP/SOI limits within its Program Study Area for areas to provide wastewater services to. The Program is therefore consistent with this policy. No indirect effects related to unplanned development as a result of implementation of the Program would occur.

Policies	Would the Program be Consistent with the Policy?
UE-1.6. Consider expansion of the City's SUDP/SOI boundary for areas within the Area of Interest when certain conditions are met. Some of the original General Plan Study Areas were found to have constraints which limited their development potential within the current plan timeline. In the interest of flexibility, and to provide interested property owners with some options, certain study areas have been designated as being within the Area of Interest. This area is of interest to the City, as it is likely going to be the location of City expansion in the next General Plan update, 20-40 years hence.	Yes. The Program was developed based on the growth projections identified in the Merced Vision 2030 General Plan and is therefore consistent with this policy. No indirect effects related to unplanned development as a result of implementation of the Program would occur.
Goal Area L-3: Urban Growth and Design **Living Environments which Encourage People to Use a Variety of Transportation Alternatives** **A Compact Urban Village Design for New Growth Areas** **Self-Sustaining, Mixed-Use, Pedestrian-Friendly Neighborhoods** **Transit-Oriented Development Adjacent to the High-Speed Rail Station**	
L-3.7. Implement policies and principles to conform to the intent of the San Joaquin Valley Regional Blueprint. In 2006, the eight Councils of Governments in the San Joaquin Valley (representing the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern) came together to develop a coordinated valley vision, the San Joaquin Valley Regional Blueprint. In April 2009, the San Joaquin Valley Regional Policy Council adopted a Preferred Blueprint Growth Scenario and a list of Smart Growth principles to be used by local jurisdictions in updating their General Plans. Conformity to Regional Blueprint plans are likely to be required per California Senate Bill (SB) 375 in the future.	Yes. The Program would conform to the policies and principals identified in the SJVB as discussed below under the respective heading in this Impact LAND-1 analysis.
Goal Area T-1: Streets and Roads **An Integrated Road System that is Safe and Efficient for Motorized and Non-Motorized Uses** **A Circulation System that is Accessible, Convenient and Flexible** **A Circulation System that Minimizes Adverse Impacts upon the Community** **A Comprehensive System of "Complete Streets" Which Address All Modes of Transportation**	
T-1.4. Promote traffic safety for all modes of transportation As traffic levels on a street approach the street's effective capacity, and as various factors affect how a roadway functions, safety is also affected. This interrelationship lends itself to some repetition among implementing actions relating to safety.	Yes. As discussed in Section 3.15, Transportation, implementation of the Program would not substantially affect transportation during construction or operation. Construction of the Program facilities could temporarily impact circulation systems (such as intermittent ingress and egress or temporary road closures for pipeline construction); however, the effect of the Program would vary depending on the Program facility type (i.e., whether it is a pump station, pipeline, maintenance, or activities at the WWTF). Worker trips from construction workers would affect roadways during commute times but would be inconsequential with an addition of on average 10 to 30 workers (with a few short-duration concentrated peaks of an approximate maximum of 50 workers) at a particular project site with sites dispersed to different parts of the Program Study Area. Worker trips from operations of the Program would be nominal with the potential to add approximately two new workers at the

Policies	Would the Program be Consistent with the Policy?
	WWTF on a given day. The Program would, therefore, be consistent with this policy.
T-1.8. Use a minimum peak hour Level of Service (LOS) "D" as design objectives for all new streets in new growth areas and for most existing City street except under special circumstances. As the City grows, traffic volumes will increase significantly. In designing the City's future circulation system, the City has required sufficient ROW be preserved to maintain an adequate level of service, a minimum of LOS "D" but typically LOS "C" or better. On some existing roadways, such a standard will most likely not be able to be maintained without widening these roadways and causing great disruption to adjacent properties. The City will strive to maintain the minimum LOS throughout the system, but some exceptions may need to be made.	Yes. As discussed in Section 3.15, Transportation, implementation of the Program would not substantially affect transportation during construction or operation. Section 15064.3(a) of the updated CEQA Guidelines shifts transportation impact analysis from a LOS standard to a VMT standard, which refers to the amount and distance of automobile travel attributable to a project and suggests a qualitative analysis to evaluate factors such as the availability of transit, proximity to other destinations for larger construction projects that are not presumed less-than-significant and don not have models or methods available to estimate the VMT. The Technical Advisory provided by Office of Planning and Research (OPR) (described in Section 3.15.2, Regulatory Framework) provides that projects with less than 110 trips per day are presumed less-than-significant (OPR 2018). The Program would result in limited daily construction trips, typically well below this presumption, with some potential intermittent daily peaks during phases of construction such as pouring concrete, excavation of soil, or fill hauling associated mainly with construction of pump stations and WWTF facilities which could exceed this presumed number of trips for limited durations (estimated to be a day to a couple weeks). Most components under the Program would have require fewer trips than the presumed 110 and those occasionally requiring more than 110 would only do so for a very limited duration and would not significantly increase VMT. The Program would, therefore, be consistent with this policy.
Goal Area P-1: Public Facilities and Services **Maintenance and Improvement of Merced's Existing Infrastructure** **New development Which Includes a Full Complement of Infrastructure and Municipal Public Facilities** **Efficient and Cost-Effective Public Service Delivery**	
P-1.1. Provide adequate public infrastructure and municipal services to meet the needs of future development. One of the key elements to promoting a healthy local economy in Merced is the quality of life enjoyed by the City's residents. The quality and availability of urban services and infrastructure is found to be an important measure of urban quality of life. It is understood that facilities and infrastructure not provided by the City is the planning and funding responsibility of other governmental, quasi-public, or private entities.	Yes. The Program was developed based on the growth projections identified in the Merced Vision 2030 General Plan and would provide needed wastewater infrastructure to serve these growth projections.
P-1.2. Utilize existing infrastructure and public service capacities to the maximum extent possible and provide for the logical, timely and	Yes. The Program would expand this existing infrastructure, as needed to meet

Policies	Would the Program be Consistent with the Policy?
economically efficient extension of municipal infrastructure and services where necessary. It is in the community's interest to maintain an efficient and cost-effective public service delivery system. To this end, the City supports development that utilizes and improves existing infrastructure and service delivery systems as much as possible.	the growth projections identified in the Merced Vision 2030 General Plan which would be utilized by both existing and projected development within the City. The Program is, therefore, consistent with this policy.
P-1.3. Require new development to provide or pay for its fair share of public facility and infrastructure improvements. New growth and development within the City is accommodated to assure that adequate space is provided to meet future population growth needs. The City will endeavor to provide for cost-effective new infrastructure and public service expansion to serve that growth. It is the City's policy, however, that new development should not create a financial burden for existing City residents and that all new development should be more self-supporting with respect to infrastructure availability, maintenance, and future municipal service provision.	Yes. As a part of the current 2022 WCSMP planning process the City has been in the process of evaluating financing options for implementation of Program infrastructure to new development. The City is currently in the process of establishing an assessment district which would provide a mechanism for new developments benefiting from new infrastructure to support the financial costs of its development.
Goal Area P-2: Police and Fire Protection Services **Maximum Crime and Fire Protection Services**	
P-2.1. Maintain and enhance public protection facilities, equipment, and personnel to the maximum extent feasible within the resource constraints of the City to serve the City's needs. Public protection services and facilities are to be maintained in the City of Merced at a level that promotes the health and welfare of the City's residents. The City is committed to assuring that facilities, equipment and staffing levels of its fire and police service units meet the highest standard that can be accommodated within the resource constraints of the City.	Yes. The Program would have a less-than-significant impact on police and protection services, as discussed in Section 3.13, Public Services and Utilities.
Goal Area P-3: Water **An Adequate Water Source, Distribution and Treatment Infrastructure System in Merced**	
P-3.1. Ensure that adequate water supply can be provided within the City's service area, concurrent with service expansion and population growth. According to the Merced Water Supply Plan and the Urban Water Management Plan, the City of Merced currently has adequate water resources and will continue to do so if they are properly managed to meet its future growth needs. The City must continue to work closely with the MID in order to ensure that these resources remain stable. The City of Merced is committed to a program of cooperating in the long-term management of the area's water resources and utilizing policies and programs which conserve and manage water use in such a manner as to maintain the potable quality of the City's system and reduce treatment costs on applications which do not require the use of treated water.	Yes. The Program would have a less-than-significant impact on water supply as discussed in Section 3.9, Hydrology and Water Quality, and Section 3.13, Public Services and Utilities.
Goal Area P-4: Wastewater **An Adequate Wastewater Collection, Treatment and Disposal System in Merced**	
P-4.1. Provide adequate wastewater collection, treatment and disposal capacity for existing and projected future needs. Future growth and development will depend on the availability of wastewater system capacity. The City is committed to keeping the City's system current with respect to present and projected future needs of the growing urban area.	Yes. The Program was developed based on the growth projections identified in the Merced Vision 2030 General Plan and is therefore consistent with this policy. No indirect effects related to unplanned development as a result of implementation of the Program would occur.

Policies	Would the Program be Consistent with the Policy?
P-4.2. Consider the use of reclaimed water to reduce non-potable water demands whenever practical. In future years, the urban expansion area of Merced may require the development of expanded wastewater treatment systems as part of a long-term comprehensive wastewater treatment plan. In their design should incorporate beneficial use of treated wastewater. It is necessary that other development components also be planned to incorporate the potential to utilize reclaimed water as a primary or secondary disposal process.	Yes. While the 2022 WCSMP evaluated the wastewater collection system and does not consider the treatment or disposal of treated effluent, the 2022 WCSMP does conceptually outline potential effluent disposal methods available to the City. These methods provide options that would allow the use of reclaimed water which could directly or indirectly reduce non-potable water demands. The Program is consistent with this policy.
Goal Area P-6: Solid Waste **Solid Waste Management Services That Accommodate the Local Population Without Causing Significant Damage to Environmental Resources**	
P-6.2. Minimize the potential impacts of waste collection, transportation and disposal facilities upon the residents of Merced. The Merced County Regional Waste Management Authority landfill is located on the western side of the City's expansion area along Highway 59. This facility will most likely be in operation well into the next century and will impact development and growth on the City's northwestern edge. It is in the City's interest to work closely with Merced County Regional Waste Management Authority on solid waste reduction programs and to develop strategies for protecting the existing landfill site from encroachment by non-compatible uses.	Yes. Impacts associated with solid waste are less-than-significant for the Program as identified in Section 3.13, Public Service and Utilities, and therefore, the Program is consistent with this policy.
Goal Area OS-1: Open Space for the Preservation of Natural Resources **Maintenance or Merced's Biological Resources** **A High-Quality, Expanding Urban Forest** **Preservation of scenic corridors and Resources** **Improvement and Enhancement of Water Quality**	
OS-1.1. Identify and mitigate impacts to wildlife habitats which support rare, endangered, or threatened species. The Merced SUDP/SOI is known to contain potential habitat for several sensitive wildlife species. Much of this potential habitat is located along riparian corridors of the community's creek system in vernal pools found in the northern part of the City's SUDP/SOI area, and on some agricultural lands throughout the planning area. As a matter of law, the City is required to review development proposals that threaten to impact known sensitive species. As a matter of policy, the City is committed to integrating potential wildlife habitat into the regional park and recreation system to enhance community awareness of the region's wildlife resources and to provide shelter for native plant and animal life of the area.	Yes. As discussed in Section 3.4, Biological Resources, all impacts related to biological resources resulting from construction and operation of the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.
OS-1.2. Preserve and enhance creeks in their natural state throughout the planning area. The urban creek system of Merced provides an important open space element within the City and provides important wildlife habitat. This creek system is also an integral part of the City's drainage system. The City is committed to a policy of preserving and protecting these important open space resources and assuring their continued viability as open space and drainage corridors.	Yes. As discussed in Section 3.4, Biological Resources, impacts to creeks and riparian areas from construction and operation are less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.

Policies	Would the Program be Consistent with the Policy?
OS-1.3. Promote the protection and enhancement of designated scenic routes. Historically, the City of Merced has developed along routes and corridors which have come to be part of the City's identity. The City has designated many of these scenic routes for special development review regulation in the past. This practice has served the City well and will be continued into the future.	Yes. As discussed in Section 3.1, Aesthetics and Visual Resources, impacts related to scenic resources are considered less-than-significant. Therefore, the Program is consistent with this policy.
OS-1.4. Improve and expand the City's urban forest. Early in the development of Merced, trees were planted to provide shelter from wind and summer heat. As a result, the City has a large number of mature trees along its streets, in public places and in private yards and has been designated a "Tree City USA" for over 30 years. The City's urban forest provides valuable wildlife habitat and creates an attractive atmosphere for residents and visitors alike. Additionally, the City's trees have substantially reduced summer heat and glare around paved areas, thereby helping the City maintain a cooler summer average temperature and reduce energy usage. In continuing this tradition, the City of Merced has established policies and programs to protect, maintain and expand its urban forests.	Yes. As discussed in Section 3.4, Biological Resources, impacts to trees resulting from the Program would be less-than-significant. Therefore, the Program is consistent with this policy.
OS-1.5. Preserve and enhance water quality. Water has become one of the most important resources for determining a region's ability to grow and prosper. California has enacted several major laws which require local communities to address the complicated issue of resources. The City of Merced has adopted policies addressing the conservation of urban water use and a development strategy to meet future water needs (Section 5.2.3 [of the 2030 General Plan]). The final element in the City's comprehensive water strategy is the preservation of water quality. It should be noted that these policies are directed towards enhancing or implementing the many existing water quality regulations which affect the City and its residents.	Yes. As discussed in Section 3.9, Hydrology and Water Quality, impacts related to water quality resulting from the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.
Goal Area OS-2: Open Space for the Managed Production of Resources Protection of Regional Agricultural Resources	
OS-2.1. Protect agricultural areas outside the City's SUDP/SOI from urban impacts. Regional agricultural cropland provides an economic base for the City of Merced, and the long-term economic health of the City is directly linked to conserving the productive capacity of regional farmland. To this degree, the City has established urban expansion policies directing urban growth away from "prime" agricultural soils. Policies are also needed to protect farmland along the urban perimeter and to promote open space policies which protect farmland and the farming industry.	Yes. As discussed in Section 3.2, Agricultural and Forestry Resources, impacts related to agricultural areas resulting from the Program would be less-than-significant. Therefore, the Program is consistent with this policy.
Goal Area OS-4: Open Space for Public Health and Safety A Safe Environment for Merced's Citizens	
OS-4.1. Preserve open space areas which are necessary to maintaining public health and safety. Areas within the City which may represent a substantial risk to public health and safety have historically been designated for open space uses which may permit limited public or private use but reduce potential exposure of the public to potential health hazards. The City is committed to continuing to protect public health, where practical, by limiting the potential for public exposure through the sound application of open space practices and policies.	Yes. As discussed in Section 3.14, Recreation, impacts to recreational resources, including open space, resulting from the Program are less-than-significant. Therefore, the Program is consistent with this policy.
Goal Area OS-5: Conservation of Resources Conservation of Water Resources	

Policies	Would the Program be Consistent with the Policy?
Preservation and Protection of Soil Resources	
OS-5.1. Promote water conservation throughout the planning area. Water is a finite resource in the Central San Joaquin Valley and is an essential ingredient to the region's continued agricultural production capacity as well as a vital element in the continued growth of the Merced Metropolitan Area. The City, in conjunction with the MID, has studied the long-term needs for water and concluded that water conservation must be part of any successful long-term water development strategy. For this reason, the City is committed to continue its water conservation efforts and expand on those efforts where necessary.	Yes. As discussed in Section 3.9, Hydrology and Water Quality, water required during construction would be minimal and no water would be required for operations of the wastewater collection system post-construction. Therefore, the Program is consistent with this policy.
OS-5.2. Protect soil resources from the erosive forces of wind and water. Merced is situated on some of the finest soil resources found in the Central San Joaquin Valley. Some of these soils are of a silty-loam texture and highly vulnerable to erosion from wind and water. Wind erosion contributes to the region's PM10 and PM 2.5 air quality problems, as discussed in the Sustainable Development Chapter (8) of this General Plan, and water erosion can contribute to sedimentation of the region's surface water drainage system. In all cases, the loss of soil through erosive forces of nature degrades the productive capacity of the land and contributes to regional environmental problems.	Yes. As discussed in Section 3.7, Geology, Soils and Mineral Resources, impacts related to soil erosion, both during and post-construction for the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.
Goal Area SD-: Air Quality and Climate Change **Clean Air with Minimal Toxic Substances and Odor** **Clean Air with Minimal Particulate Content** **Effective and Efficient Transportation Infrastructure** **Coordinated and Cooperative Inter-Governmental Air Quality Programs** **Reduction in the Generation of Greenhouse Gases (GHG) from New Development**	
SD-1.1. Accurately determine and fairly mitigate the local and regional air quality impacts of projects proposed in the City of Merced. The environmental assessment process required under the [CEQA] is by far the most important tool for local government to communicate with other agencies and the public on the air quality impacts of development within a community. CEQA, however, has only limited applicability with respect to development review and approval. The law focuses on "Discretionary" projects, as opposed to "administrative" development proposals. As a result, large-scale developments, which typically require "discretionary" permits are often subjected to CEQA mitigation that is not required of "administrative" projects. While consistent application of CEQA can make a difference in project-level air quality impacts, uniform air quality standards for all projects could make a significant contribution toward limiting regional, cumulative air quality impacts.	Yes. As discussed in Section 3.3, Air Quality and GHG, impacts related to air quality resulting from the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.
SD-1.5. Provide public facilities and operations which can serve as a model for the private sector in implementation of air quality programs. City and County governments are often the largest employers in a jurisdiction and operate large vehicle fleets. While it is recognized that the City of Merced has very limited resources with which it can play any meaningful role in supporting private sector energy conservation efforts, the City can pursue policies and programs which may have private sector applicability. In this respect, the City may take a leadership role in implementing employer-based trip reduction programs and fleet operator programs to reduce the City's emissions, demonstrate cost-effective energy management techniques, and save public money.	Yes. As discussed in Section 3.3, Air Quality and GHG, impacts related to air quality resulting from the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.

Policies	Would the Program be Consistent with the Policy?
SD-1.6. Reduce emissions of PM_{10} and other particulates with local control potential. The levels of PM_{10} and $PM_{2.5}$ (particulate matter less than 10 and 2.5 microns in diameter) exceed state and federal health-based standards. The San Joaquin Valley is classified as a serious nonattainment area for PM_{10} under the federal criteria. Because of this classification, the Air District is subject to a series of federal mandates aimed at achieving federal ambient air quality standards. Control efforts for sources under the jurisdiction of cities and counties can significantly reduce these emissions.	Yes. As discussed in Section 3.3, Air Quality and GHG, impacts related to air quality, and specifically emissions of PM_{10}, resulting from the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.
Goal Area SD-2: Cultural Resources **A Diverse and Rich Historic and Cultural Resource Environment** **A Long-Term Community Historic Preservation/Improvement Program**	
SD-2.1. Identify and preserve the City's archaeological resources. It is thought that the San Joaquin Valley was inhabited in the late Pleistocene and early Holocene period, dating from perhaps as early as 12,000 years before the present. Prior to Euro American arrival, the San Joaquin Valley was occupied by Yokuts Indian populations. The Yokuts settlement system was characterized by principal villages on terraced areas adjacent to watercourses. Knowledge of these early inhabitants is limited. It is likely that the streams traversing the Merced Planning Area served as settlements for Yokuts and it is a state policy to preserve and protect the archaeological resources of the region.	Yes. As discussed in Section 3.5, Cultural Resources and Tribal Cultural Resources, impacts related to archaeological resources resulting from the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.
SD-2.2. Identify and preserve the City's historic and cultural resources. The City of Merced contains many fine examples of its early development. Historic buildings, tree plantings, and other improvements serve to give the City a special character which is unique in the San Joaquin Valley. The City of Merced is dedicated to preserving, protecting and enhancing its historic and cultural resources.	Yes. As discussed in Section 3.5, Cultural Resources and Tribal Cultural Resources, impacts related to archaeological resources resulting from the Program would be less-than-significant with mitigation incorporated. Therefore, the Program is consistent with this policy.
Goal Area SD-3: Energy Resources **Sustainable Energy Resource Use in the City of Merced**	
SD-3.1. Promote the use of solar energy technology and other alternative energy resources. Merced is located in an area that can benefit from the use of solar energy technology and other alternative energy resources to lower household heating and cooling costs.	Yes. The Program does not prevent or directly require the use of solar technology or other alternative energy resources; however, the energy demands of the infrastructure identified in the Program (i.e. the WWTF expansion and H59PS and/or new pump stations) could be powered by renewable energy resources. Additionally, the WWTF currently has the ability to use methane gas from the biosolids drying process.
Goal Area N-1: Noise **Protection of City residents from the harmful and Annoying Effects of Exposure to Excessive Noise** **Protection of the Economic Base of the City by Preventing Incompatible Land Uses from Encroaching upon Existing or Planned Noise-Producing Uses** **The Application of State of the Art Land Use Planning Methodologies in Areas of Potential Noise Conflicts.**	
N-1.3. Reduce equipment noise levels.	Yes. As discussed in Section 3.11, Noise and Vibrations, impacts related to noise from construction and operations of the Program would be less-than-significant with mitigation incorporated. Therefore, the Program would be consistent with this policy.

Policies	Would the Program be Consistent with the Policy?
N-1.6. Mitigate all significant noise impacts as a condition of project approval for sensitive land uses.	Yes. As discussed in Section 3.11, Noise and Vibrations, impacts related to noise from construction and operations of the Program would be less-than-significant with mitigation incorporated. Therefore, the Program would be consistent with this policy.
Goal Area S-2: Seismic Safety **Reasonable Safety for City Residents from the Hazards of Earthquake and Other Geologic Activity**	
S-2.1. Reduce the potential danger from earthquake and seismic-related activity from existing buildings where necessary.	Yes. As discussed in Section 3.7 , Geology, Soils, and Mineral Resources, impacts related to earthquakes and seismic-related activity resulting from the Program would be less-than-significant. All current CBC specifications related to structural stability would be used in the design of the Program components. Therefore, this policy is consistent with this policy.
S-2.2. Encourage the improvement of all public facilities and infrastructure such as natural gas, fuel, sewer, water, electricity, and railroad lines and equipment with up-to-date seismic safety features.	Yes. As discussed in Section 3.7, Geology, Soils, and Mineral Resources, impacts related to earthquakes and seismic-related activity resulting from the Program would be less-than-significant. All current CBC specifications related to structural stability would be used in the design of the Program components. Therefore, this policy is consistent with this policy.
Goal Area S-3: Flooding **Protect People and Property for Flood Risk**	
S-3.3. Maintain essential City services in the event of flooding or dam failure.	Yes. As discussed in Section 3.9, Hydrology and Water Quality, impacts related to flooding resulting from the Program would be less-than-significant. Therefore, the Program would be consistent with this policy.
S-3.4. Locate and design essential facilities to minimize flood risk.	Yes. As discussed in Section 3.9, Hydrology and Water Quality, impacts related to flooding resulting from the Program would be less-than-significant. Therefore, the Program would be consistent with this policy.
Goal Area S-4: Fire Protection **Fire and Hazardous Material Safety for the Residents of the City and For Those Working in Fore Suppression**	
S-4.2. Maintain a reasonable level of accessibility and infrastructure support for fire suppression, disaster, and other emergency services.	Yes. As discussed in Section 3.8, Hazards, Hazardous Materials, and Wildfires, and Section 3.13, Public Services and Utilities, impacts related to emergency services and infrastructure would be less-than-significant. Therefore, the Program would be consistent with this policy.
Goal Area S-5: Airport Safety **A Safe Airport Environment Both Above and On the Ground**	
S-5.2. Prevent the encroachment of potential hazards to flight within the airport's airspace.	Yes. As discussed in Section 3.8, Hazards, Hazardous Materials, and Wildfires, impacts

Policies	Would the Program be Consistent with the Policy?
	related interference with airport operations would be less-than-significant with mitigation incorporated. Therefore, the Program would be consistent with this policy.

Consistency with City of Merced Zoning Ordinance

The City's zoning ordinance requires that a zoning designation applied to a project site must be consistent with the General Plan and the anticipated used of the project site. Because this Program consists of public infrastructure improvement and upgrades to achieve the reasonable build-out projections identified in the 2030 General Plan, the Program would be compatible with the designated land uses within the City's SUDP/SOI. Therefore, the impact would be less-than-significant.

Consistency with the San Joaquin Valley Blueprint

Implementation of the Program would not include housing or commercial buildings so key principals related to housing within the SJVB do not apply to the Program. However, the Program would not conflict or prevent the implementation of the following principals in this document:

- Preserve open space, farmland, natural beauty, and critical environmental areas; and
- Support actions that encourage environmental resource management.

Therefore, the Program would be consistent with the SJVB, and the impact would be less-than-significant.

Overall Consistency

An overall review of applicable plans and policies found the Program is consistent and would have no impact. Additionally, consistency analyses were completed in the respective resource's sections, where applicable, throughout Chapter 3.0, Environmental Impact Assessment as referenced in **Table 3.10-1**. The Program was found to be consistent with these resource-specific plans as well; therefore, the impact would be less-than-significant.

Level of Significance Prior to Mitigation: Less-Than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-Than-Significant

Impact LAND-2 Findings

Impact LAND-2 Overall Level of Significance Prior to Mitigation: Less-Than-Significant

Impact LAND-2 Mitigation Required: None Required

Impact LAND-2 Overall Level of Significance After Mitigation: Less-Than-Significant

3.10.5 Land Use and Planning Mitigation

No mitigation required.

3.11 NOISE AND VIBRATION

3.11.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- 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 or other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.

The following potential impact related to hazardous noise levels is discussed in Section 3.8, Hazards, Hazardous Materials, and Wildfires Impact HAZ-5:

- 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, would the project expose people residing or working in the Project area to excessive noise levels.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to noise and vibration that may result from implementation of the Program, identifying mitigation for potentially significant impacts, where feasible.

3.11.2 Regulatory Framework

This section discusses the Federal, state regulations and local policies and objectives related to noise and vibration that are relevant to the Program.

3.11.2.1 Federal

Federal, state, and local agencies regulate different aspects of environmental noise and vibration. Generally, the federal government sets standards for transportation-related noise and vibration sources closely linked to interstate commerce. These include aircraft, locomotives, and trucks but are not generally applicable to non-transportation related type projects. However, while not directly applicable, the federal standards for vibration can be helpful to the evaluation of construction vibration impacts associated with construction equipment used for implementation of the Program.

Federal Transit Authority Vibration Standards

The Federal Transit Authority (FTA) has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 3.11-1.**

Table 3.11-1: Construction Vibration Damage Criteria

Building Category	Peak Particle Velocity (PPV) (in/sec)
Reinforced Concrete, steel or timber (no plaster)	0.5
Engineered concrete and masonry (no plaster)	0.3
Non-engineered timber and masonry buildings	0.2
Buildings extremely susceptible to vibration damage	0.12

Source: FTA 2018

The FTA has also adopted standards associated with human annoyance for groundborne vibration impacts for three land use categories: 1) High Sensitivity; 2) Residential; and 3) Institutional. **Table 3.11-2** describes these three categories as well the associated vibration thresholds associated with human annoyance for these categories.

Table 3.11-2: Groundborne Vibration Impact Criteria for General Assessment

Land Use Category	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB	65 VdB	65 VdB
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

Source: FTA 2018
Notes:
1. More than 70 events per day
2. 30-70 events per day
3. Fewer than 30 events per day
VdB = vibration decibels

3.11.2.2 State

The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and General Plan policies. Local General Plans identify general principles intended to guide and influence development plans.

State of California General Plan Guidelines – Noise Elements

The State of California General Plan Guidelines (Governor's OPR 2017) establishes guidelines for the preparation of local General Plan noise elements, including a sound level/land use compatibility chart that categorizes, by land use, outdoor day/night noise level (L_{dn}) ranges in four categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable). For many land uses, there are overlapping L_{dn} ranges for two or more compatibility categories. **Table 3.11-3** lists the normally acceptable range and conditionally acceptable range of L_{dn} values in decibels (dB) for various types of land uses.

Table 3.11-3: State of California General Plan Acceptable Noise Range Guidelines

Land Use[a]	General Plan Acceptable Noise Range	
	Normally Acceptable Range	Conditionally Acceptable Range
Low-Density Residential	less than 60 dB	55–70 dB
High-Density Residential	less than 65 dB	60–70 dB
Educational and Medical Facilities	less than 70 dB	60–70 dB
Office and Commercial	less than 70 dB	68–78 dB

Notes:
Not all land use types are included here. A general overview of various land use types has been provided for context purposes. All full list of land uses specific to the City of Merced is provided in Table 3.11-7.

When noise levels are in the conditionally acceptable range, new construction should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation requirements are included in the design.

These overlapping L_{dn} ranges are intended to indicate that local conditions (existing sound levels and community attitudes toward dominant sound sources) should be considered in evaluating land use compatibility at specific locations.

California Department of Transportation

Caltrans Transportation and Construction Vibration Guidance Manual does not contain official Caltrans standards for vibration. However, this manual provides guidelines that can be used as screening tools for assessing the potential for adverse vibration effects related to structural damage and human annoyance. This is meant to provide practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. The vibration criteria established by Caltrans for assessing human annoyance and structural damage are shown in **Tables 3.11-4** and **3.11-5** respectively.

Table 3.11-4: Vibration Annoyance Potential Criteria Guidelines

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Notes:
Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
Source: Caltrans 2020a, 2020b

Table 3.11-5: Vibration Damage Potential Criteria Guidelines

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structure	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes:
Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
Source: Caltrans 2020a

3.11.2.3 Local

Merced Vision 2030 General Plan

The 2030 General Plan contains several policies that directly or indirectly pertain to noise, including the following:

Goal Area N-1: Noise

- **Policy N-1.3.** Reduce equipment noise levels.
    - **N-1.3.a.** Limit operating hours for noisy construction equipment used in the City of Merced.
    - **N-1.3.b.** Review City functions (e.g. construction, refuse collection, street sweeping, tree trimming) to insure that noise generated by equipment has been reduced to the lowest practicable level.
    - **N-1.3.c.** Include maximum noise level permitted for City equipment purchases and construction contracts.
- **Policy N-1.5.** Coordinate Planning Efforts so that Noise-Sensitive Land Uses are not Located Near Major Noise Sources
    - **N-1.5.f.** As feasible, require noise barriers and/or increased setbacks between heavy circulation corridors and noise-sensitive land uses.

Table 3.11-6: Exterior Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources

Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	55	45

Notes:
Titled as Table N-1 in Noise Element

Each of the noise levels specified above shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises (e.g., humming sounds, outdoor speaker systems). These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

The City can impose noise level standards that are more restrictive than those specified above based upon determination of existing low ambient noise levels.

Fixed noise sources which are typically of concern include, but are not limited to the following:

HVAC Systems	Cooling Towers/Evaporative Condensers	Pump Stations
Lift Stations	Emergency Generators	Boilers
Steam Valves	Steam Turbines	Generators
Fans	Air Compressors	Heavy Equipment
Conveyor Systems	Transformers	Pile Drivers
Grinders	Drill Rigs	Gas or Diesel Motors
Welders	Cutting Equipment	Outdoor Speakers
Blowers		

The types of uses which may typically produce the noise sources listed above include but are not limited to: industrial facilities including pump stations, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.

In the General Plan Noise Element, Table N-2, General Requirements for an Acoustical Analysis, lists how the acoustical analysis should be prepared. Pursuant to the Noise Element, the analysis should:

- Be the financial responsibility of the applicant.
- Be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics.
- Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources.
- Estimate existing and projected cumulative (20 years) noise levels in terms of Ldn or Community Noise Equivalent Level (CNEL) and/or the standards of **Table 3.11-6,** and compare those levels to the adopted policies of the Noise Element.

- Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element, giving preference to proper site planning and design over MMs which require the construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses.
- Estimate noise exposure after the prescribed MMs have been implemented.
- Describe a post-project assessment program that could be used to evaluate the effectiveness of the proposed mitigation measures.

The above implementing actions will be used in City planning efforts in order to ensure that noise-sensitive land uses are not located adjacent to major noise sources or if they are, that the noise impacts are minimized as much as possible, using the standards described above.

- **Policy N-1.6.** Mitigate all significant noise impacts as a condition of project approval for sensitive land uses.
    - **N-1.6.a.** Where noise MMs are required to achieve the standards of **Table 3.11-6**, the emphasis of such measures should be placed upon site planning and project design. The use of noise barriers should be considered a means of achieving the noise standards only after all other practical design-related noise MMs have been integrated into the project.
    - **N-1.6.b.** Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the performance standards of **Table 3.11-6**, an acoustical analysis may be required as part of the environmental review process so that noise mitigation may be included in the project design.

Additionally, the 2030 General Plan Noise Element also includes a land use compatibility chart which is shown in **Table 3.11-7**:

Table 3.11-7: Community Noise Exposure Compatibility by Land Use Category

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dB)						
	50	55	60	65	70	75	80
Residential							
Transient Lodging Motels, Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters							

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dB)						
	50	55	60	65	70	75	80
Sports Area, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, and Agricultural							

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are or normal conventional construction, without any special noise requirements
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.
Normally Unacceptable: New construction or development should be discouraged. In new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
Clearly Unacceptable: New construction or development clearly should not be undertaken.

City of Merced Noise Ordinance

The City Municipal Code (Section 10.40, Truck Routes) includes designated truck routes that are to be used within the City to avoid unnecessary noise in incompatible areas. These truck routes avoid the major residential areas and are limited to major roadways within the City.

County of Merced Noise Ordinance

The noise standard for the Merced County Code (Code 18.41.070) apply to unincorporated areas of Merced County. Section 18.41.070 of this ordinance includes the following provisions:

- Noise generated by mechanical equipment, buzzers, bells, loud speakers or other noise generating devices shall comply with the noise standards below at any boundary line of the parcel, except fire protection devices, burglar alarms and church bells. The following General Plan standards for unacceptable noise levels shall apply:

- If the proposed use is adjacent to property that is zoned for residential use, the maximum noise level shall not exceed 65 A-weighted decibels (dBA) L_{dn} or 75 dBA maximum A-weighted noise level (L_{max}) at the property line.
- If the proposed use is adjacent to a parcel that is not zoned for residential land use, the maximum noise level at the property line shall not exceed 70 dBA L_{dn} or 80 dBA L_{max} at the property line.
- The maximum noise level for uses receiving noise shall be 65 dBA L_{dn} for uses in Residential Zones and 70 dBA L_{dn} for Institutional, Commercial, Industrial and Agricultural Zones4.

- During construction, the noise level may be temporarily elevated. To minimize the impact, all construction in or adjacent to urban areas shall follow the following procedures for noise control: Construction hours shall be limited to the daytime hours between 7:00 a.m. and 6:00 p.m., and all construction equipment shall be properly muffled and maintained.

3.11.3 Environmental Setting

3.11.3.1 Noise Baseline and Terminology

Table 3.11-8 defines common terminology and metrics used throughout this section for easy reference and **Table 3.11-9** outlines typical noise levels for common noise sources to provide perspective on Program noise levels compared to common noise sources.

Table 3.11-8: Definition of Acoustical Terms

Term	Definition
Decibel (dB)	Unit of measurement of sound level.
Decibel A-Weighted (dBA)	A unit of measurement of sound level corrected to the A-weighted scale, as defined in ANSI S1.4–1971 (R1976), using a reference level of 20 micropascals (0.00002 Newtons per square meter).
A-Weighted Scale	A sound measurement scale, which corrects the pressures of individual frequencies according to human sensitivities. The scale is based upon the fact that the region of highest sensitivity for the average ear is between 2,000 and 4,000 Hz. Sound levels are measured on a logarithmic scale in decibels, dB. The universal measure for environmental sound is the A-weighted sound level, dBA.
Hertz (Hz)	Unit of measurement of frequency, numerically equal to cycles per second.
Loudness	A listener's perception of sound pressure incident in his ear.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded one percent, 10 percent, 50 percent, and 90 percent of the time during the measurement period.
Equivalent Noise Level (L_{eq})	Also called the equivalent continuous noise level. It is the continuous sound level that is equivalent, in terms of noise energy content, to the actual fluctuating noise existing at the location over a given period, usually one hour. L_{eq} is usually measured in hourly intervals over long periods in order to develop 24–hour noise levels.
CNEL	The CNEL is a measure of the cumulative noise exposure in the community, with greater weights applied to evening and nighttime periods. This noise descriptor is the equivalent noise level over a 24–hour period mathematically weighted during the evening and night when residents are more sensitive to intrusive noise. The daytime period is from 7:00 a.m. to 7:00 p.m.; evening from 7:00 p.m. to 10:00 p.m.; and nighttime from 10:00 p.m. to 7:00 a.m. A weighting factor of 1 dB is added to the measured day levels defined as 7:00 a.m. to 7:00

Term	Definition
	p.m., evening levels (7:00 p.m. to 10:00 p.m.) have a weighting factor of three and 10 dB to the nighttime levels (10:00 p.m. to 7:00 a.m.). The weighted levels over a 24–hour period are then averaged to produce the single number CNEL rating.
Day/Night Noise Level (L_{dn})	The same as CNEL except that the evening time period is not considered separately, but instead is included as part of the daytime period. Measurements of both CNEL and L_{dn} in the same residential environments reveal that CNEL is usually slightly higher (by less than 1 dB) than L_{dn} due to the evening factor weighting.
L_{min}, L_{max}	The minimum and maximum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Table 3.11-9: Typical Sound Levels of Common Noise Sources

Decibels	Description
130	Threshold of pain
120	Jet aircraft take-off at 100 feet
110	Riveting machine at operators' position
100	Shotgun at 200 feet
90	Bulldozer at 50 feet
80	Diesel Locomotive at 300 feet
70	Commercial jet aircraft interior during flight
60	Normal conversational speech at five to ten feet
50	Open office background level
40	Background level within a residence
30	Soft whisper at two feet
20	Interior of recording studio

Source: City of Merced 2012

The existing noise environment in a Project area is characterized by the area's general level of development because the level of development and ambient noise levels tend to be closely correlated. Areas that are not urbanized are relatively quiet, while areas that are more urbanized are nosier because of roadway traffic, industrial activities, and other human activities.

The measurement of any sounds level requires language used specifically for the measurement of acoustical conditions. Decibel or dB is the preferred unit used to measure sound levels using logarithmic scale to account for the large range in audible sound intensities. A general rule for dB scale is that a 10-dB increase in sound is perceived as a doubling of loudness by the human ear (Federal Highway Administration [FHWA] 2017). For example, a 55-dB sound level would sound twice as loud as a 45-dB sound level. The average healthy person cannot detect differences of 1 dB, whereas a 5-dB change is clearly noticeable. Several sound measurement descriptors are used to assess the effects of sound on the human environment. These include the equivalent sound level, which is the level of a constant sound that has the same sound energy as the actual fluctuating sound. It is similar to the average sound level.

The day-night sound level, L_{dn}, is similar to the 24-hour L_{eq}; except that a 10-dB penalty is added to sound levels between 10:00 p.m. and 7:00 a.m. to account for the greater sensitivity of people to sound at night. The CNEL also places a weighted factor on sound events occurring in the evening hours. The L_{90} value is the sound level (L) that is exceeded 90 percent of the time and is often used to describe the background or residual sound level.

Existing ambient noise levels and predicted noise levels associated with reasonable build-out within the Program Study Area were analyzed in the draft EIR for the 2030 General Plan (City of Merced 2010). Existing noise levels within the Program Study Area were set forth in the 2030 General Plan Draft EIR and vary based on location and time of day, but generally range from 45 dBA to 79 dBA, with an average of 62 dBA (City of Merced 2010). Similarly, at reasonable build-out, the 2030 General Plan Draft EIR estimated noise levels would also vary based on location within the City but would range from 52 dBA to 81 dBA, with an average of 66.5 dBA (City of Merced 2010). Due to the relatively flat topography of the region, noise tends to travel further when unobstructed by structures.

3.11.3.2 Vibration

Operation of heavy construction equipment, particularly pile driving and other impact devices such as pavement breakers, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance would result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes would decrease with increasing distance.

Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction activities. As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second [in/sec]) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the PPV. **Table 3.11-4** summarizes vibration annoyance potential criteria guidelines suggested by Caltrans, while **Table 3.11-5** summarizes vibration damage potential criteria guidelines suggested by Caltrans.

Existing groundborne vibration levels within the Program Study Area include heavy-duty vehicular traffic on local roadways, railway operations from the UPRR and the BNSF railroad tracks, as well as airport activities from the Merced Regional Airport (City of Merced 2012).

3.11.3.3 Noise-Sensitive Receptors

Noise-sensitive receptors are typically defined as land uses that are more sensitive to noise than others. These can include residential, school, library, and hospital uses, which often require concentrating, sleeping, or other activities that require a quiet atmosphere.

The Program would largely be built within the City's SUDP/SOI, which includes urban, rural, commercial, residential, and industrial areas. Noise-sensitive receptors, including homes, schools, parks, hospitals, and commercial businesses, are located throughout the area. The City generally tends to be situated around Main Street, which runs in a northwest to southeast direction. Typically, older residential and

commercial development exists in the southern limits of the Program Study Area, while newer development and commercial buildings exist moving northward. The extreme northern areas within the Program Study Area remain largely undeveloped and currently consist of open and rural areas, with planned development in the future.

North Merced: The nearest noise-sensitive receptors to the North Merced major sewer improvements are El Capitan High School and the residential housing developments on either side of the main roadways.

South Merced: The nearest noise-sensitive receptors to the South Merced major sewer improvements are Farmdale Elementary School and the residential homes on either side of the main roadways.

WWTF Expansion: The nearest noise-sensitive receptor to the WWTF is a single-family residence and is approximately 0.4 miles (approximately 2,100 feet) north of the WWTF.

Interim Sewer Improvement Projects (CIPs 1-6):

CIP 1 – BRPS Discharge: The nearest noise-sensitive receptors are residential housing developments.

CIP 2 – Parallel Sewer and Bear Creek Crossing: The nearest noise-sensitive receptors are residential homes, Merced Scholars Charter School, Merced Valley Community School, and Leontine Gracey Elementary School.

CIPs 3 and 4 – Replace 48-inch Interceptor and West Avenue Sewer: The nearest noise-sensitive receptors are residential homes, Merced Scholars Charter School, Merced Valley Community School, and Margaret Sheehy Elementary School.

CIP 5 – Yosemite Avenue Extension: The nearest noise-sensitive receptors are residential housing developments and Merced College.

CIP 6 – Parallel G Street Sewer: The nearest noise-sensitive receptors are residential housing developments and Dignity Health Hospital.

3.11.3.4 Airports and Airstrips

There is one airport within the Program Study Area, the Merced Regional Airport, which is located in the southwest corner of the City. The Castle Airport, which is located approximately three miles to west of SR (SR) 59, is not directly within the Program Study Area.

The Merced Regional Airport is a publicly owned facility that provides both commercial air and freight air cargo services for the City, as well as the surrounding areas. The Castle Airport, which was once the location of the Castle Air Force Base, has since been converted to civilian use. The 2030 General Plan land uses surrounding both of these airports generally consist of industrial designations to be consistent with the Merced County Airport Land Use Compatibility Plan and FAA recommendations regarding potential hazards (Merced County Airport Land Use Commission 2012; City of Merced 2012).

3.11.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to noise and vibration. When an impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.11.4.1 Methodology

Potential noise and vibration impacts are analyzed based on the potential for the Program to result in substantial changes in the noise environment during construction or operation. The estimated noise during construction was compared to quantitative thresholds for construction noise in the City. The estimated vibration during construction was compared to building damage and annoyance criteria. Existing site conditions before Program construction are compared to site conditions both during construction activities and after the facilities are operational.

3.11.4.2 Impact Analysis

Impact NOS-1: Potential to generate 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 or other agencies.

Impact NOS-1 Analysis

Program Impacts: North and South Merced Major and Minor Sewer Improvements and WWTF Expansion

Construction

Temporary noises would be generated during the construction of the Program components through use of heavy vehicles and equipment needed to construct Program components like new pipelines, pump stations, and WWTF expansion facilities. Construction noise would be generated intermittently as development occurs throughout the SUDP/SOI consistent with reasonable build-out of the 2030 General Plan. Program construction noise impacts would occur over the reasonable build-out planning horizon, would be distributed and dispersed throughout the Program Study Area, and would be localized and temporary to individual projects. Additionally, the majority of Program pipeline features would be located within transportation corridors identified within the 2030 General Plan where noise attenuation measures are required for development projects that would limit exposure from Program construction within those same roadway corridors.

Implementation of the Program could generate a significant impact if these temporary increases in ambient noise levels were in excess of standards established in the 2030 General Plan or the City or County Noise Ordinance (Section 3.11.2.3, Local). The 2030 General Plan Draft EIR considered these potential construction activity noise impacts associated with reasonable build-out of the SUDP/SOI, concluding that typical construction equipment's generation of maximum noise levels (ranging from 80 to 89 dBA Lmax at a distance of 50 feet) would not have a significant impact to ambient noise levels (City of Merced 2010). The 2030 General Plan EIR also evaluated increased truck traffic on area roadways as a

result of construction activities and transporting heavy materials and equipment to and from constructions sites but states that the implementing actions identified in the Noise Element limit impacts to less-than-significant. The 2030 General Plan Draft EIR concludes that the noise increase for construction activities would be of short duration, and likely occur primarily during daytime hours and would thereby be less-than-significant (City of Merced 2010). The evaluation of the 2030 General Plan Draft EIR is incorporated by reference into this section. The Roadway Construction Noise Model (RCNM) was run for comparative purposes to determine the estimated noise levels from typical Program construction equipment. The results of the RCNM are shown in **Table 3.11-10** (ranging from 76.5 to 85 dBA L_{max} at a distance of 50 feet).

Table 3.11-10: Program Roadway Construction Noise Model Typical Construction Equipment

Equipment	Acoustical Use Factor (%)	Sound Level at Receptor					
		(25 Feet)		(50 Feet)		(100 Feet)	
		L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}
Equipment with Frequent or Regular Usage							
Chain Saw	20	89.7	82.8	83.7	76.7	77.7	70.7
Backhoe	40	83.6	79.6	77.6	73.6	71.5	67.6
Excavator	40	86.7	82.8	80.7	76.7	74.7	70.7
Front End Loader	40	85.1	81.2	79.1	75.1	73.1	69.1
Dump Truck	40	82.5	78.5	76.5	72.5	70.4	66.5
Generator	50	86.7	83.6	80.6	77.6	74.6	71.6
Grader	40	91.0	87.0	85.0	81.0	79.0	75.0
Paver	50	83.2	80.2	77.2	74.2	71.2	68.2
Pumps	50	87.0	84.0	80.9	77.9	74.9	71.9
Compactor	20	89.3	82.3	83.2	76.2	77.2	70.2
Estimated Maximum Noise Level Frequently Used Equipment[1]		96.3	92.2	90.2	86.1	84.2	80.1
Equipment with Sporadic or Intermittent Usage							
Impact Pile Driver	20	107.3	100.3	101.3	94.3	95.2	88.3
Blasting	1	100	80.0	94.0	74.0	88.0	68.0
Jackhammer	20	94.9	87.9	88.9	81.9	82.9	75.9
Pavement Scarifier	20	95.5	88.5	89.5	82.5	83.5	76.5
Estimated Maximum Noise Level Infrequently Used Equipment[1]		108.4	100.8	102.4	94.8	96.4	88.8

1. This row is provided to estimate total maximum noise levels at a given time and distance during normal construction activities that would occur under the Program. Because decibels are logarithmic units, sound pressure levels cannot simply be added or subtracted through ordinary arithmetic (i.e. adding and subtracting) to get a total maximum. Instead, a logarithmic equation is used to estimate the maximum noise levels associated with use of all construction equipment based on the percentage of acoustical use.
Source: FHWA 2017

Similar to the Program discussion above, the expansion of the WWTF would involve construction activities that could generate noise that could exceed the performance standards identified in the 2030 General Plan. However, the nearest noise-sensitive receptor to the WWTF is approximately 0.4 miles (approximately 2,100 feet) north of the WWTF. Construction noise based on this distance is shown in **Table 3.11-11**.

Table 3.11-11: WWTF Expansion Roadway Construction Noise Model Typical Construction Equipment

Equipment	Acoustical Use Factor (%)	Sound Level at Receptor (2,100 Feet)	
		L_{max}	L_{eq}
Chain Saw	20	51.3	44.3
Backhoe	40	45.1	41.1
Excavator	40	48.2	44.3
Front End Loader	40	46.6	42.7
Dump Truck	40	44.0	40.0
Generator	50	48.2	45.2
Grader	40	52.5	48.6
Paver	50	44.8	41.7
Pumps	50	48.5	45.5
Compactor	20	50.8	43.8
Estimated Maximum Noise Level Frequently Used Equipment[1]		58.9	54.4

[1] This row is provided to estimate total maximum noise levels at a given time and distance during normal construction activities that would occur under the Program. Because decibels are logarithmic units, sound pressure levels cannot simply be added or subtracted through ordinary arithmetic (i.e. adding and subtracting) to get a total maximum. Instead, a logarithmic equation is used to estimate the maximum noise levels associated with use of all construction equipment based on the percentage of acoustical use.
Source: FHWA 2017

As the results in **Table 3.11-10** show, the maximum (L_{max}) noise typical construction equipment would generate ranges from 82.5 to 91 dBA L_{max} at 25 feet, 76.5 to 85 dBA L_{max} at 50 feet, and 70.4 to 79 dBA L_{max} at 100 feet for individual pieces of frequently used equipment and could range from 94.9 to 107.3 dBA L_{max} at 25 feet for infrequently used equipment (**Table 3.11-9** for common noise comparisons). In addition, the expansion of the WWTF would result in a L_{max} of 58.9 (representing an extremely conservative assumption that all the equipment in **Table 3.11-11** would be operated at the same time), which would exceed the daytime noise standards identified in the 2030 General Plan of 55 dBA. To

estimate maximum noise generation with multiple pieces of equipment operating at the same time, a logarithmic equation was used which factored in all equipment operating based on a set acoustical use factor to provide an estimated maximum noise generation range up to 96.3 L_{max} dBA at 25 feet, 90.2 L_{max} dBA at 50 feet, and 84.2 L_{max} at 100-feet for regularly used equipment with maximum generations of 108.4 L_{max} dBA at 25 feet for infrequently used equipment. These estimated maximum noise levels are similar to those contemplated in the 2030 General Plan Draft EIR that were found to have a less-than-significant; however, ambient noise levels within the City range between 60 and 80 dBA at 100 feet, as identified in the 2030 General Plan EIR. The 2030 General Plan calls for a 55 L_{eq} dBA hourly daytime performance standard activities and the 45 L_{eq} dBA nighttime performance standard in addition to the standards set for community noise exposure compatibility shown in **Table 3.11-7**. Therefore, there is a potential for Program construction activities to substantially increase localized ambient noise levels and implementation of MM NOS-1, Noise and Vibration Reduction Measures, and MM NOS-2, Notification and Coordination with Noise-Sensitive Receptors, would be required to implement BMPs for noise reduction as well as require notification and coordination with noise-sensitive receptors of construction activities occurring.

MM NOS-1 would incorporate noise reduction measures to limit construction activities to daytime hours of 7:00 a.m to 6:00 p.m. This measure would include construction equipment muffling and shielding, locating fixed construction equipment, and staging areas away from noise-sensitive receptors, and installation of construction noise barriers to block sound transmission near noise-sensitive land uses. MM NOS-2 would include notification and coordination with noise-sensitive receptors within 500 feet of proposed construction activities. MM NOS-1 and MM NOS-2 include measures that help meet the City's performance standards as required by the 2030 General Plan and reduce any potential for significant impact to less-than-significant. These measures are also consistent with the City and County Noise Ordinances which require use of designated truck routes and allow elevation of noise levels during construction with the incorporation of noise control measures limiting construction to daytime hours of 7:00 a.m. to 6:00 p.m. and proper maintenance and muffling of construction equipment. Construction activities associated with implementation of the Program would be temporary, would follow truck routes for equipment deliveries, and would not occur all in one location at one time, and with the implementation of MM NOS-1 and MM NOS-2, would not substantially increase temporary or permanent ambient noise levels in violation of a plan or policy. Therefore, with implementation of MM NOS-1 and MM NOS-2, impacts related to construction noise would be reduced to a less-than-significant level.

Operation

Operation of the Program would not involve substantial additional noise within the City. The increase in operational truck trips under reasonable build-out of 2030 General Plan SUDP/SOI was contemplated in the 2030 General Plan Draft EIR for the entire City roadway network and found to be less-than-significant (City of Merced 2010). The Program would equate to approximately 10 additional trips per year for the trunk sewer infrastructure and pump stations and approximately two additional truck trips per day for maintenance of the upgraded WWTF, including truck trips associated with hauling of biosolids. Noise generated from these additional truck trips would be consistent with existing conditions of both the existing wastewater collection system as well as existing traffic noise throughout the Program Study Area and would not introduce a substantial source of temporary or permanent noise. Thus, no standards would be exceeded, and the impact would be less-than-significant.

Public service facility activities can produce noise which affects adjacent sensitive land uses (City of Merced 2010). These noise sources can be continuous and may contain tonal components which have a potential to annoy individuals who live nearby. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels. The 2030 General Plan and draft EIR, considers these potential effects from permanent fixed noise sources such as pump stations and lift stations and sets performance standards for proposed new noise-producing uses and concludes that the implementing actions identified in the Noise Element limit impacts to less-than-significant. However, operational noise from the addition of new or upsized pump stations could result in the addition of noise from pumps or generators greater than 5 dBA above ambient conditions allowed by the implementing actions, potentially significantly impacting noise-sensitive receptors if nearby. New pump stations typically have operational noise generated from pumps themselves that range from 90 to 100 dBA, if not enclosed (Environmental Protection Department 2005). The pumps associated with the new infrastructure are anticipated to be subterranean and also within the enclosed pump station building, which dampens external noise levels by 20 to 50 dBA (Environmental Protection Department 2005). The enclosed nature of these pump stations would therefore reduce noise levels to approximately 70 to 80 dBA (if a 20 dBA reduction is achieved) or 40 dBA to 50 dBA (if a 50 dBA reduction is achieved). Therefore, because operational noise could exceed more than 5 dBA of the exterior noise thresholds identified in the 2030 General Plan (55 dBA during the daytime, and 45 dBA during the nighttime and community noise exposure compatibility standards in **Table 3.11-7**), and because these new pump stations or pump station upgrades would be placed within City-owned parcels or ROW and residential growth areas identified in the 2030 General Plan could occur directly around these new or upgraded pump stations, a potentially significant impact could occur to nearby residents if not designed appropriately. As such, to ensure that design conditions reduce perceptible noise levels outside the pump station properties, implementation of MM NOS-3 would be required to reduce noise from pumps and generators. These noise reduction measures would utilize BAT to reduce noise generated from pump station operations to acceptable levels as identified in the 2030 General Plan; therefore, reducing potential operational impacts to a less-than-significant level. The operational noise impacts associated with implementation of the Program components would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM NOS-1, MM NOS-2, and MM NOS-3
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Sewer Improvements (CIPs 1-6)

Construction

Numerous noise-sensitive receptors would be located within 25 feet of construction activities, including residences, schools, hospitals, and businesses along West Avenue, V Street, R Street, Freemark Avenue, Candle Court, 16th Street, Thornton Road, Dickenson Ferry Road, Cardella Road, Yosemite Avenue, Bellevue Road, SR 140 (Central Yosemite Highway), and G Street. As shown in **Table 3-11.10**, these noise-sensitive receptors could be subject to noise levels at an L_{max} of 97.3 dBA at 25 feet; however, construction would only occur within 25 feet of any one noise-sensitive receptor for a short period of time, likely no more than one day, considering the rate of pipeline placement (approximately 250 to 500 feet per day). Additionally, although not anticipated, more intensive construction equipment could

be required for construction of the new trunk sewer infrastructure. Portions of the trunk sewer infrastructure may also avoid or minimize noise impacts by being installed with trenchless technologies near residential receptors. This may particularly be the case along the interim sewer improvements, which would require trenchless installation technologies to cross railroad and highway facilities. The drilling associated with trenchless technologies would generate localized noise levels consistent with those of **Table 3.11-10** but would likely reduce the total number of receptors exposed. As shown in **Table 3.11-10**, construction activities could reach a L_{max} of 108.4 dBA at 25 feet or 96.4 dBA at 100 feet if more intensive construction equipment, such as an impact pile driver, jackhammer, blasting, or pavement scarifier, would be required (e. to remove rocks, pavement, or other dense materials). These pieces of equipment could be required during removal of large rocks, placement of structures (such as the pump station associated with the interim sewer improvements) or when scarifying pavement. As described for the Program, MM NOS-1 and MM NOS-2 would be implemented to reduce exterior noise levels to ambient levels by implementing noise reduction measures and notifying noise-sensitive receptors within 500 feet of any upcoming construction activities. Implementation of these measures would reduce potential impacts to noise from construction of the new trunk sewer infrastructure to a less-than-significant level.

Operation

As discussed for the overall Program above, operational noise from implementation of the new trunk sewer infrastructure would include approximately 10 additional truck trips a year associated with operation of the new trunk sewer infrastructure, as well as muffled noise associated with operations of the new enclosed pump station for the interim sewer improvements. The additional truck trips would not cause substantial noise increases that would be perceptible to the human ear and would be consistent with the existing ambient traffic noise within the City. However, as discussed for the Program above, operational noise associated with the interim sewer improvements could cause a potentially significant impact prior to mitigation for current or future residential noise-sensitive receptors in this area. Specifically, the new pump station would be located on a City-owned parcel or ROW in a rural agricultural portion of the Program Study Area with limited nearby noise-sensitive receptors. However, based on build-out projections identified within the 2030 General Plan, communities within this area could be built in the future, which could be built on properties surrounding the selected pump station site. The 2030 General Plan Draft EIR accounts for the potential exposure by proscribing implementation measures to reduce potential noise exposure; however, due to the uncertainty associated with the future development, implementation of MM NOS-3 would be required to reduce exceedances of the 2030 General Plan ambient noise thresholds. Therefore, MM NOS-3 would be required to implement noise reduction standards for this new pump station and reduce potential operational noise impacts to acceptable levels identified within the 2030 General Plan, and thus to a less-than-significant level. Operational noise associated with the new trunk sewer infrastructure would be less-than-significant with mitigation incorporated.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM NOS-1, MM NOS-2, and MM NOS-3
Level of Significance After Mitigation: Less-than-Significant

Impact NOS-1 Findings

Impact NOS-1 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact NOS-1 Mitigation Required: MM NOS-1, MM NOS-2, and MM NOS-3

Impact NOS-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact NOS-2: Potential to generate excessive groundborne vibration or groundborne noise levels.

Impact NOS-2 Analysis

Program Impacts: North and South Merced Major and Minor Sewer Improvements and WWTF Expansion

Construction

During construction of the Program components, equipment that could generate groundborne vibrations, such as excavators, loaders, backhoes, and loaded trucks, could be used within 25 feet of noise-sensitive receptors. Vibrations are considered barely perceptible at 0.04 in/sec PPV and strongly perceptible at 0.9 in/sec PPV for transient sources (Caltrans 2020a). Additionally, extremely fragile historic buildings are considered to experience potential damage from vibration at 0.12 in/sec PPV, and modern industrial/commercial buildings are considered to experience potential damage from vibration at 2.0 in/sec PPV (Caltrans 2020a).

Construction of the Program would employ conventional activities, and the equipment and techniques used would not cause excessive groundborne vibration; however, pipeline installation could have a maximum range of 0.003 to 0.210 in/sec PPV from use of the vibratory compactor/roller within 25 feet of a noise-sensitive receptor (**Table 3.11-12**). In addition, the expansion of the WWTF would involve construction activities that could generate vibration levels similar to that described for the Program above; however, there are no noise-sensitive receptors within 500 feet of the WWTF.

Table 3.11-12: Construction Equipment Related to Groundborne Vibration

Type of Equipment	PPV at 25 feet	PPV at 50 feet	PPV at 100 feet	Level at Which Human Annoyance Could Occur
Large Bulldozer	0.089	0.031	0.011	0.1
Loaded Trucks	0.076	0.027	0.010	0.1
Small Bulldozer	0.003	0.001	0.000	0.1
Vibratory Hammer	0.070	0.025	0.009	0.1
Vibratory Compactor/roller	0.210	0.074	0.026	0.1

Source: FTA 2006

Where construction is required within 25 feet of a noise-sensitive receptor, vibration levels would fall between the barely perceptible range to distinctly perceptible range with the use of a vibratory

compactor/roller (**Table 3.11-5** and **Table 3.11-12**). Although human annoyance could occur in the distinct locations where a vibratory compactor/roller is required within 25 feet of a residence or other noise-sensitive receptor, these construction activities would be intermittent and temporary. However, the likelihood of construction work that could reach a maximum PPV of 0.210 near 25 feet of a noise-sensitive receptor being required would be limited and would more likely include PPV ranges between 0.001 and 0.074 at 50 feet and 0.004 to 0.026 at 100 feet, which would not exceed any potential structure damage threshold or human annoyance threshold. Additionally, due to the linear nature of much of the program construction activities (i.e., pipeline placement), construction activities within any one location would be limited to several days to a week given the rate of placement (200 to 500 feet per day), and it is not anticipated that vibration impacts from construction activities would be significant or would exceed an annoyance thresholds or potential structural damage thresholds. However, because human annoyance thresholds could be exceeded and could thus result in a potentially significant impact, implementation of MM NOS-1 would be required and would incorporate noise and vibration reduction measures to limit construction activities to daytime hours of 7:00 a.m. to 6:00 p.m., locating fixed construction equipment and staging areas away from noise-sensitive receptors, and installation of construction noise and vibration barriers to block sound transmission near noise-sensitive land uses which would successfully mitigation potential impacts. Additionally, MM NOS-2 would be implemented and would include notification and coordination with noise-sensitive receptors within 500 feet of proposed construction activities. Therefore, impacts related to groundborne vibrations from construction would be considered less-than-significant with mitigation incorporated.

Operation

Operation of the Program would not result in operational groundborne vibrations impacts because of the absence of noise-sensitive receptors and groundborne vibration-generating activities. Once constructed, the new pipelines would be located underground and would not result in any vibrations that would be perceptible to noise-sensitive receptors. Additionally, operation of the pump stations and WWTF expansion components would not result in any substantial vibrations. Therefore, there would be no impact.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM NOS-1 and MM NOS-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Sewer Improvements (CIPs 1-6)

Construction

Similar to the discussion under the Program impacts above, the construction of the new trunk sewer infrastructure would involve the use of conventional construction equipment, which could produce groundborne vibrations within 100 feet of construction activities. Pipeline installation could have a maximum range of 0.003 to 0.210 PPV from use of the vibratory compactor/roller within 25 feet of a noise-sensitive receptor (**Table 3.11-12**); however, pipeline installation would more likely include PPV ranges between 0.001 and 0.074 at 50 feet and 0.004 to 0.026 at 100 feet. This would result in a potentially significant impact prior to mitigation because vibration levels could reach a level where human annoyance could occur. To reduce potential impacts from vibration, specifically the use of a vibratory compactor/roller, MM NOS-1 and MM NOS-2 would be implemented. Construction activities would not

exceed any potential structure damage threshold or human annoyance threshold due to the distance of vibratory construction activities from noise-sensitive receptors and duration of such construction activities near any one noise-sensitive receptor given the rate of pipeline placement and distance from noise-sensitive receptors. Therefore, impacts associated with groundborne vibrations from construction of the new trunk sewer would be less-than-significant with mitigation incorporated.

Operation

Operationally, the new trunk sewer infrastructure would not result in substantial increases in vibrations from the new upgraded water collection infrastructure. There are no new pump stations associated with the interim sewer improvements. Therefore, impacts associated with groundborne vibrations from operation of the new trunk sewer would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM NOS-1 and MM NOS-2
Level of Significance After Mitigation: Less-than-Significant

Impact NOS-2 Findings

Impact NOS-2 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact NOS-2 MM: MM NOS1, MM NOS-2

Impact NOS-2 Overall Level of Significance After Mitigation: Less-than-Significant

3.11.5 Noise and Vibration Mitigation

Mitigation Measure NOS-1: Noise and Vibration Reduction Measures

The City shall require the construction contractor to implement the following measures, as applicable, during construction of the Program components:

- Construction activities shall aim to meet current City General Plan ambient noise level requirements outlined in Table N-1 of 55 dBA for daytime activities and 45 dBA for nighttime activities community noise exposure compatibility standards shown in **Table 3.11-7** where feasible.
- Construction activities shall be limited to between 7:00 a.m. and 6:00 p.m. Monday through Saturday to avoid noise-sensitive hours of the evenings and nights. Construction activities shall be prohibited on Sundays and holidays, except by the contractor obtaining prior approval from the City. Notification of Sunday or holiday construction noise and vibration within 500 feet of a noise-sensitive receptors shall occur, consistent with MM NOS-2.
- Prior to any nighttime construction activities (if required), the construction contractor shall secure any necessary noise waivers from the City and comply with any terms and conditions of the waiver.
- Sensitive receptors (residences, schools, hospitals, etc.) within 500 feet of Project construction activities shall be identified to obtain addresses. Notification of construction noise and vibration within 500 feet of a noise-sensitive receptors shall occur, consistent with MM NOS-2.

- Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications) and by shrouding or shielding impact tools.
- Construction contractors shall locate fixed construction equipment (such as compressors or generators) and construction staging areas as far as possible from nearby noise-sensitive receptors, including residences, schools, and hospitals.
- Construction barriers between noise sources and noise-sensitive land uses shall be used to block sound transmission where prolonged noise levels would exceed City standards.
- If construction were to occur near a school, the construction contractor shall coordinate the most noise- and vibration-producing construction activities with school administration to limit disturbance to the campus.

Mitigation Measure NOS-1 Implementation

Responsible Party: The contractor.

Timing: Throughout all construction activities.

Monitoring and Reporting Program: The contractor shall prepare a monthly noise report that shall be submitted to and kept on file by the City. The monthly noise report shall include when and where construction activities occurred and any notes on compliance with the specifications of this MMs. This noise report shall be submitted in conjunction with MM NOS-2 below.

Standards for Success: Noise and vibration from construction activities does not exceed noise standards identified in the 2030 Merced Vison General Plan or the structural damage and human annoyance thresholds in the Caltrans Transportation and Construction Vibration Guidance Manual. (Section 3.11.2, Regulatory Framework).

Mitigation Measure NOS-2: Notification and Coordination with Noise-Sensitive Receptors

The City shall require the construction contractor to notify landowners and occupants of occupied properties (residences, schools, commercial businesses) within 500 feet of construction areas of the construction schedule, in writing at least two weeks prior to groundbreaking. The construction contractor shall designate a Noise Complaint Coordinator who will be responsible for responding to complaints regarding construction noise. The Coordinator shall ensure that reasonable measures are implemented to correct any problems. A contact telephone number for the Coordinator shall be posted at the construction site and included in the written notification of the construction schedule sent to surrounding properties.

Mitigation Measure NOS-2 Implementation

Responsible Party: The City and chosen contractor.

Timing: Written notice provided to occupied residences, business, and schools within 500 feet of construction activities at least two weeks prior to groundbreaking activities.

Monitoring and Reporting Program: The Contractor shall submit a monthly noise report of any noise complaints to the City. This monthly noise report shall include a write up of any complaints received and the follow-up regarding how the complaint was resolved.

Standards for Success: Noise complaints during construction are minimized, and any complaint that is submitted is fully responded to in a timely manner throughout construction activities.

Mitigation Measure NOS-3: Implement Standards for Noise Reduction of Pump Stations

The City shall consider residential and sensitive noise receptors in the pump station site selection process and where feasible, shall site new facilities in non-residential areas. If pump station siting is required within residential areas (either currently residential or identified as residential within the 2030 Merced Vison General Plan), siting preference shall be given to those sites furthest away from noise-sensitive receptors. All new pump stations shall be enclosed. New and upgraded pump station equipment (such as pumps and intermittently used backup generators) shall be designed and constructed in accordance with BAT noise attenuation measures. Pump station design shall include a current General Plan consistency analysis to estimate the noise levels of selected equipment at the pump station property boundary and shall include as many of the following noise control measures or BAT necessary to reduce those noise levels to meet the standards identified in the current General Plan. Potential BAT noise reduction measures may include, but are not limited to, the following:

- Subterranean placement of submersible pump equipment;
- Use of acoustical louvers to absorb and reduce noise from motors;
- Placement of acoustical panels on the pump station building walls to absorb noise;
- Placement of noise barriers;
- Use of acoustic lagging or damping materials; and/or
- Use of vibration isolation mounts.

Mitigation Measure NOS-3 Implementation

Responsible Party: The City.

Timing: Noise generation calculations and reduction measures shall be identified and incorporated into project design.

Monitoring and Reporting Program: The City shall document noise-sensitive receptor considerations for new pump station siting and include these considerations as design criteria. The City shall review the modeled noise calculations and prescribed reduction BAT measures for consistency with the City's current General Plan prior to approving pump station design.

Standards for Success: Operational noise shall be reduced below the noise standards identified in the current City General Plan.

3.12 POPULATION AND HOUSING

3.12.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Induce substantial unplanned population 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); or
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to population and housing that may result from implementation of the Program, identifying mitigation for potentially significant impacts, where feasible.

3.12.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives that are related to population and housing and are relevant to the Program.

3.12.2.1 Federal

There are no federal or state laws pertaining to population and housing that are applicable to the Program.

3.12.2.2 Local

Merced Vision 2030 General Plan

The 2030 General Plan contains several policies that directly or indirectly pertain to population and housing, including the following:

Goal Area UE-1: Urban Expansion

- **Policy UE-1.2**. Foster Compact and Efficient Development Patterns to Maintain a Compact Urban Form.
- **Policy UE-1.3.** Control the Annexation, Timing, Density, and Location of New Land Uses Within the City's Urban Expansion Boundaries.
- **Policy UE-1.4**. Continue Joint Planning Efforts on the UC Merced campus and University Community Plans.
- **Policy UE-1.5**. Promote Annexation of Developed Areas Within the City's SUDP/SOI During the Planning Period.

- **Policy UE-1.6.** Consider Expansion of the City's SUDP/SOI boundary for Areas within the Area of Interest when Certain Conditions are Met.

3.12.3 Environmental Setting

The Program Study Area is located in the Central Valley of California, approximately 100 miles southeast of Sacramento, 50 miles northwest of Fresno, and 115 miles southeast of San Francisco. According to the United States Census Bureau since the City was incorporated in 1889, the population has grown to approximately 93,692 people in 2023 (USCB 2024). The 2030 General Plan includes population estimates and approximate growth projections from 2000 to 2030, which are shown in **Table 3.12-1.**

Table 3.12-1: Population Estimates and Projections, 2000-2030

	2000	2010	2015	2020	2025	2030
Merced	63,893	80,985	89,400	97,700	106,800	116,800
Merced County	210,554	258,495	307,300	340,800	377,400	417,200

Source: City of Merced 2010

As further stated in the 2030 General Plan, the projected population within the City of Merced SUDP/SOI would be approximately 155,000 by 2030 (City of Merced 2010). Housing within the City included 31,997 total units in 2024, with 30,209 of those units classified as occupied, resulting a 5.6% vacancy rate (Department of Finance 2024). Additionally, employment within the City includes a range of industries, including agriculture, education, and construction. **Table 3.12-2** shows the breakdown of employment industries and number of workers in each industry.

Table 3.12-2: City of Merced Employment by Industry

Industry	Number of People
Agriculture, Forestry, Fishing, and Hunting, and Mining	1,173
Construction	1,272
Manufacturing	2,387
Wholesale Trade	691
Retail Trade	2,466
Transportation and Warehousing, and Utilities Information	923
Finance. Insurance, Real Estate, and Rental and Leasing	954
Professional, Scientific, Management, Administrative, and Waste Management Services	1,859
Educational, Health, and Social Services	5,624
Arts, Entertainment, Recreation, Accommodation, and Food Services	1,695
Other Services	989
Public Administration	1,323

Source: City of Merced 2010

3.12.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to population and housing. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.12.4.1 Methodology

This section analyzes the potential impacts of the Program that may lead to unplanned growth or the displacement of a significant number of people or housing units.

3.12.4.2 Impact Analysis

Impact POP-1: Potential to induce substantial unplanned population 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).

Impact POP-1 Analysis

Program Impacts: North and South Merced Major and Minor Sewer Improvements and WWTF Expansion

Construction

Implementation of the Program would not displace existing housing or substantial numbers of people and would not require construction of replacement housing because Program facilities (i.e., pipelines), would mainly be located in existing and future roadways and existing facilities (i.e., the existing WWTF property), and/or located on land that would accommodate new facilities (i.e., pump stations) so as to not displace existing populations. The Program would be aimed to serve planned population growth identified within the 2030 General Plan. The Program would not directly induce population growth by constructing new homes or businesses. Construction workers needed for implementation the Program would likely be served by the existing construction workforce within the City (**Table 3.12-2**) and would not require construction workers from outside of the area to move into the City. Therefore, direct construction impacts would be less-than-significant.

Operation

A project would indirectly induce growth if it would remove an obstacle to unplanned growth and development. This could occur through removing a constraint or adding an additional public service. The Program is considered growth-accommodating and not growth-inducing through the construction and operation of new and expanded wastewater collection infrastructure to accommodate growth projections identified in the 2030 General Plan. Specifically, the 2030 General Plan Draft EIR analyzed a 3 percent growth rate for planning purposes, with additional directly induced growth from the addition of the University Community, Castle Farms Community Plan Areas, and other planning areas to the City's SUDP/SOI (City of Merced 2010). The analysis in the 2030 General Plan EIR concludes that future infrastructure would be required to accommodate this future growth, and because the 2030 General Plan includes policies and standards to regulate future growth that would be allowed under the 2030 General Plan in an orderly and planned manner, the 2030 General Plan would not result in a substantial unexpected population growth. Therefore, the 2017 WCSMP, and thus the Program, were developed based on these growth projections of the 2030 General Plan to allow for long-term planned growth within the City. The Program would not induce growth beyond the levels of growth already analyzed and

approved in the 2030 General Plan, and there would be a less-than-significant impact to population growth.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Sewer Improvements (CIPs 1-6)

Construction

Implementation of the interim sewer improvements would not displace existing housing or substantial numbers of people and would not require construction of replacement housing because Program facilities (i.e., pipelines), would mainly be located in existing and future roadways and existing facilities, and/or located on land that would accommodate new facilities so as to not displace existing populations. This would be aimed to serve planned population growth identified within the 2030 General Plan. The interim sewer improvements would not directly induce population growth by constructing new homes or businesses. Construction workers needed for implementation the interim sewer improvements would likely be served by the existing construction workforce within the City (**Table 3.12-2**) and would not require construction workers from outside of the area to move into the City. Therefore, direct construction impacts would be less-than-significant.

Operation

A project would indirectly induce growth if it would remove an obstacle to unplanned growth and development. This could occur through removing a constraint or adding an additional public service. The interim sewer improvements are considered growth-accommodating and not growth-inducing through the construction and operation of new and expanded wastewater collection infrastructure to accommodate growth projections identified in the 2030 General Plan. Specifically, the 2030 General Plan Draft EIR analyzed a 3 percent growth rate for planning purposes, with additional directly induced growth from the addition of the University Community, Castle Farms Community Plan Areas, and other planning areas to the City's SUDP/SOI (City of Merced 2010). The analysis in the 2030 General Plan EIR concludes that future infrastructure would be required to accommodate this future growth, and because the 2030 General Plan includes policies and standards to regulate future growth that would be allowed under the 2030 General Plan in an orderly and planned manner, the 2030 General Plan would not result in a substantial unexpected population growth. Therefore, the 2017 WCSMP, and thus the interim sewer improvements, were developed based on these growth projections of the 2030 General Plan to allow for long-term planned growth within the City. The interim sewer improvements would not induce growth beyond the levels of growth already analyzed and approved in the 2030 General Plan, and there would be a less-than-significant impact to population growth.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact POP-1 Findings

Impact POP-1 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact POP-1 Mitigation Required: None Required

Impact POP-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact POP-2: Potential to displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

Impact POP-2 Analysis

Program Impacts: North and South Merced Major and Minor Sewer Improvements and WWTF Expansion

Construction and Operation

Implementation of the Program would not displace substantial numbers of existing people or housing. No development that would require substantial displacement of people or housing is proposed as part of the Program. To the contrary, the 2017 WCSMP sets forth a plan to accommodate future housing needs within the Program Study Area. Additionally, projected growth identified in the 2030 General Plan is anticipated to occur within infill locations and undeveloped parcels which would accommodate people requiring housing and would not be affected by implementation of the Program. Program components would be constructed and operated occur within these areas to accommodate this projected growth. Implementation of the Program would have no impact on displacement of a substantial number of existing housing units or people.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Project Impacts: Interim Sewer Improvements (CIPs 1-6)

Construction and Operation

Implementation of the interim sewer improvements would not displace substantial numbers of existing people or housing. No development that would require substantial displacement of people or housing is proposed as part of the interim sewer improvements. To the contrary, the 2017 WCSMP sets forth a plan to accommodate future housing needs within the Program Study Area. Additionally, projected growth identified in the 2030 General Plan is anticipated to occur within infill locations and undeveloped parcels which would accommodate people requiring housing and would not be affected by implementation of the interim sewer improvements. Improvement components would be constructed and operated occur within these areas to accommodate this projected growth. Implementation of the interim sewer improvements would have no impact on displacement of a substantial number of existing housing units or people.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Impact POP-2 Findings

Impact POP-2 Overall Level of Significance Prior to Mitigation: No Impact

Impact POP-2 Mitigation Required: None Required

Impact POP-2 Overall Level of Significance After Mitigation: No Impact

3.12.5 Population and Housing Mitigation

No mitigation required.

3.13 PUBLIC SERVICES AND UTILITIES AND SERVICE SYSTEMS

3.13.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues for public services would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines and combined in discussion with utilities and service systems. The following Appendix G checklist questions are evaluated further in this EIR.

- 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:
    - Fire protection;
    - Police protection;
    - Schools;
    - Parks; or
    - Other public facilities.
- Exceed wastewater treatment requirements of the applicable RWQCB.
- Require or result in the relocation or construction of new or expanded water or wastewater facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- 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.
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed.
- 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.
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs.
- Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to public services and utilities and service systems that may result from implementation of the Program, identifying mitigation for potentially significant impacts, where feasible and necessary.

3.13.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives that relate to public services and utilities and service systems and are relevant to the Program.

3.13.2.1 Federal

Clean Water Act

The Federal Water Pollution Control Act (33 USC 1251 et seq.), otherwise known as the CWA, sets forth national goals that waters shall be “fishable, swimmable” waters (CWA Section 101 (a)(2)). To enforce the goals of the CWA, the USEPA established the NPDES program. NPDES is a national program for regulating and administering permits for discharges to receiving waters, including non-point sources. Under Section 1251 (b) of the CWA, Congress and USEPA must recognize and preserve the primary responsibilities and rights of states concerning the reduction of pollution in water resources.

Safe Drinking Water Act (1974)

The Safe Drinking Water Act was established in 1974 to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designed for drinking use, whether from above-ground or underground sources.

The state has expanded the federal requirements through passage of an Antidegradation Policy – State Water Board Resolution 68-16 ("Statement of Policy with Respect to Maintaining High-Quality Waters in California"). Resolution 68-16 has been approved by the USEPA to be consistent with the federal antidegradation policy.

3.13.2.2 State

Porter-Cologne Water Quality Control Act

The State of California established the SWRCB, which oversees the nine RWQCBs, through the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). Through the enforcement of the Porter-Cologne Act, the SWRCB determines the beneficial uses of the waters (surface and groundwater) of the state, establishes narrative and numerical water quality standards, and initiates policies relating to water quality. The SWRCB, and more specifically, the RWQCB, is authorized to prescribe WDRs for the discharge of waste, which may impact the WOTS. Furthermore, the development of water quality control plans, or Basin Plans, are required by the Porter-Cologne Act to protect water quality. The SWRCB issues both general construction permits and individual permits under the auspices of the federal NPDES program.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of by transformation (i.e., recycling) and land disposal, the State Legislature passed the California Integrated Waste Management Act of 1989 (Assembly Bill [AB] 939), effective January 1990. According to AB 939, all cities and counties are required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Solid waste plans are required to explain how each City’s AB 939 plan will be integrated within the respective county’s plan. They must promote (in order of priority) source reduction, recycling and

composting, and environmentally safe transformation, and land disposal. Cities and counties that do not meet this mandate are subject to $10,000-per-day fines.

California Constitution, Article X

Article X (10), Section 2, of the California Constitution recognizes the need to put the state's water resources to maximum beneficial use:

> *It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.*

Uniform Fire Code

The Uniform Fire Code (UFC) contains regulations relating to construction, maintenance, and use of buildings. Topics addressed in the code include fire department access, fire hydrants, automatic storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire safety requirements for new and existing buildings and their surrounding premises. The code contains specialized technical regulations related to fire and life safety.

California Health and Safety Code

State fire regulations are set forth in Sections 13000 et seq. of the California Health and Safety Code, include regulations for building standards (as also set forth in the CBC), fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, high-rise building and childcare facility standards, and fire suppression training.

Utilities – Protection of Underground Infrastructure

CGC Sections 4216-4216.9, "Protection of Underground Infrastructure" requires an excavator to contact a regional notification center (e.g., Underground Services Alert or Dig Alert) at least 2 days prior to excavation of any subsurface installations. Anyone seeking to begin a project that could damage underground infrastructure can call Underground Service Alert, the regional notification center for Northern California. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the Program components. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of Program construction activities in the area.

3.13.2.3 Local

Merced Municipal Code

Section 17.62 (Public Facilities Impact Fees) of the Merced Municipal Code states that, to implement the goals and objectives of the City of Merced's Merced Vision 2030 General Plan (2030 General Plan) and to mitigate the impacts caused by future development in Merced, certain public facilities must be or have been required to be constructed, and/or compensation measures must be or have been required to be taken to offset resources lost due to the future development. The City Council has determined that public

facilities impact fees and/or compensation measures are needed to finance these public facilities and to pay for each development's fair share of the construction costs of these improvements and/or the costs of the compensation measures. In establishing the fees, the City Council has found the fees to be consistent with the 2030 General Plan and pursuant to Government Code Section 65913.2, has considered the effects of the fee with respect to the City of Merced's (City's) housing needs as established in the Housing Element of the 2030 General Plan.

A public facilities impact fee is established on issuance of building permits for development in the City to pay for municipally owned public facilities, including but not limited to fire stations, police stations, community recreation facilities, traffic-related improvements, and bikeways facilities.

Merced Vision 2030 General Plan

The 2030 General Plan public services (updated May 2017) and Safety Elements (updated June 2016), contain a number of policies that apply to public services and utilities and service systems impacts in conjunction with the Program in accordance with the 2030 General Plan:

Goal Area P-2: Police and Fire Protection Services

- **Policy P-2.1.** Maintain and enhance public protection facilities, equipment, and personnel to the maximum extent feasible within the resource constraints of the City to serve the City's needs.

Goal Area P-3: Water

- **Policy P-3.1.** Ensure that adequate water supply can be provided within the City's service area, concurrent with service expansion and population growth.

Goal Area P-4: Wastewater

- **Policy P-4.1.** Provide adequate wastewater collection, treatment and disposal capacity for existing and projected future needs.
- **Policy P-4.2.** Consider the use of reclaimed water to reduce non-potable water demands whenever practical.

Goal Area P-6: Solid Waste

- **Policy P-6.2.** Minimize the potential impacts of waste collection, transportation, and disposal facilities upon the residents of Merced

Goal Area S-4: Fire Protection

- **Policy P-4.2.** Maintain a reasonable level of accessibility and infrastructure support for fire suppression, disaster, and other emergency services.

City of Merced Urban Water Management Plan

UWMPs are required under the CWC to be completed every five years by urban water suppliers within the state. These UWMPs are designed to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future

beneficial use, and provide a mechanism for response during water drought conditions. The 2020 UWMP for the City was adopted in November 2021 (City of Merced 2021).

3.13.3 Environmental Setting

3.13.3.1 Wastewater

Wastewater collection and treatment in the Program Study Area is or is planned to be provided by the City. The wastewater collection system handles wastewater generated by residential, commercial, and industrial uses in the City.

The City's WWTF , located in the southwest part of the City about two miles south of the Merced Airport, has periodically been expanded and upgraded to meet the needs of the City's growing population and new industry. As discussed in Section 2.0, Project Description, the City's WWTF has a capacity of 12 million gallons per day (Mgal/d). This draft EIR for the City's 2022 WCSMP considers the expansion of the wastewater collection system from current capacity to approximately 27.2 Mgal/d to accommodate the reasonable build-out identified and analyzed in the 2030 General Plan.

The current treated effluent is disposed of in several ways depending on the time of year. Most of the treated effluent (75 percent average) is discharged to Hartley Slough throughout the year. The remaining treated effluent is delivered to a land application area and the onsite City-owned wetland area south of the treatment plant.

3.13.3.2 Water

The City is the only water purveyor for uses within the City boundaries. The City uses groundwater exclusively, drawing water from 20 wells with a combined capacity of 49,500 gallons per minute (gpm). The active wells are fully operational and used on a regular basis for water supply within the City (City of Merced 2021). Well depths range from 161 to 800 feet, and individual capacities of the operating wells range from 1,000 gpm to 4,000 gpm. The depth of the City's wells suggests that the City is primarily drawing water from the deep aquifer associated with the Mehrten formation, a significant aquifer in terms of water supply. The wells are arrayed in a mile grid system supplying 16-inch mains on a mile grid and 12-inch mains on a one-half mile grid. This strategy for well siting is intended to minimize the potential for local drawdown of groundwater from pumping operations.

Instead of a centralized water treatment plant, water is treated at the wellhead with disinfection and fluoridation systems and distributed through a transmission system with the help of well pumps. The City has a storage capacity of approximately 1.4 million gallons in four elevated storage tanks. These facilities provide average daily demand, meet peak urban level conditions, and provide for adequate flows to end users (City of Merced 2021).

3.13.3.3 Solid Waste

The solid waste disposal for the City is managed by the Merced County Solid Waste Regional Agency. Merced County and its six incorporated cities jointly own and operate two active solid waste landfill facilities, the Highway 59 landfill serving the eastern end of the County and the Billy Wright Landfill

serving the western end of the County. Both of these facilities are permitted to accept municipal solid waste.

The City provides all waste collection and transport services within the City limits, processing approximately 60,000 tons per year. Commercial and industrial solid waste collection services are provided up to six times per week. It is anticipated that the Highway 59 landfill approximately 2 miles north of the City would accommodate solid waste generated from Program construction activities. Permitted waste types at the Highway 59 landfill are Class III, nonhazardous solid waste, inert wastes, and nonfriable asbestos. Currently, this landfill has a permitted capacity to accept a maximum of 1,500 tons per day (tpd) of solid waste; however, the landfill is currently under preliminary review for a new permit package to increase the permitted capacity from 1,500 tpd to 3,000 tpd over incremental periods from 2019 to 2035 (CalRecycle 2019). The estimate closure date is 2055 (CalRecycle 2019).

Additionally, the Synagro Central Valley Compost Facility is located approximately 22 miles from the WWTF and is permitted to accept 355 tpd of materials with a maximum permitted capacity of 149,100 cubic yards per year (CalRecycle 2024).

3.13.3.4 Electrical Services

Two public utility providers provide electrical service to customers within the Program Study Area: the MID and PG&E. MID, under the authority of the CWC, has the authority to operate as an electric utility. During the past 70 years, MID has provided wholesale power to PG&E. Historically, MID has served the general area from the City of Livingston to the City of Atwater. MID has expanded its power delivery area in recent years, and in 2000, it completed the extension of its network to the City of Merced with a series of overhead and underground lines.

PG&E delivers approximately 81,923 million kilowatt hours (kWh) of electricity to its 13 million customers throughout the 70,000-square-mile service area in Northern and Central California. The Wilson Substation, which is located immediately south of SR 140 and west of Tower Road, is one of PG&E's substations serving the City. Two parallel transmission lines originate from this substation and extend to the northwest: a 115-kilovolt (kV) line, called the Wilson-Atwater, and a 230-kV line called the Belotta-Harndon.

3.13.3.5 Telecommunications Service

The Program Study Area is located in the service area of AT&T, which would provide telephone communications service to the Program Study Area (i.e., at the WWTF facility). AT&T provides telecommunications services, including local, long distance, and digital subscriber line to the City.

Cable television services are provided by Comcast, who is in the process of renovating local facilities to offer high-speed internet access through the cable system and other products.

3.13.3.6 Schools

The City includes four school districts, the Merced City School District, Merced Union High School District, Weaver Union School District, and the McSwain Union School District, all of which contain a number of individual schools, which are shown on **Figure 3.8-1** in Section 3.8, Hazards and Hazardous Materials.

3.13.3.7 Police Protection

Police protection for the Program Study Area is provided by the City of Merced Police Department. There are three separate police districts with three main police stations located at the following locations:

- District 1 – North Station at 1109 Loughborough Drive (serves area north of Bear Creek);
- District 2 – Central Station at 611 West 22nd Street (serves area between Highway 99 to the south and Bear Creek to the north); and
- District 3 – South Station at 470 West 11th Street (serves area south of Highway 99).

The Police Department employs a combination of sworn officers, non-sworn officers, and unpaid volunteers. The service standard is approximately 1.32 sworn officers per 1,000 population. Police stations and patrols are staffed 24 hours a day, seven days a week. Approximately 111 sworn officers are employed at the City of Merced Police Department. Services provided by the Merced Police Department include patrol and crime prevention, special weapons and tactical negotiations, domestic violence, bomb squad services, K-9 units, bicycle patrols, mounted patrols, and identification and fingerprinting services (City of Merced 2010, 2012).

3.13.3.8 Fire Protection

The Program Study Area is within the service area of the Merced Fire Department. There are currently five fire stations located within the City including the following:

- Station 51 at 99 East 16th Street;
- Station 52 at Merced Municipal Airport;
- Station 53 at 800 Loughborough Drive;
- Station 54 at 1425 East 21st Street; and
- Station 55 at the intersection of Parsons Avenue and Silverado.

Fire service personnel are typically assigned on a three-platoon work schedule, which provides the City coverage 24 hours a day, seven days a week. This around the clock coverage is staffed with approximately 54 full-time staff (15 Captains, 18 Engineers, and 21 Firefighters), three Battalion Chiefs, two Division Chiefs, one Chief, and two Secretaries. The department equipment includes first-line engine companies, ladder companies, reserve engines and ladder trucks, airport emergency vehicles and other miscellaneous vehicles such as rescue boats and trailers. According to the draft EIR completed for the 2030 General Plan, the City's service protection rating is considered to be well above average (City of Merced 2010).

3.13.3.9 Parks and Recreation

The City has approximately 238 acres of developed parks, which are scattered around the City and include mini parks, neighborhood parks, community parks, school parks, special use areas, urban plazas, athletic parks, and linear parks. Historically, the City has used the standard of having five acres of park space for every 1000 residents, with supplemental areas such as Lake Yosemite and school grounds that provide additional open space not included in the five to 1000 ratio. In addition to the parks located within

the City, there is also an extensive bicycle system, which covers approximately 13 miles and crosses through four creek corridors and numerous City roadways with expansion planned. Other minor recreational facilities including sports fields, gymnasiums, pool space, and tennis courts are less used by the general public within the City (City of Merced 2010).

3.13.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to public services and utilities and service systems. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.13.4.1 Methodology

To assess impacts on public services, methods included a review of local planning documents and maps. To assess impacts to utilities and service systems, methods included a review of how the Program's landfill disposal requirements align with the capacity of local landfills and the City's ability to meet solid waste diversion targets. This process aimed to determine the proximity of public services, utilities, and service systems to the Program Study Area and identify any that could be directly or indirectly affected by the Program. The assessment focuses on evaluating the potential for the Program to cause direct adverse impacts on public services, utilities, and service systems given the proximity of the identified public service and utility, and the impact the Program could have on the public service, utilities, and service systems.

3.13.4.2 Impact Analysis

Impact PUB-1: Potential to 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:
Fire protection
Police protection
Schools
Parks
Other public facilities

Impact PUB-1 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The Program implementation would not create the need for new or physically altered fire departments, police stations, schools, parks, other public facilities, or the expansion of existing facilities. Construction activities would involve a temporary increase in workers. However, employment opportunities associated

with the construction of the Program would be assumed to be filled by the local workforce and would not result in an increased housing or public service demand (Section 3.12, Population and Housing for more details). The construction of the Program would not result in the significant permanent increase in residences or populations to warrant an increase in the need for new fire, police protection facilities, schools, parks, or other public facilities and there would be no impact.

Operation

The WWTF expansion may involve a minimal increase in staff to accommodate future expansion (up to 27.2 Mgal/d). The number of staff would be minimal (ranging from two to 10 additional workers) compared with baseline staff numbers and would not present a substantial increase in workers to the WWTF facility; therefore, there would be very little demand for new housing units, new or expanded recreational or other public facilities, or schools. Further, operational activities associated with the facilities would not require expanded fire department or police services beyond existing conditions. Program components would not result in the significant permanent increase in residences or populations; therefore, there is no increase in the need for new fire, police protection facilities, schools, parks, or other public facilities and there would be no impact.

In addition to direct impacts related to implementation of the Program, the Program could also result in indirect impacts of new infrastructure allowing for the development of unplanned growth which could place a strain on other public resources. The Program, however, is designed to accommodate growth planned within the 2030 General Plan and evaluated in the 2030 General Plan EIR. Because the growth is planned, it is anticipated that other City services are planned to expand alongside or after the implementation of the Program. The analysis in the 2030 General Plan EIR concluded that with compliance with General Plan policies, implementation actions, and with payment of in-lieu fees by developers, impacts related to fire and police protection services would be less-than-significant under reasonable build-out. Therefore, the Program would not induce growth beyond the levels of growth already planned, analyzed, and approved in the 2030 General Plan, and there would be a less-than-significant impact to fire, police protection services, schools, parks, or other public facilities.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

The CIPs 1-6 would not include or require new or physically altered public services such as, fire departments, police stations, schools, parks or the expansion of existing public facilities. Implementation of the CIPs 1-6 would not directly induce population growth in the region that would require expanded fire, police, schools, parks or other public facilities. Construction activities would involve a temporary increase in employees. However, employment opportunities associated with the construction of the CIPs 1-6 would be assumed to be filled by the local workforce and would not result in an increased housing demand (Section 3.12, Population and Housing, for more details).

Operation

Operation of the CIPs 1-6 would not require new full-time employees to operate; therefore, there would be very little demand for new housing units that could generate school-age children, new or expanded recreational or other public facilities, or schools. Further, operational activities associated with the facilities would not require fire department or police services. As such, because CIPs 1-6 would not result in the significant permanent increase in residences or populations, no increase in the need for new fire, police protection facilities, schools, parks, or other public facilities would occur, and there would be no impact.

In addition to direct impacts related to implementation of the CIPs 1-6, the improvements could also result in indirect impacts of new infrastructure allowing for the development of unplanned growth which could place a strain on other public resources. The CIPs 1-6, however, is designed to accommodate growth planned within the 2030 General Plan and evaluated in the 2030 General Plan EIR. Because the growth is planned, it is anticipated that other City services are planned in relation and the CIPs 1-6 would not initiate an indirect substantial adverse impact requiring additional public facilities or more fire or police protection services. The analysis in the 2030 General Plan EIR concluded that with compliance with General Plan policies, implementation actions, and with payment of in-lieu fees by developers, impacts related to fire and police protection services would be less-than-significant under reasonable build-out. Therefore, the CIPs 1-6 would not induce growth beyond the levels of growth already planned, analyzed, and approved in the 2030 General Plan, and there would be a less-than-significant impact to fire and police protection services.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact PUB-1 Findings

Impact PUB-1 Overall Level of Significance Prior to Mitigation: No Impact

Impact PUB-1 Mitigation Required: None Required

Impact PUB-1 Overall Level of Significance After Mitigation: No Impact

Impact PUB-2: Potential to require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electrical power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

Impact PUB-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Implementation of the Program would result in the construction of wastewater facilities including pipelines, pump stations, associated appurtenances, and upgrades to the existing WWTF. These facilities involve the construction of new or expanded water and stormwater drainage facilities, which is a net benefit to the

community. The Program would not involve the construction of electrical power, natural gas, or telecommunications facilities or necessitate the need for new or expanded electric power, gas, or telecom facilities because most of the power to operate temporary construction machinery will come from diesel fuel. At this time, no underground gas, telecommunication facilities, or electrical power facilities are planned to be relocated to accommodate the Program because trenching is anticipated cross under existing utilities (with maximum depths of 40 to 50 feet below ground surface). Thus, implementation of the Program would result in a less-than-significant impact to relocation or construction of new or expanded water, wastewater, stormwater drainage, electrical power, natural gas, and telecommunications facilities.

Operation

The operation of the Program is not planned to require new electric, telecommunications, or natural gas facilities because future pump stations and expansions at the WWTF already have adequate existing electrical utility connections and most of the Program relies on a gravity-fed system to minimize energy use. The operational energy use for the Program is projected to be from an emergency generator fueled by diesel (see Project Operations Energy Use in Energy Calculations). Any unexpected additional electric requirements needed for operation of the Program components, including the new pipelines, pump stations, or the expansion of the WWTF, would incorporate appropriate energy efficiency standards as identified and analyzed in Section 3.7, GHG and Energy Resources. Therefore, implementation of the Program would result in a less-than-significant impact to relocation or construction of new or expanded water, wastewater, stormwater drainage, electrical power, natural gas, and telecommunications facilities.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

The CIPs 1-6 would result in the construction of wastewater facilities including pipelines and associated appurtenances. These projects only involve the construction of pipelines or pipeline upgrades (i.e., new or expanded water and stormwater drainage facilities), which is a net benefit to the community. The CIPs 1-6 do not involve the construction of electrical power, natural gas, or telecommunications facilities or necessitate the need for new or expanded electric power, gas, or telecom facilities because most of the power to operate temporary construction machinery will come from diesel fuel. At this time, no underground gas, telecommunication facilities, or electrical power facilities are planned to be relocated to accommodate the CIPs 1-6 because the pipelines to be replaced (CIPs 3 and 4) are already placed to not interfere with electrical power, natural gas, or telecommunications facilities and the new pipelines (CIPs 2, 5, and 6) are anticipated cross under existing utilities (with maximum depths of 40 to 50 feet below ground surface). HDD would be used for CIP 2, 5, and 6 to avoid environmental impacts to creeks and physical impacts to public utilities. The rest of the construction would involve grading, pipeline installation, and paving in existing or planned roads or the City’s ROW, reducing impacts to the environment. Thus, construction of the CIPs 1-6 would result in a less-than-significant impact to the environment due to the relocation or construction of new or expanded water, wastewater, stormwater drainage, electrical power, natural gas, and telecommunications facilities.

Operation

The operation of the Program is not planned to require new electric, telecommunications, or natural gas facilities because the CIPs already have adequate existing electrical utility connections and most of the CIPs 1-6 rely on a gravity-fed system to minimize energy use. CIP 5 would be connected to H59PS. No additional electric facilities for H59PS are planned because H59PS is anticipated to already have the pumping capacity for CIP 5. Telecommunication and natural gas facilities are not planned in the CIPs. Therefore, implementation of the CIPs 1-6 would result in a less-than-significant impact to relocation or construction of new or expanded water, wastewater, stormwater drainage, electrical power, natural gas, and telecommunications facilities.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact PUB-2 Findings

Impact PUB-2 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact PUB-2 Mitigation Required: None Required

Impact PUB-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact PUB-3: Potential to have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.

Impact PUB-3 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction of the Program, including the pipelines, pump stations, and WWTF expansion components, and associated appurtenances would require water for dust control, cleanup, soil compaction, and testing of the system. The water demand during construction would be served by the City's existing municipal water supply, which consists of 20 active wells that collectively produce over an average of 49,500 gpm (City of Merced 2021). The average water truck can hold 2,000 to 4,000 gallons of water, which would be used daily during earth-moving activities, and approximately 2,000 gallons of water would be required per acre of disturbed soil for fugitive dust control. The existing supply would have sufficient capacity to serve the Program components throughout construction activities. Therefore, there would be sufficient water supply to serve the Project's construction and reasonably foreseeable future development during normal, dry, and multiple dry years and the Program would result in a less-than-significant impact.

Operation

Operation of the Program would not require additional water supplies because water usage apart from wastewater treatment is not a planned part of Program operations (such as a landscape plan or employee facilities). In addition, the Program is designed to accommodate the planned development and growth set

forth in the 2030 General Plan which was analyzed in the 2030 General Plan EIR. The analysis in the 2030 General Plan EIR evaluated water supply impacts and the need for water supplies to meet reasonable build-out. Because the 2022 WCSMP, and thus the Program, was developed to accommodate the planned growth set forth in the 2030 General Plan, the Program would have sufficient water supplies available to serve the Program. Therefore, there would be sufficient water supply to serve the Project's operations and reasonably foreseeable future development during normal, dry, and multiple dry years and the Program would result in a less-than-significant impact.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction of the CIPs 1-6 would require water for dust control, cleanup, soil compaction, HDD, and testing of the system, similar to the discussion on Program impacts above. The water demand during construction would be served by the City's existing municipal water supply, which consists of 20 active wells that collectively produce over an average of 49,500 gpm (City of Merced 2021). The average water truck can hold 2,000 to 4,000 gallons of water, which would be used daily during earth-moving activities, and approximately 2,000 gallons of water would be required per acre of disturbed soil for fugitive dust control. HDD would also require water for the pressure nozzle. The existing supply would have sufficient capacity to serve the CIPs 1-6 components throughout construction activities. Therefore, the CIPs 1-6 would have sufficient water supply to serve the projected and reasonably foreseeable future development during normal, dry, and multiple dry years; therefore, would result in a less-than-significant impact.

Operation

Operation of the CIPs 1-6 would not require additional water supplies because water usage is not a planned part of CIP operations. As mentioned previously, the CIPs 1-6 are designed to accommodate the planned growth (increased wastewater) set forth in the 2030 General Plan which was analyzed in the 2030 General Plan EIR. The analysis in the 2030 General Plan EIR evaluated water supply impacts and the need for water supplies to meet reasonable build-out, but the CIPs are planned to accommodate increased water usage, not water supply. Because the 2022 WCSMP, and thus the CIPs 1-6, were developed to accommodate the planned wastewater set forth in the 2030 General Plan the CIPs 1-6 would have sufficient water supplies available to serve the present Program and reasonably foreseen development. Thus, the Program would result in a less-than-significant impact.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact PUB-3 Findings

Impact PUB-3 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact PUB-3 Mitigation Required: None Required

Impact PUB-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact PUB-4: Potential to 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.

Impact PUB-4 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction activities associated with the Program (such as dewatering if groundwater is encountered during excavations or trenching activities and requires discharge) could potentially cause a temporary increase in wastewater generation. The wastewater generated from dewatering activities would be tested and treated, if necessary, and may be used for other construction activities, such as dust control. Hydraulic testing required for the new and upgraded pipelines would also be required, and result in wastewater. Wastewater generated by any hydraulic testing would be transported to the WWTF once testing is complete. The wastewater generation would be temporary and would not place a demand on the City's and WWTF service capacity beyond what has been currently permitted. Therefore, the impact to the wastewater treatment provider from construction activities would be less-than-significant.

Operation

The Program aims to meet reasonable build-out of the City's SUDP/SOI as identified in the 2030 General Plan. Current capacity of the WWTF would be expanded from 12 Mgal/d to 27.2 Mgal/d in order to accommodate reasonable growth identified, planned, and analyzed in the 2030 General Plan. The Program would not result in inadequate capacity to serve the projected demand in addition to existing commitments; therefore, the impact would be less-than-significant. Rather, the Program would be a net benefit to the wastewater treatment provider.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction activities associated with the CIPs 1-6 (such as dewatering if groundwater is encountered during excavations or trenching activities and requires discharge) could potentially cause a temporary increase in wastewater generation. The wastewater generated from dewatering activities would be tested and treated, if necessary, and may be used for other construction activities, such as dust control. Hydraulic testing required for the new and upgraded pipelines would also be required, and result in wastewater. Wastewater generated by any hydraulic testing would be transported to the WWTF once testing is complete. The wastewater generation would be temporary and would not place a demand on the City's and WWTF service capacity beyond what has been currently permitted. Therefore, the CIPs 1-6

would create a less-than-significant impact to the wastewater treatment provider from construction activities.

Operation

The CIPs 1-6 aims to meet reasonable build-out of the City's SUDP/SOI as identified in the 2030 General Plan. The CIPs 1-6 would not result in inadequate capacity to serve the projected demand in addition to existing commitments; therefore, the impact would be less-than-significant. Rather, the CIPs 1-6 would be a net benefit to the wastewater treatment provider.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact PUB-4 Findings

Impact PUB-4 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact PUB-4 Mitigation Required: None Required

Impact PUB-4 Overall Level of Significance After Mitigation: Less-than-Significant

Impact PUB-5: Potential to generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.

Impact PUB-5 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction activities associated with implementation of the Program would result in a temporary increase in solid waste, such as pavement removal, excess or unsuitable spoils, excess concrete, and excess excavated materials. This waste would be accumulated over the duration of the construction of the Program components, including for the new pump stations, pipelines, and WWTF expansion activities, and would periodically be hauled offsite, thus not impacting the landfill all at once. Based on the remaining capacity, it is expected that the Highway 59 landfill would have sufficient capacity to receive solid waste generated during construction of the Program. Some Program components are anticipated to be completed as needed to accommodate reasonable build-out, which based on recent estimates would be approximately 2045. The Highway 59 landfill has capacity to receive solid waste through 2055, which should accommodate waste generated by these components over time. Additionally, excavated materials during pipeline placement would be stockpiled and reused onsite to backfill the trench. This would limit the amount of excavated materials hauled offsite from construction activities. Any construction waste and excavated materials removed from the site would follow CALGreen standards. The City would Develop a Construction Waste Management Plan as required per CALGreen code Title 24. A. In addition, the City is in compliance with the State of California's 50 percent waste diversion goal (the California Integrated Waste Management Act), and implementation of the Program would comply with this goal. Therefore,

construction impacts from the Program components related to the generation of waste in excess of state or local standards or in excess of local infrastructure capacity would be less-than-significant.

Operation

Operation of the Program would largely involve the storage, transport, and treatment of wastewater. As discussed in Section 2.3.2.2, Existing WWTF Projects, the expansion of the WWTF would involve an increase in biosolid generation. Biosolids generated at the WWTF could be applied to additional agricultural areas within two miles of the WWTF or trucked to the Synagro Central Valley Compost Facility (approximately 22 miles from the WWTF). The Synagro Central Valley Compost Facility has both the capacity and permitted waste classification to accept such materials (CalRecycle 2024). Any application of these biosolids to offsite areas would be in compliance with the Merced County biosolids disposal ordinance, WDRs, and 40 CFR Part 503. Therefore, operational impacts associated with the Program and WWTF expansion would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction activities associated with implementation of the CIPs 1-6 would result in a temporary increase in solid waste, such as pavement removal, excess or unsuitable spoils, excess concrete, and excess excavated materials. This waste would be accumulated over the duration of the construction of the CIPs 1-6, including for the pipelines, and would periodically be hauled offsite, thus not impacting the landfill all at once. Based on the remaining capacity, it is expected that the Highway 59 landfill would have sufficient capacity to receive solid waste generated during construction of the CIPs 1-6. Some CIPs 1-6 components are anticipated to be completed as needed to accommodate reasonable build-out, which based on recent estimates would be approximately 2045. The Highway 59 landfill has capacity to receive solid waste through 2055, which should accommodate waste generated by these components over time. Additionally, excavated materials during pipeline placement would be stockpiled and reused onsite to backfill the trench. This would limit the amount of excavated materials hauled offsite from construction activities. The City would Develop a Construction Waste Management Plan as required per CALGreen code Title 24. A. In addition, the City is in compliance with the State of California’s 50 percent waste diversion goal (the California Integrated Waste Management Act), and implementation of the Program would comply with this goal. Therefore, construction impacts from the CIPs 1-6 components related to the generation of waste in excess of state or local standards or in excess of local infrastructure capacity would be less-than-significant.

Operation

Operation of the CIPs 1-6 would involve the transport of wastewater, and thus would not generate solid waste during operation. Therefore, operational impacts associated with the CIPs 1-6 would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant

Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact PUB-5 Findings

Impact PUB-5 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact PUB-5 Mitigation Required: None Required

Impact PUB-5 Overall Level of Significance After Mitigation: Less-than-Significant

Impact PUB-6: Potential to comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Impact PUB-6 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The City is currently in compliance with the State of California's 50 percent waste diversion goal (the California Integrated Waste Management Act), and implementation of the Program would comply with this goal. Construction of the Program components would generate debris, including pavement removal, excess or unsuitable spoils, excess concrete, and excess excavated materials. As discussed under Impact PUB-5, some of the excavated material during trenching and pipeline placement would be used as backfill, which would reduce waste generation at the Highway 59 landfill location. The Program construction activities would be in compliance with both state and local regulations regarding waste from construction. Construction waste is expected to be limited and temporary in nature and would not conflict with any of the applicable goals and regulations. Therefore, the impact would be considered less-than-significant.

Operation

Operation of the Program would only generate solid waste at the existing WWTF through the increase in biosolid production from the increase in treatment capacity of the WWTF. As discussed in Impact PUB-5, the majority of these biosolids would be land applied to the agricultural areas south of the WWTF. Any application of these solids at different City-owned property would comply with the Merced County biosolids disposal ordinance and 40 CFR Part 503. If City lands are not able to accommodate land application, biosolids may also be transported offsite to the Synagro Central Valley Compost Facility (located approximately 22 miles from the WWTF), which has both the capacity and permitted waste classification to accept such materials (CalRecycle 2024). Therefore, operational impacts associated with implementation of the Program and compliance with federal, state, and local management and reduction for solid waste would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

The City is currently in compliance with the State of California's 50 percent waste diversion goal, and implementation of the CIPs 1-6 would comply with this goal. Construction of the CIPs 1-6 components would generate debris, including pavement removal, excess or unsuitable spoils, excess concrete, and excess excavated materials. As discussed under Impact PUB-5, some of the excavated material during trenching and pipeline placement would be used as backfill, which would reduce waste generation at the Highway 59 landfill location. The CIPs 1-6 construction activities would be in compliance with both state and local regulations regarding waste from construction. Construction waste is expected to be limited and temporary in nature and would not conflict with any of the applicable goals and regulations. Therefore, the impact would be considered less-than-significant.

Operation

No part of the operation of the CIPs 1-6 would generate waste. Therefore, operational impacts associated with implementation of the CIPs 1-6 and compliance with federal, state, and local management and reduction for solid waste would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact PUB-6 Findings

Impact PUB-6 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact PUB-6 Mitigation Required: None Required

Impact PUB-6 Overall Level of Significance After Mitigation: Less-than-Significant

3.13.5 Public Service Mitigation

No mitigation required.

3.14 RECREATION

3.14.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- 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?
- 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?

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to recreation that may result from implementation of the Program and identifies mitigation for significant impacts, where feasible.

3.14.2 Regulatory Framework

This section discusses the federal, state regulations and local policies and objectives that related to recreation and are relevant to the Program.

3.14.2.1 Federal

There are no Federal regulations that apply to the Program pertaining to recreation and recreational facilities.

3.14.2.2 State

California Government Code Section 65560(b)

CGC Section 65560(b) defines “open space land” as any parcel or area of land or water that is unimproved and devoted to an open space use. State law requires that the local General Plans include an Open Space element to promote the retention of open space for recreational purposes.

3.14.2.3 Local

The City of Merced Parks and Open Space Master Plan

The City Parks and Open Space Master Plan is a long-range planning guide for parks and recreation services within the City (City of Merced 2004). This plan contains an assessment of park, open space, and facility needs within the City, as well as recommendations and policies related to acquisition and development and improvements to existing and future park sites. Through the planning efforts completed in this plan and the 2030 population projections of 116,800 people identified in the 2030 General Plan, the City has identified the need to expand the existing park system.

Merced Vision 2030 General Plan

The 2030 General Plan contains several policies that directly or indirectly pertain to recreation. Chapter 7: Open Space, Conservation, and Recreation was amended in June 2016. There are five goals related to open space/recreation, including the following:

Goal Area OS-1: Open Space for the Preservation of Natural Resources

- Policy OS-1.2 Preserve and enhance creeks in their natural state throughout the planning area.
- Policy OS-1.5 Preserve and enhance water quality.

Goal Area OS-2: Open Space for the Managed Production of Resources

- Policy OS-2.1 Protect agricultural areas outside the City's SUDP/SOI from urban impacts.
- Policy OS-2.2 Relieve pressures on converting areas containing large concentrations of "prime" agricultural soils to urban uses by providing adequate urban development land within the Merced City SUDP/SOI.

Goal Area OS-3: Open Space for Outdoor Recreation

- Policy OS-3.1 Provide high-quality park and open space facilities to serve the needs of a growing population.

Goal Area OS-4: Open Space for Public Health and Safety

- Policy OS-4.1 Preserve open space areas which are necessary to maintaining public health and safety.

Goal Area OS-5: Conservation of Resources

- Policy OS-5.1 Promote water conservation throughout the planning area.
- Policy OS-5.2 Protect soil resources from the erosive forces of wind and water.

3.14.3 Environmental Setting

The City includes approximately 238 aces of developed parks which are scattered around the City and surrounding areas. These developed areas include mini parks, neighborhood parks, community parks, school parks, special use areas, urban plazas, athletic parks, and linear parks. Historically, the City has used the standard of having five acres of park space for every thousand residents, with supplemental areas such as Lake Yosemite and school grounds which provide additional open space not included in the 5 to 1,000 ratio. There are two school parks directly within the Program Study Area, school parks are park facilities, usually neighborhood park facilities that are developed adjacent to or on school grounds. There is also an extensive bicycle system which covers approximately 13 miles and crosses through four creek corridors and numerous City roadways with plans for expansion. Other recreational facilities including sports fields, gymnasiums, pool space, and tennis courts are less used by the general public within the City (City of Merced 2010).

Table 3.14-1: School Parks Adjacent to Program Study Area

School Park Facility	Position to Program Study Area
Farmdale Elementary School	Adjacent—200 feet north of South Merced Major Improvements
Our Lady of Mercy Preschool	Adjacent—Immediately adjacent to Program Minor Improvements

3.14.4 Environmental Impacts

This section analyzes the Program's potential to result in significant impacts to recreation resources. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact. Recreation impacts were determined by comparing the Program with the objectives of the General Plan, specifically the Open Space element (Chapter 7) as well as the threshold of significance. According to Appendix G of the CEQA Guidelines, a proposed Project will have a significant impact on the environment if it will 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 or include the construction of new recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

3.14.4.1 Methodology

The potential recreational impacts of the Program are assessed qualitatively, drawing from knowledge of the Program Study Area and a review of aerial photographs, recreation maps, and usage data provided by state and local planning agencies. The evaluation of the Program's effects on nearby recreational facilities aims to avoid or minimize environmental impacts by considering the proximity of these facilities to the Program components.

3.14.4.2 Impact Analysis

Impact REC-1: Potential to 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; or include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

Impact REC-1 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction of the Program would not directly or indirectly increase use of or require expansion recreational facilities due to the underground and infrastructure-related nature of wastewater systems. Construction equipment would not be staged at existing parks. Construction would not diminish or prevent use of parks (specifically the Farmdale Elementary School park and Our Lady of Mercy park) because the

Program would not obscure or restrict access to the parks and all work would be adjacent to the parks, not within. Construction crews that are temporarily living in the City for construction of the Program may utilize park facilities when not working during the duration of Program construction. However, the anticipated number of workers (an approximate maximum of 80 workers if all are not local) is relatively minimal when comparing the number of parks available for recreation throughout the City. Therefore, substantial deterioration of existing parks or other recreational facilities would not occur nor would the expansion or new construction of parks be required as result of the Program activities, resulting in no impact.

Operation

Implementation of the Program would allow the City to address existing system deficiencies such as replacement of aging infrastructure, provide new infrastructure to meet the growth projections identified in the 2030 General Plan (i.e. pipelines and pump stations), and expand the existing WWTF to meet these increased flows. Because the 2022 WCSMP would be designed to meet these designated growth projections, no indirect effect would occur from the increased sewer capacity that could induce growth beyond these projections. As identified within the 2030 General Plan, the City's plan to accommodate growth is consistent with that that described in the 2022 WCSMP and the City would continue to implement its policies and ratios governing development and park facilities. Specifically, Section 3.13, Recreation, of the 2030 General Plan EIR concludes that with implementation of 2030 General Plan policies, implementation actions, and with adherence to the guidelines and standards in the City's Park and Open Space Master Plan, as well as with payment of development fees, impacts related to service ratios for parks would be less-than-significant under reasonable build-out. Compliance with this stipulation in the 2030 General Plan would ensure that future development within the Program Study Area would not create a need for construction or expansion of recreational facilities beyond what was anticipated in the 2030 General Plan. Therefore, because the 2022 WCSMP used the growth projections in the 2030 General Plan as a basis for reasonable build-out assumptions, the Program itself would not result in additional growth beyond what was previously analyzed, and no additional recreation facilities would be required. Operation of the Program would not directly or indirectly increase use of or require expansion recreational facilities due to the underground and infrastructure-related nature of wastewater systems. Therefore, substantial deterioration of existing parks or other recreational facilities would not occur nor would the expansion or new construction of parks be required as result of the Program activities, resulting in no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Project Impacts: Interim Collection System Improvements (CIP 1-6)

Construction

Construction of the Interim Collection System Improvements (CIP 1-6) would not directly or indirectly increase use of or require expansion recreational facilities due to the underground and infrastructure-related nature of wastewater systems. There are no park facilities adjacent to the Interim Collection System Improvements (CIP 1-6). Therefore, diminished use, prevention, or substantial deterioration of existing parks or other recreational facilities would not occur, nor would the expansion or new

construction of parks be required as result of the Interim Collection System Improvements activities, resulting in no impact.

Operation

Implementation of the Interim Collection System Improvements (CIP 1-6) would allow the City to address existing system deficiencies such as replacement of aging infrastructure and to provide new infrastructure to meet the growth projections identified in the 2030 General Plan (i.e. pipelines). Because the 2022 WCSMP would be designed to meet these designated growth projections, no indirect effect would occur from the increased sewer capacity that could induce growth beyond these projections. As identified within the 2030 General Plan, the City's plan to accommodate growth is consistent with that that described in the 2022 WCSMP and the City would continue to implement its policies and ratios governing development and park facilities. Specifically, Section 3.13, Recreation, of the 2030 General Plan EIR concludes that with implementation of 2030 General Plan policies, implementation actions, and with adherence to the guidelines and standards in the City's Park and Open Space Master Plan, as well as with payment of development fees, impacts related to service ratios for parks would be less-than-significant under reasonable build-out. Compliance with this stipulation in the 2030 General Plan would ensure that future development within the Program Study Area would not create a need for construction or expansion of recreational facilities beyond what was anticipated in the 2030 General Plan. Therefore, because the 2022 WCSMP used the growth projections in the 2030 General Plan as a basis for reasonable build-out assumptions, the Interim Collection System Improvements would not result in additional growth beyond what was previously analyzed, and no additional recreation facilities would be required. Operation of the Interim Collection System Improvements would not directly or indirectly increase use of or require expansion recreational facilities due to the underground and infrastructure-related nature of wastewater systems. Therefore, substantial deterioration of existing parks or other recreational facilities would not occur, nor would the expansion or new construction of parks be required as result of the Interim Collection System Improvements activities, resulting in no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Impact REC-1 Findings

Impact REC-1 Overall Level of Significance Prior to Mitigation: No Impact

Impact REC-1 Mitigation Required: None Required

Impact REC-1 Overall Level of Significance After Mitigation: No Impact

Impact REC-2: Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Impact REC-2 Analysis

Program Impacts: North and South Merced Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction of the Program would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment because the Program components are underground and are infrastructure related to wastewater systems, not recreation, resulting in no impact.

Operation

Implementation of the Program would allow the City to address existing system deficiencies related to wastewater, not recreational facilities. Operation of the Program would not include recreational facilities or require the construction or expansion of recreational facilities due to the underground and infrastructure-related nature of wastewater systems, resulting in no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Project Impacts: CIPs 1-6

Construction

Construction of the Interim Collection System Improvements (CIP 1 -6) would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment because the Interim Collection System Improvements are underground and are infrastructure related to wastewater systems, not recreation, resulting in no impact.

Operation

Implementation of the Program would allow the City to address existing system deficiencies related to wastewater, not recreational facilities. Operation of the Program would not include recreational facilities or require the construction or expansion of recreational facilities due to the underground and infrastructure-related nature of wastewater systems, resulting in no impact.

Level of Significance Prior to Mitigation: No Impact
Mitigation Required: None Required
Level of Significance After Mitigation: No Impact

Impact REC-2 Findings

Impact REC-2 Overall Level of Significance Prior to Mitigation: No Impact

Impact REC-2 Mitigation Required: None Required

Impact REC-2 Overall Level of Significance After Mitigation: No Impact

3.14.5 Recreation Mitigation

No mitigation required.

3.15 TRANSPORTATION

3.15.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in this EIR.

- Conflict with a program, plan, ordinance, or policy addressing the circulation systems, including transit, roadway, bicycle and pedestrian facilities
- Conflict with or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersection(s) or incompatible uses (e.g. farm equipment))
- Result in inadequate emergency access

The remainder of this section describes the regulatory and environmental setting to support the evaluation of the potential impacts and describes the potential impacts to transportation that may result from implementation of the Program, identifying mitigation for potentially significant impacts, where feasible and necessary.

3.15.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives that related to transportation and traffic and are relevant to the Program.

3.15.2.1 Federal

There are no federal plans, policies, regulations, or laws that are related to transportation and traffic and are relevant to the Program.

3.15.2.2 State

California Department of Transportation

Caltrans manages inter-regional transportation, including the management and construction of the California highway system. In addition, Caltrans is responsible for the permitting and regulation of state roadways. State facilities likely to be used as regional access routes by construction traffic associated with the Program include SRs (SRs) 99, 59, and 140. Caltrans requires that permits be obtained for transportation of oversized loads and transportation of certain materials, and for construction-related traffic disturbance.

Updated CEQA Guidelines and Transportation Impact Evaluations

In December 2018, the California Natural Resources Agency certified and adopted the CEQA Guidelines update package, including the Guidelines section implementing Senate Bill (SB) 743. CEQA Guidelines Section 15064.3 states, “This section describes specific considerations for evaluating a project's transportation impacts. Generally, VMT is the most appropriate measure of transportation impacts. For the purposes of this section, VMT refers to the amount and distance of automobile travel attributable to a

project. Other relevant considerations may include the effects of the project on transit and non-motorized travel. Except as provided in subdivision (b)(2) (regarding roadway capacity), a project's effect on automobile delay shall not constitute a significant environmental impact." Section 15064.3(b) sets forth criteria for determining the significance of transportation impacts stating the following:

Land Use Projects. VMT exceeding an applicable threshold of significance may indicate a significant impact. Projects that decrease VMT in the Project area compared to existing conditions should be presumed to have a less-than-significant transportation impact.

Transportation Projects. Transportation projects that reduce, or have no impact on, VMT should be presumed to cause a less-than-significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.

Qualitative Analysis. If existing models or methods are not available to estimate the VMT for the particular project being considered, a lead agency may analyze the project's VMT qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.

Methodology. A lead agency has discretion to choose the most appropriate methodology to evaluate a project's VMT, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's VMT and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate VMT and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

From these updated CEQA Guidelines, the OPR developed a Technical Advisory on Evaluating Transportation Impacts in CEQA, which contains OPR's technical recommendations regarding assessment of VMT, thresholds of significance, and MMs (OPR 2018). This Technical Advisory includes a screening threshold of small projects, which states that, "projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact" (OPR 2018).

3.15.2.3 Local

Merced Vision 2030 General Plan

The 2030 General Plan was adopted January 3, 2012 (City of Merced 2012). The Transportation and Circulation (T) Element was amended May 2014, April 2015, and April 2023. The element contains several policies that directly or indirectly pertain to transportation and traffic, including the following:

Goal Area T-1: Streets and Roads

- **Policy T-1.4.** Promote traffic safety for all modes of transportation.

- **Policy T-1.8.** Use a minimum peak hour LOS "D" as design objectives for all new streets in new growth areas and for most existing City street except under special circumstances.

City of Merced Municipal Code

Section 17.58.010 (Road Construction Application and Plans) of the City of Merced Municipal Code has the following provisions related to construction within roadways:

- Whenever a person is required to construct or reconstruct road improvements that have been or will be dedicated to the City, he or she shall first make application to the City engineer for a road construction permit, and submit to the City engineer for approval, construction plans and such specifications and other details as required to describe fully the proposed road construction. The plans shall have been prepared under the supervision of and shall be signed by a qualified engineer registered in the state.
- Construction plans for the road improvements shall conform to the latest adopted edition of the City's "Standard Designs of Common Engineering Structures Manual", and unless otherwise specified in the ordinance, developed permit, map approval or other entitlement requiring the improvements, shall include the full road width, including curb and gutter.

Section 10.40 (Truck Routes) includes the following designated truck routes through the City:

- West 13th Street from G Street to V Street;
- West Highway 140 (Mc Swain Road) from its intersection with V Street to the westerly City limits;
- West 16th Street from the westerly City limits to G Street;
- East 16th Street from G Street to Yosemite Parkway;
- Yosemite Parkway from its intersection with East 16th Street to the easterly City limits;
- G Street from the northerly City limits to 13th Street;
- Martin Luther King, Jr. Way from West 16th Street to Childs Avenue;
- V Street from West 16th Street to West Avenue;
- Childs Avenue from westerly City limit to Highway 99;
- West Olive Avenue from Highway 59 to the easterly City limits;
- Kibby Road from Yosemite Parkway to Childs Avenue;
- Parsons Avenue from Yosemite Parkway to Childs Avenue;
- West Avenue from V Street to Childs Avenue;
- Highway 59 (Snelling Road) from 16th Street to northerly City limits; and
- M Street from West 16th Street to Olive Avenue.

City of Merced 2013 Bicycle Transportation Plan

The purpose of the City of Merced 2013 Bicycle Transportation Plan is to provide City staff and the local community with a comprehensive, long-range view for the development of bicycle facilities and programs within the City (City of Merced 2013). Implementation of this plan will result in a comprehensive, continuous, and well-maintained bikeway network, which will maximize bicycling benefits. Due to the

increase in bicycle use from the UC Merced campus and increases in local groups that are engaged in healthy living initiatives, the City has been focusing on developing a more bicycle-friendly community.

City of Merced Neighborhood Traffic Calming Guidelines

The City of Merced Neighborhood Traffic Calming Guidelines were created to reduce traffic within the problematic streets of the City. The relevant policies within these Guidelines that pertain to the Project are listed below (City of Merced 2008):

- To the extent feasible, through traffic should be routed to arterial streets, regional routes and highways, and away from neighborhood streets; and
- Access for emergency vehicles should be preserved at levels that meet City response standards.

Merced County Association of Governments Regional Transportation Plan/Sustainable Communities Strategy

In 2022, the Merced County Association of Governments (MCAG) updated the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) for the Merced region (MCAG 2022). The RTP is a long-range planning document that provides the framework for investments in roads, freeways, public transit, bikeways, and other ways that people move around the County. The RTP/SCS includes regional goals and priorities to ensure transportation system efficiency over the next 25 years.

Goals within this document that are applicable to the Program include the following:

1. **Highways, Streets, and Roads:** Provides a safe and efficient regional road system that accommodates the demand for movement of people and goods.
2. **Transit:** Provide an efficient, effective, coordinated regional transit system that increases mobility for urban and rural populations, including transportation for disadvantaged persons.
3. **Active Transportation (Bicycle & Pedestrian):** A regional transportation system for bicyclists and pedestrians. Create a safe, connected, and integrated regional transportation system for bicyclists and pedestrians.
4. **Energy:** Reduce usage of nonrenewable energy resources for transportation purposes.
5. **Air Quality:** Achieve air quality standards set by the USEPA, and the State Air Resources Board.
6. **Reliability and Congestion:** Achieve a significant reduction in congestion on the National Highway System. Improve the efficiency and reliability of the surface transportation system.
7. **Safety for all Roadway Users:** Achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
8. **System Preservation:** Maintain the existing transportation system in a state of good repair.

3.15.3 Environmental Setting

The transportation system within the Program Study Area is a combination of roadways, bike paths, and a complex public transportation system. Each of element of this transportation system is described in further detail below:

3.15.3.1 Roadways

Currently, three major highways provide regional access to and through the Program Study Area include the following:

- **SR 99** is the primary regional highway in the Merced area. SR 99 provides access north to Sacramento and south to Fresno and Bakersfield. Through Merced, SR 99 is a four- to six-lane freeway, with an average traffic volume in the range of 35,000 to 40,000 vehicles per day. SR 99 is also a major freight corridor, with trucks making up 21 percent of the total traffic of this thoroughfare.
- **SR 59** is a highway that that extends from SR 152, south to Snelling, a community located north of the City. SR 59 is a two-lane rural highway through Merced, serving between 14,000 and 16,000 vehicles per day. SR 59 is located about 3.5 miles east of the WWTF . SR 59 is a significant inter-regional route of statewide importance and carries most of the truck-transported agricultural goods produced in or transported through the Merced area.
- **SR 140** is a two-lane, east-west conventional highway providing regional access to Yosemite National Park to the east and extending west past SR 99 and Interstate 5.

Additional important roadways within the City and Program Study Area include G Street and Santa Fe Drive, which have more limited roles in terms of regional access as they connect the City of Merced with the nearby communities of Snelling and Atwater. The City has a well-established local roadway consisting of a 1-mile grid system of major north-south roadways including SR 59, R Street, G Street, and Parsons/Gardner Avenue, as well as major east-west roadways including Olive Avenue, Yosemite Avenue, W Cardella Road, E Cardella Road, and Bellevue Road. According to the 2030 General Plan, this existing system will be expanded to accommodate future growth, particularly in the northern areas of the City and the Program Study Area.

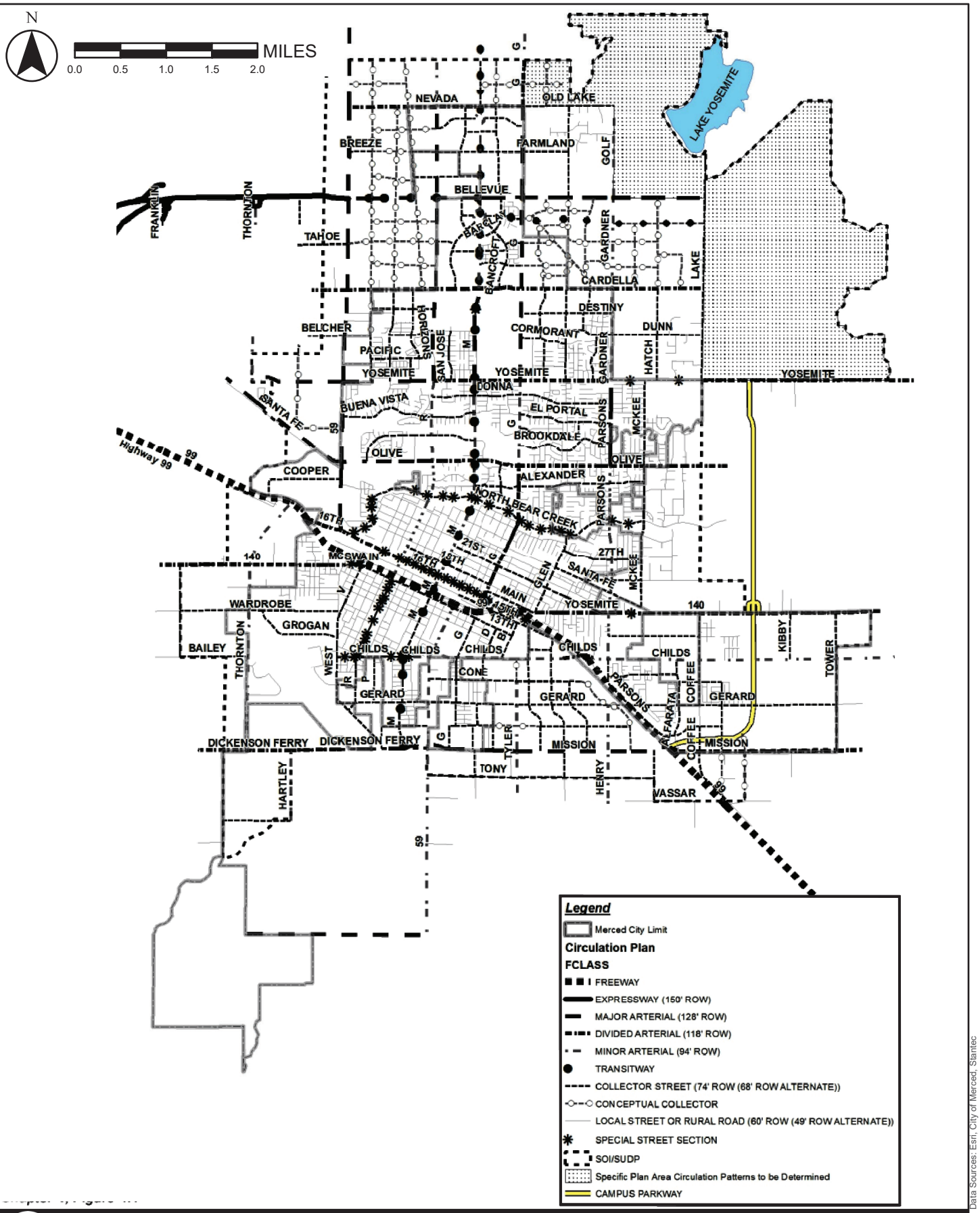
The LOS thresholds for roadway segments within the Program Study Area are included in **Table 3.15-1**, and **Figure 3.15-1** shows the exiting circulation plan for the City.

Table 3.15-1: Level of Service Thresholds for Roadway Segments

Type of Roadway	Number of Lanes	ADT Level of Service Capacity Thresholds				
		A	B	C	D	E
Lane Freeway	4	25,900	42,600	57,800	68,400	76,00
	6	40,000	65,800	89,200	105,600	117,400
	8	54,000	89,000	120,600	142,800	158,800
	10	68,000	112,000	152,200	180,200	200,200
Lane Expressway	2	-	-	16,800	23,200	24,400
	4	-	3,000	27,800	36,000	37,800
	6	-	5,900	38,900	48,900	51,300
	8	-	9,600	60,600	73,500	77,100
Lane Highway	2	2,300	7,600	14,200	20,000	27,400
	4	20,500	33,200	48,000	62,200	70,600
Lane County Road	2	-	-	7,700	15,000	16,100
	4	-	-	18,000	32,200	34,000

Type of Roadway	Number of Lanes	ADT Level of Service Capacity Thresholds				
		A	B	C	D	E
Lane Arterial	2	-	-	11,600	16,000	16,800
	4	-	4,100	26,800	33,700	35,400
	6	-	6,600	41,800	50,700	53,200
Lane Collector	2	-	-	4,800	10,300	13,200
	4	-	-	11,300	22,200	26,400

Source: (City of Merced 2012)



Document Path: U:\18401\18403060\geospatial\ArcPro\Merced_EIR_maps.aprx

Data Sources: Esri, City of Merced, Stantec

Stantec

City of Merced
Wastewater Collection System
Master Plan - Environmental Impact Report

Figure 3.15-1

Existing Merced 2030 General Plan Circulation Plan

3.15.3.2 Bicycle and Pedestrian System

Bicycle and pedestrian activity within the City's SUDP/SOI is considered by the 2030 General Plan as an important mode of travel due to favorable climate and ease of terrain (i.e., relatively flat) within the area. The City SUDP/SOI currently has a number of Class I off-road bicycle/pedestrian trail systems, with a majority of these trails located along existing waterways (i.e., Bear, Black Rascal, Cottonwood, and Fahrens Creeks). This existing system is planned for expansion with the Merced 2013 Bicycle Transportation Plan to form one complete loop along Bear and Black Rascal Creeks between McKee Road and SR 59. A large sub-route is also planned along Fahrens Creek, to Lake Yosemite and down Lake Road to Black Rascal Creek. Regional access to the UC Merced campus is also planned (City of Merced 2012). The existing bike routes and lanes overlapping with the Program components are listed below in **Table 3.15-2** (City of Merced 2013).

Table 3.15-2: Existing Bike Routes within Program Study Area

Program Component	Streets	Bike Path, Route, or Lane
North Merced Major Improvements	Highway 59	Existing Bike Lane
South Merced Major Improvements	Childs Avenue	Existing Bike Route
Program Minor Improvements	N/A	N/A
WWTF Expansion Projects	N/A	N/A
CIP 1	Cardella Road	Existing Bike Lane
CIP 2	V Street, W 8th Street, and W 11th Street	Existing Bike Lane
CIP 3	West Avenue and Grogan Avenue	Existing Bike Lane
CIP 4	N/A	N/A
CIP 5	Yosemite Avenue	Existing Bike Lane
CIP 6	G Street	Existing Bike Lane

Other Transit

Other public, commercial, and private transit systems include public transit (i.e. busses, shuttles, taxis), railway services (i.e., UPRR and the BNSF), and air services (i.e., the Merced Regional Airport and Castle Airport). Public transit services are available throughout the City and Program Study Area to varying degrees. Railway and air services are not applicable to the analysis below; therefore, are not discussed further.

The Merced Transit System (MTS)/City Shuttle provides services with "The Bus" which provides both local and inter-regional access. The Bus operates on 16 fixed routes as well as demand responsive services during the weekdays and on Saturday (Transit Joint Powers Authority 2020). These routes are located throughout the City, with the majority of the routes located toward the center portion of the City. Several routes are located within roadways that would be utilized for the placement of the North Merced Improvements, South Merced Improvements, Program Minor Improvements, WWTF Expansion Projects, and the CIPs 1-6. These routes include:

- The Merced - UC route which runs along Yosemite Avenue, Lake Road, and G Street.

- The Merced - M3 route which runs along G street.
- The Merced – M3, M4, M5 routes all which run along Childs Avenue.

The bus also connects with the UC Merced student shuttle service, known as “Cat Tracks”. Additional public and private transit services, such as Dial-A-Ride, ride share apps, public taxis, and Amtrak are also utilized within the City.

3.15.4 Environmental Impacts

This section analyzes the Program’s potential to result in significant impacts to transportation and traffic. When a potential impact was determined to be potentially significant, feasible MMs were identified to reduce or avoid that impact.

3.15.4.1 Methodology

The VMT metric concentrates on land development and project-level and long-term planning decisions that support achieving the state’s climate and air quality goals in accordance with SB 375. The 2018 OPR Technical Advisory offers recommendations for evaluating VMT for residential, office, retail, and mixed-use developments—those uses that have the greatest influence on VMT. For these uses, the types of trips, the typical lengths of those trips, and, hence, the VMT are well understood, as are means of reducing VMT.

The Program would not be a long-term generator of trips beyond those necessary for transporting equipment and personnel to and from the Program Study Area during construction and minimal operations and maintenance. Unlike land development projects which can have a substantial change in travel demand post-construction, the impacts of the Program focuses almost entirely on the timeframe anticipated to complete the construction. Therefore, the Program does not lend itself neatly to a VMT analysis that seeks to analyze long-term travel patterns since it would only generate temporary traffic trips that would terminate following completion of the construction; therefore, traffic impacts are also assessed qualitatively.

3.15.4.2 Impact Analysis

Impact TRA-1: Potential to conflict with a program, plan, ordinance, or policy, addressing the circulation systems, including transit, roadway, bicycle and pedestrian facilities.

Impact TRA-1 Analysis

Program Impacts: North and South Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Construction of the Program could potentially conflict with the programs, plans, ordinances, or policies described in Section 3.25.2, Regulatory Framework during activities that would interfere with the existing

or planned circulation system. These activities result from vehicle trips associated with construction or road closures associated with construction.

Construction of the Program would require vehicle trips associated with both construction worker commutes, material hauling, and equipment transport to and from the sites throughout construction. For the Program construction, these trips would be intermittent and localized to individual areas; however, the increase in trips per day on local and regional roadways has a limited potential to affect circulation systems by requiring temporary single or double lane road closures, introducing slower movements, and larger turning radii of construction trucks. The number and type of material, equipment, and worker vehicles required for construction of the Program would be dispersed over the long-term planning horizon of reasonable build-out of the 2030 General Plan and would not introduce a significant number of trips to the extent they would conflict with the programs, plans, ordinances, or policies listed in Section 3.15.2, Regulatory Framework. Trips associated with construction under the Program are anticipated to be similar or less than those estimated for the proposed Projects (Chapter 2.0, Project Description, Section 2.4.3, Construction Equipment and Workers, and Appendix B.1).

Worker trips from construction workers would affect roadways during commute times but would be inconsequential with an addition of on average 10 to 30 workers (with a few short-duration concentrated peaks of an approximate maximum of 50 workers) at a particular project site with sites dispersed to different parts of the Program Study Area (if construction happened to be concurrent). Truck trips from equipment delivery would be sporadic. Delivery trips would be limited to delivery of the construction equipment assumed necessary. Haul trips associated with construction would be limited and largely associated with construction of pump stations the WWTF and to a lesser degree possibly pipelines and would occur during the excavation and or building phase utilizing local roadways. During peak excavation or concrete pouring periods, haul trips may generate upwards of 80 trips per day (Appendix B.1) for a very limited periods of time. These additions of construction traffic could temporarily conflict with the programs, plans, ordinances, or policies set forth in the planning documents in Section 3.15.2, Regulatory Framework, by conflicting with service level ratios, increasing wait times for public vehicles, and limiting pedestrian and bicycle access along these roadways, potentially creating a significant impact prior to mitigation. As such, MM TRA-1, Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan, would be required to ensure that consistency with programs, plans, ordinances, and policies is maintained, and existing traffic conditions are maintained by outlining a plan to reduce construction conflicts through traffic controls, notice, AM and PM peak timing, and coordination by understanding existing traffic data. Therefore, with implementation of MM TRA-1, impacts from construction and operational vehicle trips would be less-than-significant.

Additionally, construction of the Program facilities could temporarily impact circulation systems; however, the effect of the Program would vary depending on the Program facility type (i.e., whether it is a pump station, pipeline, maintenance, or activities at the WWTF). Potential impacts would range from intermittent ingress and egress from and to local roadways causing circulation facility impairments to temporary road closures for pipeline construction. The existing roadways are predominantly two-lane rural roads. The roads in North Merced near the UC have bicycle and transit use and facilities with the remainder of the Project areas and the Program Study Area outside the City limits having no developed or devoted bicycle or transit routes (Section 3.15.3, Environmental Setting). The majority of future Program infrastructure is proposed for future roadways and is anticipated to be constructed prior to installation of the roadways

themselves, thus limiting potential road closures and transportation impacts associated with physical construction. Temporary partial or full road closures are anticipated as a part of trunk sewer infrastructure construction along the in-roadway sections of the proposed North Merced and South Merced Major Improvements and the WWTF Expansion Projects under the Program. These road closures could affect the existing circulation system within the City by obstructing vehicles, pedestrians, and bicycles and preventing adequate access to certain areas along the pipeline alignment. These potential conflicts, while anticipated to be temporary and limited in duration, pose the potential to conflict with the City's plans, ordinances and polices set forth in Section 3.15.2, Regulatory Framework, surrounding safety, access, and circulation. This would be a potentially significant impact. Therefore, in addition to MM TRA-1 planning out detours, traffic controls, and plans to reduce impacts to the circulation system, MM TRA-2 would also be implemented to ensure that the public and emergency service agencies are properly notified of these road closures and access is properly coordinated and maintained for residents, recreationalists, and emergency services, as needed and ensure consistency with the applicable plans, policies, ordinances, and programs. Construction-related transportation impacts for the Program would be less-than-significant with MM TRA-1 and MM TRA-2 incorporated.

The programs, plans, ordinances, or policies listed in Section 3.15.2, Regulatory Framework were reviewed for potential inconsistencies or incompatibilities with Program activities and all Program construction activities were found to be compatible and result in a less-than-significant impact (with mitigation where noted). The Program impacts described in the previous paragraphs considered consistency with the following programs, plans, ordinances, or policies:

- **Caltrans Encroachment permit – Consistent**. A Caltrans encroachment permit would be obtained for all work within state ROWs.
- **Caltrans oversized loads and hazardous materials – Consistent**. Transport of construction materials would meet Caltrans requirements.
- **2030 General Plan Circulation Plan – Consistent**. The Program accommodates the planned growth of the General Plan where wastewater collection system infrastructure was envisioned within roadways consistent with the 2030 General Plan's Circulation Plan as shown in **Figure 3.15-1** to avoid disruptions with other City land uses.
- **2030 General Plan Transportation Policy T-1.8 – Consistent.** MM TRA-1 and MM TRA-2 would set for plans for controlling construction traffic and detours to maintain LOS during temporary interruptions to the extent feasible.
- **Merced Municipal Code City Engineer Approval – Consistent.** The Program is proposed and coordinated through the City Public Works Department and City Engineer.
- **Merced Municipal Code Designated Truck Routes – Consistent.** The Program would follow the City's proscribed designated truck routes.
- **2013 Bicycle Transportation Plan, Neighborhood Traffic Calming Guidelines, and MCAG's RTP/SCS – Consistent.** TRA-1 and MM TRA-2 would set for plans for controlling construction traffic and detours to maintain bicycle and pedestrian access during temporary interruptions to the extent feasible.

Therefore, with the implementation of MM TRA-1 and MM TRA-2, construction of the Program would reduce the potential conflict with circulation programs, plans, ordinances, or policies to a less-than-significant level.

Operation

Operation of the Program would not conflict with the programs, plans, ordinances, or policies described in Section 3.25.2, Regulatory Framework during activities that would interfere with the existing or planned circulation system. These activities result from vehicle trips associated with operation. Worker trips from operations would be nominal with the potential to add approximately two new workers at the WWTF on a given day. Haul trips associated with operations are assumed to be approximately two per day and would not substantially impair circulation operation. Therefore, impacts from operational vehicle trips would be less-than-significant.

The programs, plans, ordinances, or policies listed in Section 3.15.2, Regulatory Framework were reviewed for potential inconsistencies or incompatibilities with Program activities and all Program operational activities were found to be compatible and result in a less-than-significant impact. The Program impacts described in the previous paragraphs considered consistency with the following programs, plans, ordinances, or policies:

- **Caltrans oversized loads and hazardous materials – Consistent**. Transport of operational materials would meet Caltrans requirements.
- **2030 General Plan Circulation Plan – Consistent**. The Program accommodates the planned growth of the General Plan where wastewater collection system infrastructure was envisioned within roadways consistent with the 2030 General Plan's Circulation Plan as shown in **Figure 3.15-1** to avoid disruptions with other City land uses.
- **2030 General Plan Transportation Policy T-1.8 – Consistent.** Operation of the Program would not significantly contribute to a change of LOS.
- **Merced Municipal Code City Engineer Approval – Consistent.** The Program is proposed and coordinated through the City Public Works Department and City Engineer.
- **Merced Municipal Code Designated Truck Routes – Consistent.** The Program would follow the City's proscribed designated truck routes.
- **2013 Bicycle Transportation Plan, Neighborhood Traffic Calming Guidelines, and MCAG's RTP/SCS – Consistent.** Operation of the Program would not significantly contribute to a change of in pedestrian or bicycle access or routes.

Therefore, operation of the Program have a less-than-significant impact on circulation programs, plans, ordinances, and policies.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1 and MM TRA-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Construction of the CIPs 1-6 could potentially conflict with the programs, plans, ordinances, or policies described in Section 3.25.2, Regulatory Framework during activities that would interfere with the existing or planned circulation system. These activities result from vehicle trips associated with construction or road closures associated with construction.

Construction of the CIPs 1-6 would require vehicle trips associated with both construction worker commutes, material hauling, and equipment transport to and from the sites throughout construction. For the CIPs 1-6 construction, these trips would be intermittent and localized to individual Project areas; however, the increase in trips per day on local and regional roadways has a limited potential to affect circulation systems by requiring temporary single or double lane road closures, introducing slower movements, and larger turning radii of construction trucks. The number and type of material, equipment, and worker vehicles required for construction of the CIPs 1-6 would be dispersed over the long-term planning horizon of reasonable build-out of the 2030 General Plan and would not introduce a significant number of trips to the extent they would conflict with the programs, plans, ordinances, or policies listed in Section 3.15.2, Regulatory Framework. Trips associated with construction of individual CIPs are anticipated to be similar or less than those estimated for the proposed Projects (Chapter 2.0, Project Description, Section 2.4.3, Construction Equipment and Workers, and Appendix B.1).

Worker trips from construction workers would affect roadways during commute times but would be inconsequential with an addition of on average 10 to 30 workers (with a few short-duration concentrated peaks of an approximate maximum of 50 workers) at a particular project site with sites dispersed to different parts of the Program Study Area (if construction happened to be concurrent). Truck trips from equipment delivery would be sporadic and focused construction around start-up and completion of the CIPs 1-6. Delivery trips would be limited to delivery of the construction equipment assumed necessary and is assumed the CIPs 1-6 would require the maximum number of trips with smaller subsequent projects requiring less equipment. Haul trips associated with construction would be limited to pipelines, would occur during the excavation phase, and utilize local roadways. During peak excavation or concrete pouring periods, haul trips may generate upwards of 80 trips per day for a very limited periods of time. These additions of construction traffic could temporarily conflict with the programs, plans, ordinances, or policies set forth in the planning documents in Section 3.15.2, Regulatory Framework, by conflicting with service level ratios, increasing wait times for public vehicles, and limiting pedestrian and bicycle access along these roadways, potentially creating a significant impact prior to mitigation. As such, MM TRA-1, Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan, would be required to ensure that consistency with programs, plans, ordinances, and policies is maintained, and existing traffic conditions are maintained by outlining a plan to reduce construction conflicts through traffic controls, notice, AM and PM peak timing, and coordination by understanding existing traffic data. Therefore, with implementation of MM TRA-1, impacts from construction vehicle trips would be less-than-significant.

Additionally, construction of the CIPs 1-6 could temporarily impact circulation systems; however, the effect of the CIPs 1-6 would vary depending on the CIP. Potential impacts would range from intermittent ingress and egress from and to local roadways causing circulation facility impairments to temporary road closures for pipeline construction. The existing roadways are predominantly two-lane roads. CIPs 1, 2, 3, 5, and 6 are on or adjacent to roads with existing bike lanes (Section 3.15.3, Environmental Setting). Temporary partial or full road closures are anticipated as a part of CIPs 1-6 construction along the in-

roadway sections of the six CIPs. Road closures could affect the existing circulation system within the City by obstructing vehicles, pedestrians, and bicycles and preventing adequate access to certain areas along the pipeline alignment. These potential conflicts, while anticipated to be temporary and limited in duration, pose the potential to conflict with the City's plans, ordinances and polices set forth in Section 3.15.2, Regulatory Framework, surrounding safety, access, and circulation. This would be a potentially significant impact. Therefore, in addition to MM TRA-1 planning out detours, traffic controls, and plans to reduce impacts to the circulation system, MM TRA-2 would also be implemented to ensure that the public and emergency service agencies are properly notified of these road closures and access is properly coordinated and maintained for residents, recreationalists, and emergency services, as needed and ensure consistency with the applicable plans, policies, ordinances, and programs. Construction-related transportation impacts for the CIPs 1-6 would be less-than-significant with MM TRA-1 and MM TRA-2 incorporated.

The programs, plans, ordinances, or policies listed in Section 3.15.2, Regulatory Framework were reviewed for potential inconsistencies or incompatibilities with CIPs 1-6 and all construction activities were found to be compatible and result in a less-than-significant impact (with mitigation where noted). The CIPs 1-6 impacts described in the previous paragraphs considered consistency with the following programs, plans, ordinances, or policies:

- **Caltrans Encroachment permit** – **Consistent**. A Caltrans encroachment permit would be obtained for all work within state ROWs.
- **Caltrans oversized loads and hazardous materials -- Consistent**. Transport of construction materials would meet Caltrans requirements.
- **2030 General Plan Circulation Plan – Consistent**. The CIPs 1-6 accommodate the planned growth of the General Plan where wastewater collection system infrastructure was envisioned within roadways consistent with the 2030 General Plan's Circulation Plan as shown in **Figure 3.15-1** to avoid disruptions with other City land uses.
- **2030 General Plan Transportation Policy T-1.8 – Consistent.** MM TRA-1 and MM TRA-2 would set for plans for controlling construction traffic and detours to maintain LOS during temporary interruptions to the extent feasible.
- **Merced Municipal Code City Engineer Approval – Consistent.** The CIPs 1-6 are proposed and coordinated through the City Public Works Department and City Engineer.
- **Merced Municipal Code Designated Truck Routes – Consistent.** The CIPs 1-6 would follow the City's proscribed designated truck routes.
- **2013 Bicycle Transportation Plan, Neighborhood Traffic Calming Guidelines, and MCAG's RTP/SCS – Consistent.** TRA-1 and MM TRA-2 would set for plans for controlling construction traffic and detours to maintain bicycle and pedestrian access during temporary interruptions to the extent feasible.

Therefore, with the implementation of MM TRA-1 and MM TRA-2, construction of the CIPs 1-6 would reduce the potential conflict with circulation programs, plans, ordinances, or policies to a less-than-significant level.

Operation

Operation of the CIPs 1-6 could potentially conflict with the programs, plans, ordinances, or policies described in Section 3.25.2, Regulatory Framework during activities that would interfere with the existing or planned circulation system. These activities result from vehicle trips associated with operation.

Worker trips from operations would be nominal since no new workers will be added for the CIPs 1-6 operations. There are no haul trips associated with operations. The programs, plans, ordinances, or policies listed in Section 3.15.2, Regulatory Framework were reviewed for potential inconsistencies or incompatibilities with CIPs 1-6 operational activities and all activities were found to be compatible and result in a less-than-significant impact. The CIPs 1-6 impacts described in the previous paragraphs considered consistency with the following programs, plans, ordinances, or policies:

- **Caltrans oversized loads and hazardous materials – Consistent**. Transport of operational materials would meet Caltrans requirements.
- **2030 General Plan Circulation Plan – Consistent**. The CIPs 1-6 accommodate the planned growth of the General Plan where wastewater collection system infrastructure was envisioned within roadways consistent with the 2030 General Plan's Circulation Plan as shown in **Figure 3.15-1** to avoid disruptions with other City land uses.
- **2030 General Plan Transportation Policy T-1.8 – Consistent.** Operation of the CIPs 1-6 would not significantly contribute to a change of LOS.
- **Merced Municipal Code City Engineer Approval – Consistent.** The CIPs 1-6 are proposed and coordinated through the City Public Works Department and City Engineer.
- **Merced Municipal Code Designated Truck Routes – Consistent.** The CIPs 1-6 would follow the City's proscribed designated truck routes.
- **2013 Bicycle Transportation Plan, Neighborhood Traffic Calming Guidelines, and MCAG's RTP/SCS – Consistent.** Operation of the CIPs 1-6 would not significantly contribute to a change of in pedestrian or bicycle access or routes.

Therefore, operation of the Program have a less-than-significant impact on circulation programs, plans, ordinances, and policies.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1 and MM TRA-2
Level of Significance After Mitigation: Less-than-Significant

Impact TRA-1 Findings

Impact TRA-1 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact TRA-1 Mitigation Required: MM TRA-1 and MM TRA-2

Impact TRA-1 Overall Level of Significance After Mitigation: Less-than-Significant

Impact TRA-2: Potential to conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).

Impact TRA-2 Analysis

Program Impacts: North and South Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

As described under the Section 3.15.2, Regulatory Framework, Section 15064.3(a) of the updated CEQA Guidelines shifts transportation impact analysis from a LOS standard to a VMT standard, which refers to the amount and distance of automobile travel attributable to a project and suggests a qualitative analysis to evaluate factors such as the availability of transit, proximity to other destinations for larger construction projects that are not presumed less-than-significant and don not have models or methods available to estimate the VMT. As described under Impact TRA-1, construction of the Program, would require vehicle traffic associated with construction worker commutes, material hauling, and equipment transport to and from the sites throughout construction. As discussed in the Chapter 2.0, Project Description (Section 2.4.3, Construction Equipment and Workers), it is conservatively assumed that a maximum of 50 workers would be working on construction of Program facilities at any given time; however, realistically a maximum of 10 to 15 construction workers would be working at any given construction site during Program implementation. It assumed that each worker would generate one round trip per day and that alternative modes or carpools would be used where feasible but may be difficult given the location and lack of transit near construction sites. Materials haul and equipment transport vendor trips would be sporadic throughout the construction activities associated with the Program, with more concentrated trips during excavation and facility construction activities, and very few trips during site preparation and restoration activities.

The Technical Advisory provided by OPR (described in Section 3.15.2, Regulatory Framework) provides that projects with less than 110 trips per day are presumed less-than-significant (OPR 2018). The Program would result in limited daily construction trips, typically well below this presumption, with some potential intermittent daily peaks during phases of construction such as pouring concrete, excavation of soil, or fill hauling associated mainly with construction of pump stations and WWTF facilities which could exceed this presumed number of trips for limited durations (estimated to be a day to a couple weeks). Construction activities associated with Program projects are anticipated to be smaller efforts and require less workers, less material hauling, and less equipment deliveries than the estimates for the larger construction effort associated with the Interim Collection System Improvements and WWTF Expansion Projects. While it is anticipated that generally pipeline, pump station, WWTF, and associated facilities' construction would generate less than 110 trips per day, it is possible that daily trips could reach up to 130 trips per day for limited duration on larger projects such as the proposed CIP Projects. However, even on these max trip days, construction activities would be of limited duration and would likely be the result of multiple crews working at the same time, which, while it would increase daily trips it would shorten the overall construction period reducing the overall VMT by shortening the number of days and miles traveled. Additionally, the viability of substituting transport of construction workers, materials, and equipment by alternative modes of transit is extremely limited and generally unfeasible in a rural area like the Program Study Area. Most projects under the Program would have require fewer trips than the presumed 110 and those occasionally requiring more than 110 would only do so for a very limited duration and would not significantly increase VMT. Therefore, it is not anticipated that construction of the Program would result in a significant increase in VMT and construction impacts associated with the Program would be less-than-significant.

As discussed under the overall Program and similar to the Interim Collection System Improvements discussion, construction and operation of the WWTF Expansion Projects would not result in a significant impact to VMT. Construction of the WWTF Expansion Projects would likely require 10 to 15 construction workers at any given time and would require an average of five to 10 material haul trips per day. Further, each WWTF expansion project would occur as needed until reasonable build-out is achieved, meaning that construction work and related vehicle trips would be spread out over the 10-year planning horizon, with periods of heavier construction trips and periods with no vehicle trips. Overall, periods of construction for the expansions, material, worker, and haul trips would not exceed 110 trips per day; therefore, would have a less-than-significant impact related to VMT.

Operation

Similar to the presumption that projects generating less than 110 trips per year described for construction impacts, operational impacts for the Program are expected to not change significantly from existing conditions. The Program is expected to introduce an approximate maximum of 10 trips per day (1-2 worker trips, occasional maintenance and inspection trips, and an over conservative average of two trips per day for hauling biosolids to a disposal site if needed). Consistent with the OPR Technical Advisory, operation of projects and facilities planned in the Program would be well below the threshold of 110 trips per day; therefore, operational transportation impacts associated with the Program would be less-than-significant (OPR 2018).

Summary

As described in the discussion above and in the regulatory setting, Section 2.0, Project Description, and Appendix B.1, the projects implemented under the Program would generally meet the screening threshold of “small project” set forth by OPR’s Technical Advisory since they would generate or attract fewer than 110 trips per day. Therefore, the increase in daily trips itself would be less-than-significant because the Program would not generate greater than 110 trips per day, and as such would be consistent with the CEQA Guidelines transportation impact evaluation and programs, plans, ordinances, and policies under threshold Impact TRA-1.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

As discussed under the overall Program above, construction and operation of the Program would not result in a significant impact to VMT within the area. Both the six Interim Collection System Improvements and WWTF Expansion Projects would result in similar truck trips due to the type and scale of project. The CIPs 1-6 are estimated to have an approximate average of 20-30 daily trips with concentrated peak

periods estimated at 80 to 130 trips per day[26]. Conservative average round trip distances were considered for these trips ranging from approximately 14 miles for vendor material deliveries, 34 miles for worker trips, and 40 miles for haul trips.

Trips generated during construction would be dispersed throughout the Program Study Area, with trips for the six Interim Collection System Improvements are concentrated in the western limits and along proposed and future Cardella Road and trips for the South Merced Major Improvements concentrated in the southern limits along W Dickenson Ferry Road and S Thornton Road. The majority of trips would occur in rural areas during non-peak times (hours outside of 7 AM to 8 AM and 5 PM to 6 PM) and would have a duration of approximately two years or less. Construction associated with the six CIP projects would be temporary and would not exceed 110 truck trips a day and would be consistent with the OPR Technical Advisory; therefore, would have a less-than-significant impact related to construction truck trips.

Operation

Similar to the discussion for the Program, operation of the six Interim Collection System Improvements would only require periodic maintenance along the pipelines, and associated appurtenances that would not result in a substantial increase in truck trips beyond existing conditions. Therefore, impacts associated with construction and operation of the new trunk sewer infrastructure would be less-than-significant.

Level of Significance Prior to Mitigation: Less-than-Significant
Mitigation Required: None Required
Level of Significance After Mitigation: Less-than-Significant

Impact TRA-2 Findings

Impact TRA-2 Overall Level of Significance Prior to Mitigation: Less-than-Significant

Impact TRA-2 Mitigation Required: None Required

Impact TRA-2 Overall Level of Significance After Mitigation: Less-than-Significant

Impact TRA-3: Potential to substantially increase hazards due to a geometric design feature (e.g. sharp curves or dangerous intersection(s) or incompatible uses (e.g. farm equipment)).

Impact TRA-3 Analysis

Program Impacts: North and South Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

The Program features would not involve significant roadway alterations beyond placement of pipe and replacement of affected pavement, and thus would not increase hazards due to a design feature such as

[26] These estimates are reflective of daily scenarios and are consistent but differ slightly from estimates prepared specifically for air quality modeling inputs as shown in Appendix B.1.

a sharp curve or dangerous intersection. While the pipelines would be placed within the ROW of existing or planned roadways, no change to the exiting design or functionality of the road would occur as a result of the Program. Any disturbed roadways would be repaved back to existing conditions or better and would not result in a long-term change or hazards. Construction of the Program features would involve the hauling of heavy equipment and machinery along public roadways, which could create a hazard to the public by impeding traffic or limiting motorists' line-of-sight on roadways. Risk would be highest when vehicles and equipment interact with the general public, such as when entering a public ROW while exiting a construction area. This risk could be potentially significant if trucks and construction vehicles were to pull out in front of roadway traffic at a dramatically slower speed or if it were to require traffic to slow suddenly and create potential road hazards. Therefore, implementation of MM TRA-1 would minimize any potential hazards by requiring that a traffic control plan be prepared and implemented by the City and/or their contractor for all work affecting local roadways. Additionally, compliance with Caltrans standard specifications applicable to licensing, size, weight, load, and roadway encroachment hauling of any oversized loads, including heavy equipment, would be required during mobilization, construction activities, or demobilization. Implementation of MM TRA-1, as well as with compliance of standard regulatory requirements to reduce hazards caused by incompatible roadways uses during construction, impacts would be less-than-significant.

Operation

Pump station sites would be located off of the roadways on a privately owned or City ROW parcels and would not result in any hazards to the local roadways in the area. Improvements at the WWTF would all occur within the existing WWTF property, which would not result in any increases in hazards or incompatible uses. Therefore, impacts caused by operation would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Similar to the Program, the CIPs 1-6 would not involve significant roadway alterations beyond placement of pipe and replacement of affected pavement, and thus would not increase hazards due to a design feature such as a sharp curve or dangerous intersection. While the pipelines would be placed within the ROW of existing or planned roadways, no change to the exiting design or functionality of the road would occur as a result of the improvements. Any disturbed roadways would be repaved back to existing conditions or better and would not result in a long-term change or hazards. Construction of the CIPs 1-6 would involve the hauling of heavy equipment and machinery along public roadways, which could create a hazard to the public by impeding traffic or limiting motorists' line-of-sight on roadways. Risk would be highest when vehicles and equipment interact with the general public, such as when entering a public ROW while exiting a construction area. This risk could be potentially significant if trucks and construction vehicles were to pull out in front of roadway traffic at a dramatically slower speed or if it were to require traffic to slow suddenly and create potential road hazards. Therefore, implementation of MM TRA-1 would minimize any potential hazards by requiring that a traffic control plan be prepared and implemented by the City and/or their contractor for all work affecting local roadways. Additionally, compliance with

Caltrans standard specifications applicable to licensing, size, weight, load, and roadway encroachment hauling of any oversized loads, including heavy equipment, would be required during mobilization, construction activities, or demobilization. Implementation of MM TRA-1, as well as with compliance of standard regulatory requirements to reduce hazards caused by incompatible roadways uses during construction, impacts would be less-than-significant.

Operation

Once operational, the majority of the Program components would be located underground and would not result in any increased hazards due to a geometric design feature. Therefore, impacts caused by operation would be less-than-significant.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1
Level of Significance After Mitigation: Less-than-Significant

Impact TRA-3 Findings

Impact TRA-3 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact TRA-3 Mitigation Required: MM TRA-1

Impact TRA-3 Overall Level of Significance After Mitigation: Less-than-Significant

Impact TRA-4: Potential to result in inadequate emergency access.

Impact TRA-4 Analysis

Program Impacts: North and South Major Improvements, Program Minor Improvements, and WWTF Expansion Projects

Construction

Emergency access could be hindered by a significant increase in traffic congestion or temporary road closures. Fire protection, emergency medical services, and police services within the Program Area are provided by the Merced Fire Department and the Merced Police Department (Section 3.13). Depending upon the timing, location, and duration of construction activities, construction of the Program could delay emergency vehicle response times and result in a potentially significant impact. As such, MM TRA-1 and MM TRA-2 would require the preparation and implementation of a traffic control plan that would allow for adequate ingress and egress of traffic, including for emergency personnel, as well as provide proper noticing to emergency response agencies of any detours required during construction activities. Adherence to these MMs would reduce any potential impacts from construction of the Program related to emergency services to less-than-significant.

Operation

Once operational, the majority of the Program components would be located underground and would not result in any ongoing impacts to emergency access. The routine maintenance activities would be sporadic throughout any given year, and as described under Impact TRA-2, would likely only involve one or two trucks on roadways or within City-owned areas (i.e., pump station sites or at the WWTF site), and would

not result in substantial changes to emergency access. Therefore, there would be no operational impacts from the Program related to inadequate emergency access.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1 and MM TRA-2
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: CIPs 1-6

Construction

Emergency access could be hindered by a significant increase in traffic congestion or temporary road closures. Fire protection, emergency medical services, and police services within the CIPs 1-6 areas are provided by the Merced Fire Department and the Merced Police Department (Section 3.13). Depending upon the timing, location, and duration of construction activities, construction of the improvements could delay emergency vehicle response times and result in a potentially significant impact. As such, MM TRA-1 and MM TRA-2 would require the preparation and implementation of a traffic control plan that would allow for adequate ingress and egress of traffic, including for emergency personnel, as well as provide proper noticing to emergency response agencies of any detours required during construction activities. Adherence to these MMs would reduce any potential impacts from construction of the CIPs 1-6 related to emergency services to less-than-significant.

Operation

Once operational, the majority of the CIPs 1-6 would be located underground and would not result in any ongoing impacts to emergency access. The routine maintenance activities would be sporadic throughout any given year, and as described under Impact TRA-2, would likely only involve one or two trucks on roadways or within City-owned areas, and would not result in substantial changes to emergency access. Therefore, there would be no operational impacts from the Program related to inadequate emergency access.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM TRA-1 and MM TRA-2
Level of Significance After Mitigation: Less-than-Significant

Impact TRA-4 Findings

Impact TRA-4 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact TRA-4 Mitigation Required: MM TRA-1 and MM TRA-2

Impact TRA-4 Overall Level of Significance After Mitigation: Less-than-Significant

3.15.5 Transportation Mitigation

Mitigation Measure TRA-1: Prepare and Implement a Traffic, Pedestrian, and Bicycle Control Plan

The selected construction contractor and/or the City of Merced shall prepare and implement a Traffic, Pedestrian, and Bicycle Control Plan to the satisfaction of City Traffic Engineer. The Traffic, Pedestrian, and Bicycle Control Plan shall require the review of traffic counts or conduct additional traffic counts on

intersections near the proposed Project facilities to establish existing traffic conditions. Based on these traffic counts, the Traffic, Pedestrian, and Bicycle Control Plan shall recommend measures and steps to avoid significant delays or disturbance to existing traffic conditions. The Traffic, Pedestrian, and Bicycle Control Plan shall ensure that acceptable operating conditions on local roadways, freeway facilities, bicycle, and pedestrian facilities are maintained with adequate detours or delays no more than 20 minutes. The Traffic, Pedestrian, and Bicycle Control Plan shall also take into consideration other projects that may being occurring in the same or similar locations as the projects to avoid cumulative traffic impacts. Projects shall require implementation of different measures depending on the Project's site-specific construction details and location within the City. At a minimum, the Traffic, Pedestrian, and Bicycle Control Plan shall include but not be limited to the following:

- Description of trucks including number and size of trucks per day, expected arrival and departure times, truck circulation patterns.
- Description of staging areas including location, maximum number of trucks simultaneously permitted in staging areas, use of traffic control personnel, specific signage.
- Description of street closures and bicycle and pedestrian facility closures including duration, advance warning and posted signage, safe and efficient access routes for emergency vehicles, and use of manual traffic control.
- Description of driveway access plan including provisions for safe vehicular, pedestrian, and bicycle travel; minimum distance from any open trench; special signage; and maintained residential vehicle accesses.
- Identification of hours of construction and hours for deliveries, potentially avoiding the AM and PM peak commute hours to minimize disturbance on traffic flow.
- Compliance with the City of Merced Municipal Code Section 10.40 (Truck Routes), which includes designated truck routes that should be used for any construction-related truck trips.
- Coordination with facility owners or administrators of sensitive land uses such as police and fire stations (including all fire protection agencies), transit stations, hospitals, and schools. Facility owners or operators shall be notified in advance of timing, location, and duration of construction activities and the locations of detours and lane closures in conformance with MM TRA-2.
- Coordination with local transit service providers, including temporary relocation of bus routes or bus stops in work zones, as necessary.
- Roadway ROW shall be repaired or restored to their original conditions or better upon completion of construction and compliance with the City of Merced Municipal Code Section 17.58.010 (Road Construction Application and Plans) for any road construction within roadways.
- The Traffic, Pedestrian, and Bicycle Control Plan shall contain detailed measures to ensure acceptable levels of traffic flow.

Close coordination with the City through the Traffic, Pedestrian, and Bicycle Control Plan process shall ensure that potential conflicts with traffic, transportation, pedestrians, and bicycles shall be reduced to less-than-significant levels.

Mitigation Measure TRA-1 Implementation

Responsible Party: The City and chosen contractor

Timing: Development of the Traffic, Pedestrian, and Bicycle Control Plan shall occur prior to the start of construction and be implemented throughout all construction activities.

Monitoring and Reporting Program: The City shall review the Traffic, Pedestrian, and Bicycle Control Plan prior to the start of construction mobilization each year to determine relevance to upcoming construction activities. The City shall monitor and coordinate with the chosen contractor during weekly construction meetings to ensure that the Traffic, Pedestrian, and Bicycle Control Plan is implemented successfully as documented in inspection logs. The Traffic, Pedestrian, and Bicycle Control Plan shall remain on file at the City.

Standards for Success: Traffic impacts and delays resulting from construction activities or conflicting with applicable plans and policies, an increase in hazards due to geometric design, and inadequate emergency access are reduced to a less-than-significant level.

Mitigation Measure TRA-2: Inform Public and Emergency Service Agencies of Lane Closures and Detours

The City shall inform the public, neighboring schools, and emergency service agencies such as the Merced Police Department and the Merced Fire Department of scheduled lane closures and detours through public outreach such as public meetings and postings in the local newspapers. Proper signage shall be used to direct traffic as identified through the Traffic Control Plan. Unanticipated lane closures and detours shall be minimized to the maximum extent feasible, and both the public and the emergency service agencies shall be informed of closures and detour routes as soon as possible.

Mitigation Measure TRA-2 Implementation

Responsible Party: The City and chosen contractor

Timing: Throughout construction activities

Monitoring and Reporting Program: The City shall monitor implementation of this MMs during construction.

Standards for Success: Safe, efficient travel in within the City is maintained with minimal traffic delays. Conflict with local policies and plans for transportation and traffic, and emergency and public access impacts are reduced at a less-than-significant level during construction activities.

3.16 TRIBAL CULTURAL RESOURCES

3.16.1 Basis for Analysis

The NOP published in 2018 (Appendix A) determined that the full range of environmental issues would be contemplated for consideration under CEQA statute and Appendix G of the CEQA Guidelines. The following Appendix G checklist questions are evaluated further in the Tribal Cultural Resources section of the EIR. Would the Project:

- Cause a substantial adverse change in the significance of a tribal cultural resource (TCR), defined in PRC Section 21074 as either a site feature, place, cultural landscape that is geographically defined in terms of the size, or object with cultural value to the California Native American tribe, and that is (1) listed or eligible for listing in the CRHR, or in a local register of historic resources as defined in Public Resource Code Section 5020.1(k); or (2) a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1.

This section describes the existing regulatory and environmental setting for TCR within the Program Area and Project CIPs and evaluates the potential for impacts related to TCR to occur as a result of implementation of the Program development and of the Project CIPs. Section 3.5 Cultural Resources, addresses impacts on built environment and archaeological/historical cultural resources.

The term Tribal Cultural Resources refers to sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either included in or determined eligible for inclusion in the CRHR, or included in a qualifying local register of historic and other resources that have been determined by a lead agency to be significant pursuant to the criteria for listing in the CRHR. Included in this section are brief descriptions of the ethnographic and contemporary setting of the Program and Project.

3.16.2 Regulatory Framework

This section discusses the federal and state regulations and local policies and objectives that relate to TCR and are relevant to the Program.

3.16.2.1 Federal

This Program does not involve a federal undertaking or federal funding; therefor there are no federal plans, policies, regulations, or ordinances related to cultural resources that apply.

3.16.2.2 State

Tribal Cultural Resources

CEQA defines a “TCR” as any one of the following (PRC Section 21074):

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either (1) included in or eligible for inclusion in the CRHR, or (2) included in a local register of historical resources.

- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. The lead agency shall consider the significance of the resource to a California Native American tribe.
- A cultural landscape that meets the requirements listed above and is geographically defined in size and scope.

Archaeological sites, including those that qualify as historical resources (PRC Section 21084.1), unique archaeological resources (PRC Section 21083.2(g)), and non-unique archaeological resources (PRC Section 21083.2(h)), may qualify as TCR.

Prior to the release of a Negative Declaration, Mitigated Negative Declaration, or EIR, the agency must initiate consultation with tribes that are traditionally and culturally affiliated with the geographic area of the proposed Project if (1) the tribe requested of the agency, in writing, to be informed through formal notification of proposed projects in the geographic area that is traditionally and culturally affiliated with the tribe; and (2) the tribe responds, in writing, within 30 days of receipt of the formal notification of a proposed Project and requests consultation with the agency (PRC Section 21080.3.1(b)).

Consultation is concluded when the agency and tribe(s) agree to measures to mitigate or avoid significant effects on a TCR, or if either party concludes that mutual agreement cannot be reached after a good-faith and reasonable effort (PRC Section 21080.3.2(b)).

HEALTH AND SAFETY CODE 7050.5: HUMAN REMAINS

Section 7050.5 of the California Health and Safety Code states that, in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the Merced County Coroner has determined whether the remains are subject to the coroner's authority. If the human remains are of Native American origin, the coroner must notify the NAHC within 24 hours of this identification.

PRC 5097.98: NOTIFICATION OF MOST LIKELY DESCENDANT

PRC Section 5097.98 states that the NAHC, upon receiving notification of the discovery of Native American human remains pursuant to Health and Safety Code Section 7050.5, shall immediately notify the MLD of the deceased. With permission of the landowner or a designated representative, the MLD may inspect the remains and any associated cultural materials and make recommendations for treatment or disposition of the remains and associated grave goods. The MLD shall provide recommendations or preferences for treatment of the remains and associated cultural materials within 48 hours of being granted access to the site.

3.16.2.3 Local

There are no local plans, policies, regulations, or ordinances related to TCR that apply to the Program and Project CIPs.

3.16.3 Environmental Setting

The environmental section is based on information provided in the Archaeological Resources Study (Stantec 2024) [27]

3.16.3.1 Ethnographic Setting

Prior to Euro American settlement, the Merced area has traditionally been home to Northern Valley Yokuts, an Indigenous language and cultural group. The area was also likely frequented by Southern Valley Yokuts as well, though they principally resided further south. Population estimates for the Central Valley, prior to European arrival in the Americas, hover in the 100,000 range with anywhere from 11,000 to 30,000 of these being Northern Valley Yokuts-speakers.

The Northern Valley Yokuts language belongs to the Penutian language stock. A branch of Penutian, called Yok-Utian, has two sub-branches, consisting of Miwok-Ohlone (spoken by groups in the Bay Area, and parts of the northern Sierra Nevada) and Yokuts (Northern and Southern). Linguistic differences between these and other California groups suggest that Yokuts-speakers have resided in the Central Valley for between 4000-5000 years, perhaps coeval with the Windmiller Pattern observed in the region archaeologically.

Ethnographically, Yokuts groups are known for dense settlements and complex sociopolitical organization, even compared with other Indigenous Californian groups. In terms of subsistence, the San Joaquin River and its many tributaries were the lifeblood of Yokuts survival. Salmon were among the most important fish, as were white sturgeon and river perch. Waterfowl, such as geese and ducks, were also a key a resource. Wild plant foods like acorn were of prime significance, as were tule roots and a variety of seeds. Notably, tule reed boats were used along the waterways of the San Joaquin Valley, both for fishing and transportation. Tribes, or villages, could have as many as 300 people, with each tribe having a headman. Settlements were often perched on top of low mounds, on or near the banks of large watercourses. Many Yokuts groups practiced a fission-fusion settlement pattern, as did many native Californian groups. This pattern is characterized by tribal members gathering communally in the winter, at their principal villages, and then dispersing, in small family groups, into the surrounding landscape and foothills in spring to forage among new growth.

With the beginning of the Mission period in 1776, the lifeways of Indigenous Californians were rapidly and massively disrupted. Starting in the 1800s, Northern Valley Yokuts-speakers were recruited, both voluntarily and not, to labor at Missions San Jose and Santa Clara. Diseases such as smallpox and influenza decimated native populations. Many who had avoided or escaped the mission system fell victim to an epidemic of malaria in 1833 that wiped out entire villages. When the secularization of the mission system was instituted in 1834, many Yokuts-speakers returned to their homelands. However, the Gold

[27] This report contains confidential information regarding the location of archaeological resources. Such resources are nonrenewable, and their scientific, cultural, and aesthetic values can be significantly impaired by disturbance. To deter vandalism, artifact hunting, and other activities that can damage such resources, this study is not included in the public review Appendix D. The legal authority to restrict cultural resources information is in Section 304 of the National Historic Preservation Act of 1966, as amended. Furthermore, California Government Section Code 6254.10 exempts archaeological sites from the California Public Records Act, which requires that public records be open to public inspection

Rush in 1849 and its aftermath, including the Homestead Act of 1862, dealt another blow to native Californians. Many native Californians, including Yokuts, were driven out of their traditional homelands by Euro American settlers seeking fertile farmland. In 1850, the reservation system was established. As of 2024, at least eight California Tribal Nations represent Yokuts-speakers.

Today, many Yokuts groups are working to revitalize their traditional cultural practices and pursue self-determination. Notably, these practices include prescribed burns for landscape management as with the Amah Mutsun (a Tribe comprising Ohlone- and Yokuts-speakers). Tribal gaming has been an important source of economic sovereignty for Yokuts groups. The Picayune Rancheria of Chukchansi (Southern) Yokuts, near Fresno, has been active in pursuing and supporting language and cultural revitalization movements.

3.16.4 Native American Heritage Commission

The NAHC is a state agency that maintains the Sacred Lands File, an official list of sites that have cultural and religious importance to California Native American tribes. To identify areas within the Program Area and Projects that may be considered sensitive by local Indigenous tribal groups, the NAHC was contacted on May 29, 2024. The NAHC responded on June 3, 2024, with a negative result; however, the NAHC included in the response, a list of 12 tribal representatives from seven tribal groups.

3.16.5 Consultation Outreach per Public Resources Code Section 21080.3.1

Invitation to consult letters pursuant to PRC Section 21080.3.1 were sent to the 12 representatives from the following seven tribal groups on September 25, 2024. Included in the letters were details about the Program Area, Project CIPs and a location map. In addition to certified mail, representative were contacted via email on October 3, 2024 and by phone on October 8, 2024.

- Amah Mutsun Tribal Band
- North Fork Rancheria of Mono Indians
- Northern Valley Yokut/Ohlone Tribe
- Picayune Rancheria of the Chukchansi Indians
- Southern Sierra Miwuk Nation
- Tule River Indian Tribe
- Wuksachi Indian Tribe/Eshom Valley Band

On October 8, 2024, the City received communication from two of the above tribal groups, Picayune Rancheria of the Chukchansi Indians and the North Fork Rancheria of Mono Indians. Both tribal groups declined consultation.

As of November 2024, no additional responses have been received and the City has determined that the consultation process is concluded without a written request for consultation under PRC Sections 21080.3.1(b)(1) & (2).

3.16.6 Environmental Impacts

Implementation of the Program and the Projects would have a significant effect if it would result in any of the conditions listed below.

- Cause a substantial adverse change in the significance of a TCR, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe that is:

  a. Listed or eligible for listing in the CRHR or in a local register of historical resources, as defined in PRC Section 5020.1(k), or

  b. Determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

3.16.6.1 Impact Analysis

Impact TCR-1: Would the project cause a substantial adverse change in the significance of a TCR, defined in PRC §21074

Impact TCR-1 Analysis

Program Impacts

Construction

The results of the CCIC records search as described in Section 3.5, *Cultural Resources*, indicate that four pre-European contact era previously recorded archaeological sites are within the Program Area; however, the entirety of the Program Area has not been subject to archaeological survey. No tribal representatives provided additional information about TCR resources that may be affected within the Program Area as a result of the City's invitation to consult pursuant to PRC Section 21080.3.1.

As discussed in Section 3.5, Cultural Resources, archaeological deposits that may qualify as TCR could be encountered during Program construction. Such resources may be eligible for listing in the CRHR or a local register of historical resources, or the lead agency, in its discretion and supported by substantial evidence, could determine the resources to be significant pursuant to the criteria set forth in subdivision (c) of PRC Section 5024.1. Should deposits be encountered during Program construction, this could result in an adverse change to a TCR. Thus**,** potentially significant impacts related to TCR could result from construction of the Program.

Implementation of MMs CUL- 2 described in Section 3.5, Cultural Resources, would ensure that impacts related to any TCR that may be uncovered during Program construction would be less-than-significant with mitigation through identification, evaluation, and treatment of archaeological deposits that may qualify as TCR.

Should Native American human remains be encountered during Program construction, the Merced County Coroner would be required to notify the NAHC as provided in CUL-5, and all applicable state and federal regulations governing the treatment of human remains will be followed.

Operation

Any impact on TCR would occur during Program construction, as discussed above; thus, no impact to TCR could result from operation of the Program.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM CUL-2 and MM CUL-5
Level of Significance After Mitigation: Less-than-Significant

Project Impacts: Interim Sewer Improvements (CIPs 1-6)

Construction

The results of the CCIC records search as described in Section 3.5, Cultural Resources, indicate that no previously recorded archaeological resources were listed within the Project areas. No tribal representatives provided additional information about TCR that may be affected by the Project as a result of the City's invitation to consult pursuant to PRC Section 21080.3.1. However, a review of the relevant geologic maps and literature indicated sensitivity for buried pre-European contact archaeological deposits within portions of CIP numbers 2, 4, 5, and 6 which cross or run adjacent to stream beds. As discussed in Section 3.5, Cultural Resources, archaeological deposits that may qualify as TCR could be encountered during Project construction. Such resources may be eligible for listing in the CRHR or a local register of historical resources, or the lead agency, in its discretion and supported by substantial evidence, could determine the resources to be significant pursuant to the criteria set forth in subdivision (c) of PRC Section 5024.1. Should deposits be encountered during Project construction, this could result in an adverse change to a TCR. Thus, potentially significant impacts related to TCR could result from construction of the Project.

Should Native American human remains be encountered during Project construction, the Merced County Coroner would be required to notify the NAHC and all applicable state and federal regulations governing the treatment of human remains will be followed.

Implementation of MMs CUL-3, CUL-4 ,and CUL-5, described in Section 3.5, Cultural Resources, would ensure that impacts related to any archaeological deposits that may qualify as TCR that may be uncovered during Project CIP construction would be less than significant with mitigation through development and implementation of and AMP, archaeological monitoring, implementation of cultural resources sensitivity training (including training regarding sensitivity to TCR) for all construction crews participating in ground-disturbing activities, and requirements to stop work if archaeological deposits are encountered during ground-disturbing activities.

Operation

Any impact on TCR would occur during Project construction, as discussed above; thus, no impact to TCR could result from operation of the Project.

Level of Significance Prior to Mitigation: Potentially Significant
Mitigation Required: MM CUL-3, MM CUL-4, and MM CUL-5

Level of Significance After Mitigation: Less than Significant

Impact TCR-1 Findings

Impact TCR-1 Overall Level of Significance Prior to Mitigation: Potentially Significant

Impact TCR-1 Mitigation Required: MM CUL-2, MM CUL-3 MM CUL-4, and MM CUL-5

Impact TCR-1 Overall Level of Significance After Mitigation: Less than Significant

***Mitigation Measure CUL-2 , CUL-3, CUL-4, and CUL -5* Implementation**

Responsible Party: The City

Timing: Prior to and during construction at future Project sites within the Program Area and prior to and during construction of Project CIPs

Monitoring and Reporting Program: Archaeological Resources Study, AMP, and Archaeological Monitoring Results Report.

Standards for Success: A complete Archaeological Resources Study, AMP, and Archaeological Monitoring Results Report.

4.0 ALTERNATIVES

In accordance with CEQA Guidelines Section 15126.6, this chapter of the Recirculated DEIR provides the City's consideration of reasonable alternatives to the Program. The following sections present the alternatives analysis that the City used to evaluate alternatives compared to the Program and to select the environmentally superior action alternative. The following sections discuss the methodology and analysis used by the City in selecting alternatives, the alternatives considered, the alternatives considered but rejected from further consideration, and an evaluation of the alternatives for their potential to reduce one or more significant impact of the Program, and finally identify an environmentally superior alternative.

4.1 ALTERNATIVE ANALYSIS

According to the CEQA Guidelines (14 CCR Section 15126.6(a)), the discussion of alternatives, "shall describe a range of reasonable alternatives to a project, or its location, that would feasibly obtain most or all of the basic objectives of the project but would avoid or substantially lessening the significant effects of the project." It is the responsibility of the lead agency to select and publicly disclose the reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason. Although an EIR must contain a discussion of "potentially feasible" alternatives, the ultimate determination of whether an alternative is feasible or infeasible is made by the lead agency's decision-making body (PRC Section 21081[a][3]).

The CEQA Guidelines indicate that the range of alternatives included in this discussion should be sufficient to allow decision-makers a reasoned choice between alternatives and the proposed Project. In determining what alternatives should be considered in this RDEIR, it is necessary to acknowledge the goals and objectives of a project, the project's significant effects, and unique project considerations, as well as the feasibility of the alternatives. This section outlines the alternative identification selection process and evaluates feasible alternatives following the CEQA Guidelines requirements.

4.1.1 No Project Alternative

CEQA Guidelines Section 15126.6(e)(1) requires that the No Project Alternative be described and analyzed, "to allow decision-makers to compare the impacts of approving the project with the impacts of not approving the project." The No Project Alternative analysis is required to discuss "the existing conditions at the time the NOP is published… as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (Section 15126.6(e)(2)).

As directed by the CEQA Guidelines (Section 15126.6(e)(3)(B)), when a project consists of a development project on identifiable property, the "no project" alternative is the circumstance under which the project does not proceed. If disapproval of the project under consideration would result in predictable actions by others, such as the proposal of some other project, the "no project" consequence should be discussed.

The No Project Alternative assumes that if selected, the Program would not be implemented, the wastewater collection system within the City of Merced would remain operating under existing conditions,

and limited connections would be available to future wastewater connections. It also means that developers or others may explore other means to provide sewer service (e.g. septic). None of the environmental impacts identified in Chapter 3.0, Sections 3.1 through 3.15 would occur; however, additional impacts could result from the existing system reaching capacity, aging, or conflicting with the City of Merced Vision 2030 General Plan (2030 General Plan). Furthermore, implementation of the No Project Alternative would not meet any of the Program objectives.

The Program objectives would not be accomplished if the Program was not approved, and the No Project Alternative was selected. Implementation of the No Project Alternative would not provide the benefits of improving, upgrading, or replacing the wastewater collection system within the City of Merced. No new infrastructure would be built to convey and treat wastewater under the No Project Alternative; therefore, the City would not be able to meet the future growth needs projected within the 2030 General Plan. The No Project Alternative would not meet any of the stated Program objectives and would not address the City's need for ensuring a reliable wastewater collection system capable of meeting the increased sewer capacity needs of the area. Additionally, the No Project Alternative would likely encourage other forms of sanitary systems, such as septic, that conflict with CVRWQCB policy for regionalization of wastewater treatment (**Table 4.1-1**, Objective #9) (CVRWQCB 2009).

Although no direct environmental impacts would occur from the No Project Alternative, the wastewater collection and treatment system would continue to operate at existing capacity, which would not be sufficient to serve future growth identified in the 2030 General Plan. Currently, the wastewater collection system within the City, including both at the WWTF and throughout the existing pipeline system, is reaching capacity. Keeping the system at this capacity would not allow the City to expand populations or accommodate future growth identified in the 2030 General Plan in any way. This would result in a greater impact to land use and planning and population and housing resources compared to the Program. Additionally, aging infrastructure within the existing collection system could potentially become a hazard and lead to cracks and pipe breakdown if not properly maintained and/or upgraded when needed. This could lead to additional environmental impacts and emergency situations. This could present impacts to air quality, hazards, hazardous materials, and wildfires, hydrology and water quality, public services and utilities, and transportation. If there is a failure(s) of existing facilities, a failure could affect the human environment due to broken pipes or could result in reduced capacity at the existing WWTF due to things like power outages, floods, breakdowns.

4.1.2 Action Alternatives Considered

The City's methodology for identifying potential action alternatives included consideration of the following: the updated 2022 WCSMP, the 2017 WCSMP, CEQA NOP scoping public and agency written comments (Chapter 1.0), and professional judgment for feasible alternatives that would reduce environmental impacts while still meeting most or all of the Program objectives. The 2022 WCSMP was developed through multiple iterations and refinements, such as 2017, beginning in 2014 (City of Merced 2023). Appendix E provides a detailed overview of the WCSMP alternative development process and the ultimate selection of the Program. Table 1 in Appendix E presents a summary of the identified alternatives considered and illustrates the evolution of alternative concepts and naming throughout the planning process. These sub-alternatives were ultimately developed to form the Program (the proposed Projects), the North Merced Satellite Treatment Facility Alternative, and the Campus Parkway Alternative, and (as

described in the following subheadings) based on considerations of alternate alignments and growth scenarios within the City's 2030 General Plan SUDP/SOI.

The following list of action alternative concepts were identified by the City as potentially reasonable alternatives to further evaluate their ability to meet Program objectives and assess their feasibility. If they were found to be feasible and meet most of the Program objectives, they were then considered for their ability to reduce one or more significant impacts associated with the Program. These action alternatives include the following:

- North Merced Satellite Treatment Facility[28] Alternative
- Campus Parkway Trunk Alternative
- Decentralized Treatment Facilities Alternative
- Recycled Water Reclamation Alternative
- Reduced Build-Out Sewer Capacity Alternative
- Parallel or Upsized Existing System Alternative

The following subsections provide a brief description of each alternative.

4.1.2.1 North Merced Satellite Treatment Facility Alternative

The North Merced Satellite Treatment Facility Alternative was derived as a part of the 2017 WCSMP development. The alternative would consist of building a second WWTF in North Merced to accommodate new wastewater associated with development as the area grows to reasonable build-out of the SUDP/SOI. The new facility would require the City to purchase the industrial zoned property located west of the intersection of West Yosemite Avenue and SR (SR) 59. The facility would initially accommodate 4 to 5 Mgal/d wastewater flows with plans to expand to a maximum capacity of 14 to 15 Mgal/d at reasonable build-out, while the existing WWTF would accommodate wastewater flows from the rest of the SUDP/SOI with an initial expansion to 16 Mgal/d and subsequent expansion as reasonable build-out is neared to reach a maximum capacity of 20 Mgal/d. Between the two treatment facilities the alternative would achieve the total 27.2 Mgal/d treatment capacity required to meet reasonable build-out conditions under the 2030 General Plan. Additionally, this alternative would require new effluent disposal and/or reuse facilities and discharge permits to serve the new treatment facility.

Similar to the Program, the key wastewater collection system trunk pipelines have been identified for the same alignments but exclude the area crossing from North to South Merced with many potential utility and ROW conflicts like the railroad, highways, and MID canals. This alternative would require the construction of a new WWTF within the City SUDP/SOI, which would result in additional costs and associated long-term maintenance that currently does not exist. This would not fully meet the objective of the Program to achieve the lower overall life-cycle costs for sewer service for anticipated O&M over the coming decades since it would require operation of a second WWTF. Additionally, this alternative would require additional land for effluent disposal, which could total approximately 4,550 acres of land. Although

[28] WCSMP Plan B Alternative, from the 2017 WCSMP

this alternative could reduce agricultural use of groundwater in the area through this effluent disposal and could meet most the Program objectives.

Construction impacts of the alternative would be temporary and would be similar in scale to the Program. The location of the alternative would also occur in the City's SUDP/SOI in existing and future ROWs and therefore would result in similar impacts as described under the Program. Although the pipelines under this alternative would follow a slightly different alignment than under the Program, general system upsizing and placement of pipelines throughout the City's SUDP/SOI would still be required under this alternative and would include similar installation methods as described under the Program. Impacts associated with construction would be similar to the Program, with slightly different construction footprints (less area for the North Merced Major Improvements and Program Minor Improvements and more area required for an additional treatment facility). Operationally, the alternative would require operation of a second facility, which would increase employees, operational truck routes, and additional effluent discharge and biosolid disposal. Impacts associated with the North Merced Major and Program Minor Improvements crossing from North Merced to South Merced would be reduced under this alternative since there would be no crossing. This would include a reduced potential to conflict with Caltrans and UPRR ROWs as well as MID canals. It would also require less HDD under creeks and waterways, which would have a lesser impact than the Program's already less than significant impact.

New private land would be needed to house the new treatment facility, which could be located on environmentally sensitive areas, resulting in greater impacts to environmental resources. Additionally, operation of the alternative would require additional baseline emissions and operational impacts (i.e., from additional trunk trips) that would not be included under Program. The long-term visual impacts of construction of a new treatment facility could also be greater under this alternative. Further, operation of two WWTFs would require two WDR permits to be obtained from the CVRWQCB, which would be less efficient with respect to the City's efforts to simplify its monitoring and compliance efforts. Lastly, the proposed location of the alternative is within the Lake Yosemite inundation zone; therefore, could experience flooding and potential contamination if a dam failure were to occur.

4.1.2.2 Campus Parkway Alternative

The Campus Parkway Alternative is a variation on the Eastern Trunk Servicing Concept that was explored during the 2017 WCSMP development process described in Appendix E and was based on public input. The alternative would require an additional trunk sewer to be placed outside of the City's SUDP/SOI from the UC Merced Campus to Campus Parkway where it would connect with the existing sewer collection system. This alternative would involve two phases to reach the reasonable build-out capacity needed and analyzed in the 2030 General Plan.

Phase 1 of the Campus Parkway Alternative would involve conveyance of wastewater within the campus community area, and possibly from additional portions of the service area to flow down through this system and eventually reach the City's existing WWTF near the southwest portion of the City's SUDP/SOI. Trunk sewers in the north would be reduced in size as flow from the northwestern portion of the service area would be conveyed via this expansion of the existing WWTF. Expansion of the existing WWTF would be required to reach the maximum 35 Mgal/d reasonable build-out capacity, similar to the Program's 27.2 Mgal/d build-out.

Phase 2 of this alternative would require additional wastewater infrastructure for the new development in the far north and northwestern portions of the City (partially outside of the City's SUDP/SOI). These additional alternative features would require the installation of pipelines with sufficient capacity to serve the new growth in the area, as well as associated appurtenances and possible pump and lift stations to achieve adequate flow to the existing WWTF. Service outside the SUDP/SOI would also likely require additional planning and annexation or other approvals to connect to City services.

This alternative would require the placement of pipe through areas outside of the City's current SUDP/SOI, which would necessitate the need for Merced County coordination and approvals. As such, this alternative would not meet the Program objective to minimize land use impacts and use existing publicly owned property to the extent feasible because it could place additional land use restrictions associated with the sewer easement. Additionally, this alternative would require additional creek crossing and disturbance of Prime Farmland, which could have further environmental impacts when compared to the Program.

Impacts associated with this alternative would generally be similar to those of the Program but on the eastern side of the SUDP/SOI rather than the western side. There are more agricultural lands designated as important farmland and Williamson Act contracted lands on the eastern side of the SUDP/SOI which would result in this alternative having a greater potential to impact agricultural resources. The alternative would avoid some of the receptors and the airport in western Merced. Additionally, implementation of the Campus Parkway Alternative would require construction of new pipelines outside of the City's SUDP/SOI, which could result in greater impacts to land use and may be inconsistent with the 2030 General Plan. Additional permits and agreements with Merced County would be required for placement and long-term maintenance and operation of these pipelines.

4.1.2.3 Decentralized Treatment Facilities Alternative

The concept of multiple wastewater treatment facilities in the North Merced area was raised by stakeholders during the 2017 WCSMP planning process as a potential means to reduce the initial size, cost, and time delays associated with conveying City wastewater to the existing WWTF. This would be a decentralized system with multiple treatment facilities developed in phases to accommodate anticipated growth within the City. These new WWTFs would be built in new development areas and would treat the wastewater associated with each new development as they occur. This alternative would require the placement of trunk and collector pipelines using gravity-fed systems to the maximum extent feasible to convey wastewater flows to the new decentralized facilities as well as to the existing WWTF throughout the City's SUDP/SOI. This alternative would require the individual treatment and permitted disposal of effluent at each new site as well as operations and maintenance associated with each new facility added. Each facility would require a treatment train sufficient to treat the wastewater generated within a particular development area and would be required to meet waste discharge permitting requirements and maintain an individual NPDES permit or provide reclamation lands on which to reuse treated effluent, as well as appropriate discharge permits issued by the CVRWQCB.

The decentralized treatment facilities alternative would not meet the objective to achieve the lower overall life-cycle costs for sewer service for anticipated O&M over the coming decades (Section 4.1.3, Ability to Meet Basic Program and Project Objectives). Additionally, multiple decentralized facilities would require additional land acquisitions that do not currently exist, which would increase the City's capital investment

and not meet the objective to minimize land use impacts and to use existing publicly owned property to the extent feasible. Constructing multiple decentralized facilities would result in a larger overall footprint and potentially increased risk to wastewater treatment standards, which could lead to greater environmental impacts.

Impacts from pipelines would be reduced under this alternative, which would provide smaller onsite treatment facilities as development occurred. However, impacts related to the facilities from construction and operations would be substantially more than the Program. Stream crossing and ROW impacts would be reduced by this alternative as well as trenching depths. An increased need for localized effluent disposal would also potentially jeopardize water quality. New land would need to be obtained to house the new treatment facilities, which could be located on environmentally sensitive areas, resulting in greater impacts to environmental resources. Additionally, operation of the alternative would include additional baseline emissions and operational impacts (i.e., from additional trunk trips) that would not be included under the Program. The long-term visual impacts of construction of new treatment facilities could also be greater under this alternative. Further, operation of multiple treatment facilities would require multiple WDRs permits to be obtained from the CVRWQCB, which would be less efficient with respect to the City's efforts to simplify its monitoring and compliance efforts. Lastly, the proposed location of the alternative is located within the Lake Yosemite inundation zone (Section 3.9, Hydrology and Water Quality), which could experience flooding and potential contamination if a dam failure were to occur.

4.1.2.4 Recycled Water Reclamation Alternative

The concept of developing a recycled water system was explored within the 2017 WCSMP and in previous administrative drafts of the WCSMP. This alternative would implement that concept to recharge groundwater use in North Merced by returning effluent from the WWTF to North Merced through a network of reclaimed water pipes. Based on the evaluation for pipeline placement, it is assumed that recycled pipelines would follow the same alignments as the Program. These recycled water pipelines would likely be required to have appropriate health and safety setbacks from the Program pipelines (approximately a minimum distance of 10 feet or other form of sewer containment such as encased pipes). Recycled water uses and connections within the City would be required under this alternative for areas such as City parks or landscaped areas. Where the Program pipelines gravity flow to the WWTF, pumping the recycled water back through the system would be required. Pumping would require placement of one or more pumps or lift stations.

This alternative would result in additional environmental impacts related to construction and operation as it would expand and almost double the existing infrastructure planned to serve the City from that required for the Program. The alternative was developed in response to a NOP comment relating to groundwater impacts and the need for recharge in near the location of groundwater extraction. While this alternative was considered, it would not result in a benefit to the net groundwater condition within the Merced groundwater basin, since the basin is all in one aquifer, and the City's water distribution system benefits the entire City regardless of where the groundwater wells are located.

4.1.2.5 Reduced Build-Out Sewer Capacity Alternative

This alternative considers a reduction in the total maximum reasonable build-out capacity of the Program. The alternative would reduce the scale and magnitude of Program impacts. While the proposed North

Merced Major Improvements, South Merced Major Improvements, Program Minor Improvements, and CIPs 1-6 would retain their footprint, the pipe and pump sizing could be reduced, and the total amount of infrastructure needed would be less than the Program and would not include the WWTF Expansion Projects. This alternative would not necessarily change the 2030 General Plan SUDP/SOI boundary, but it would require the City to restrict development to only certain developments or certain densities less than what was planned for in the 2030 General Plan. It is anticipated that this reduced build-out alternative would serve 20 Mgal/d capacity.

This alternative would have similar footprints, operations, and construction activities to the Program (Program figures in Chapter 2.0). Many potential impacts associated with the Program would still occur but some at a lesser magnitude.

4.1.2.6 Parallel or Upsized Existing System Alternative

The 2017 WCSMP also explored installing parallel sewers adjacent to the main existing trunk lines within the City limits to accommodate interim wastewater flows and to allow for additional sewer connections within North Merced and eastern Merced. This alternative expands on that concept by considering the parallel or upsized trunk lines within the City adjacent to trunk sewers. This alternative would target critically impacted sewers, installing a parallel or upsized trunk sewer within the ROW associated with West Avenue and Olive Avenue and adjacent to or within the ROW of existing sewers at or near capacity. This alternative would require construction throughout many of the developed areas within the City, would require utility relocations, and would require resolution of conflicts with other utilities and infrastructure. This alternative would be designed to meet reasonable build-out flows identified within the 2030 General Plan and would require parallel pipes or upsized replacement pipes throughout much of the existing system.

Aging pipelines within the existing collection system could potentially become a hazard and lead to cracks and pipe breakdown if not properly maintained and/or upgraded when needed. The alternative's reliance on this infrastructure could result in critical limitations to wastewater services. This could lead to additional environmental impacts and emergency situations.

4.1.3 Ability to Meet Basic Program Objectives

As required by CEQA, to be considered as a viable alternative to the Program, an alternative must meet all or most of the Program objectives as described in Chapter 2. The Program objectives were developed based on engineering requirements, City planning needs, and stakeholder and public input during development of the 2017 WCSMP and this RDEIR. **Table 4.1** presents an analysis of the identified alternatives ability to meet the Program objectives.

Table 4.1: Alternatives Ability to Meet Program Objectives

Program Objective	No Project Alternative	North Merced Satellite Treatment Alternative	Campus Parkway Alternative	Decentralized Facilities Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Construct and maintain safe and reliable facilities	No – no construction and no facilities would be built or improved	Yes – would double the maintenance and compliance required, but a second facility would be safe and reliable	Yes – would provide pipelines design to operate at current standards	No – would result in lower-grade treatment and more maintenance at each individual facility, which would not be as safe	Yes – would provide pipelines engineered to design and operate to current standards	Yes – would provide pipelines engineered to design and operate to current standards	Yes – would provide pipelines engineered to design and operate to current standards
Meet long-term sewer service collection system needs by constructing the components of the collection system in stages, as needed	No – no changes to the collection system would occur	Yes – would serve collection system needs and could be done in stages	Yes – would serve collection system needs and could be done in stages	Yes – would serve collection system needs and could be done in stages	Yes – would serve collection system needs and could be done in stages	No – could be done in stages, but does not meet long-term collection system needs	Yes – would serve collection system needs and could be done in stages
Achieve lower overall life-cycle cost and maintain relatively low costs for sewer service considering upfront costs and anticipated O&M costs over the coming decades	No – implementing the project would require multiple quick fixes that would cost more in the long-term	No – operating two treatment systems would cost more and require more maintenance and staff	Yes – this would be similar to the Program in terms of operation and life-cycle costs	No – operating multiple treatment systems would cost more and require more maintenance and staff	No – adding a recycled water system would increase the amount of infrastructure to be maintained	Yes – this would be similar to the Program in terms of operation and life-cycle costs	No – upfront costs for constructing in City streets would be significantly more, and long-term maintenance would run the risk of potential conflicts
Maintain high water quality and wastewater treatment standards	Yes – existing WWTF operations and planned expansions would continue up to 20 Mgal/d. The existing wastewater collection system would be at risk of failure with overflow from future flows and treatment mechanisms other than the Program would be required	No – operation of two treatment systems would likely only achieve secondary or tertiary treatment at the new facilities and would likely not have UV or other forms of disinfection due to the cost of constructing and operating such facilities. While new facilities would be required to maintain water quality standards, the highest levels of water quality and treatment would not be achieved	Yes – this would be similar to the Program in terms of water quality and treatment standards	No – operation of multiple treatment systems would likely only achieve secondary or tertiary treatment at the new facilities and would likely not have UV or other forms of disinfection due to the cost of constructing and operating such facilities. While new facilities would be required to maintain water quality standards, the highest levels of water quality and treatment would not be achieved	Yes – this would be similar to the Program in terms of water quality and treatment standards	Yes – this would be similar to the Program in terms of water quality and treatment standards	Yes – this would be similar to the Program in terms of water quality and treatment standards
Reduce or maintain relatively low operational costs and energy demand by selecting gravity systems where feasible	Yes – no conveyance would be required; however, septic systems or other treatment methods may result	Yes – this would decrease the need for the North Merced major and minor sewer improvement's pump station and could be almost entirely served by gravity flows; however, an additional treatment facility would introduce additional treatment costs and energy demands	Yes -- this would have similar costs and energy demands to the Program	Yes – this would decrease the need for the North Merced major and minor sewer improvement's pump station and could be almost entirely served by gravity flows; however, additional treatment facilities would introduce additional treatment costs and energy demands	No – this would require extensive pumping to return treated water from the WWTF to North Merced increasing energy costs that would not allow the selection of gravity systems	Yes – this would have similar costs and energy demands to the Program, but would ultimately reduce treatment energy demands by not increasing WWTF to full build-out capacity	Yes – while the complexities of working around infrastructure and within City streets could require additional energy demand, the alternative would have similar overall energy costs as the Program
Maintain consistency with the Merced Vision 2030 General Plan	No – this would not accommodate the growth projections of the 2030 General Plan	No – Policy P-1.2 of the 2030 General Plan emphasizes using existing infrastructure to the extent possible; this alternative	Yes – this would be similar to the Program in terms of consistency with the 2030 General Plan	No – Policy P-1.2 of the 2030 General Plan emphasizes using existing infrastructure to the extent possible; this alternative	No – Policy P-1.2 of the 2030 General Plan emphasizes using existing infrastructure to the extent possible; this alternative	No – this would not accommodate the growth projections of the 2030 General Plan	Yes – this would be similar to the Program in terms of consistency with the 2030 General Plan

Program Objective	No Project Alternative	North Merced Satellite Treatment Alternative	Campus Parkway Alternative	Decentralized Facilities Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
		would require new treatment infrastructure		would require new treatment infrastructure	would require new treatment infrastructure		
Plan collection system infrastructure that meets reasonable build-out conditions of 35 Mgal/d	No – this would not accommodate the growth projections of meeting 35 Mgal/d	Yes – this could accommodate build-out	Yes – this could accommodate build-out	Yes – this could accommodate build-out	Yes – this could accommodate build-out	No – this would not accommodate the growth projections of meeting 35 Mgal/d	Yes – this could accommodate build-out
Minimize land use and environmental impacts. (Section 4.1.5 for further analysis)	Yes – this would not impact land use. There would be limited environmental impacts	Yes – the additional treatment site would require additional land. Some impacts would be reduced	Yes – while this alternative would likely have greater impacts to agricultural resources, it is anticipated that other land use and environmental impacts would be similar to the Program	No – the additional treatment sites would require additional land. Many additional impacts would be generated, and few would be reduced	No – this would increase construction impacts with larger footprints and potentially additional alignments. It would increase supplies and could double the size of pipeline footprint	No– while this would limit the ability to serve some future development, most of the sewer infrastructure would still be required and downsizing would not substantially minimize impacts but may minimize a few	No -- while this would reduce disturbance of other areas within the City, it would have greater land use and environmental impacts due to proximity to receptors and developed portions of the City
Adhere to federal and state policies and regulations in support of regionalization, reclamation, recycling, and conservation for wastewater treatment plants (such as CVRWQCB Resolution Number R5-2009-0028)	No – with the No Project Alternative, forms of wastewater treatment would be required in conflict with regionalization policies	No – building a second treatment facility is in conflict with regionalization policies	Yes – this would maintain the treatment objectives of the Program with different conveyance infrastructure	No – building multiple treatment facilities is in conflict with regionalization policies	Yes – recycled water would be consistent with recycling and conservation policies	Yes – this is a reduced capacity version of the Program; it would provide regionalization for wastewater treatment	Yes – this would maintain the treatment objectives of the Program with different conveyance infrastructure
Use the existing publicly owned property, roadways, and ROW to the extent feasible	Yes – no project would occur	Yes – this would include an additional treatment site	No – this alternative would run cross country and not make use of existing roadways	No – this would require acquisition of property for each new facility and would not make use of public ROWs	Yes – recycled water lines would be placed within existing ROWs and roadways similar to the Program infrastructure	Yes – this footprint would be similar to the Program infrastructure	Yes – this would capitalize on existing infrastructure which is predominantly in existing roadways and public ROWs
Total Number of Objectives Met	3/10	6/10	9/10	3/10	6/10	6/10	8/10

4.1.4 Reasonable Alternatives Feasibility

As required by CEQA, the term "feasible" is defined as, "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (14 CCR Section 15364). CEQA does not require that an EIR determine the ultimate feasibility of a selected alternative, but rather that an alternative be potentially feasible. Accordingly, no studies have been prepared regarding the economic feasibility of the selected alternatives.

Although, an EIR must contain a discussion of "potentially feasible" alternatives, the Merced City Council has made the determination, based on technical information presented by consultants, of feasibility of many of the alternatives considered throughout the 2022 WCSMP update process, mainly discussed in the 2017 WCSMP (PRC Section 21081(a)(3)). The City's development of feasible alternatives and the range of feasible alternatives considered for this RDEIR are discussed in the following section in a manner to foster meaningful public participation and informed decision-making. **Table 4.2** illustrates a summary of the feasibility of the identified reasonable alternatives. Pursuant to the CEQA Guidelines, factors taken into consideration for assessing feasibility of alternatives include the following:

> *Site suitability, economic viability, availability of infrastructure, General Plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.*

Table 4.2: Reasonable Alternative Feasibility

Alternative	Feasibility
No Project Alternative	Yes – Failure to implement the Program would limit sewer service within the SUDP/SOI in a strategic and well thought out manner, but it would be possible to limit development.
North Merced Satellite Treatment Facility	Yes – As evaluated within the 2017 WCSMP, this alternative is a feasible alternative, although costs associated with operating a second treatment facility would be doubled.
Campus Parkway	Yes – Construction of trunk sewers similar to those of the Program would be feasible in a different location provided that it would similarly be within planned or existing roadways.
Decentralized Facilities	No – Permitting and operational costs associated with treatment of decentralized facilities would be exponentially higher than the WWTF. This would be inconsistent with the identified land uses within the 2030 General Plan and would require acquisition of exponentially more City property for siting.
Recycled Water Reclamation	No – As evaluated in the 2017 WCSMP, recycled water would be too costly due to increased energy demands required to pump reclaimed water from the WWTF back uphill to North Merced.
Reduced Build-Out Sewer Capacity	Yes – A reduced capacity system would be feasible and would be similar to the proposed Projects and Program, but trunk sewers would be downsized.
Parallel or Upsized Existing System	No – As evaluated in the 2017 WCSMP and previous WCSMP planning efforts, parallel pipelines were considered next to existing sewer infrastructure within the City and found to have too many conflicts with existing infrastructure and facilities to allow for appropriate setbacks.

Notes: WCSMP = Wastewater System Collection Master Plan; WWTF = Wastewater Treatment Facility

4.1.5 Alternatives Ability to Lessen One or More Environmental Impacts

The CEQA Guidelines further require that the alternatives be limited to those that would avoid or substantially lessen any of the significant effects of the proposed Project (CEQA Guidelines Section 15126.6(f)). The CEQA Guidelines require that potential impacts of the alternatives be compared to the project's environmental impacts and that the "no project" alternative be considered (CEQA Guidelines Section 15126.6(d)[e]). Finally, Section 15126.6(b) of the CEQA Guidelines defines requirements of the alternatives analysis as follows:

> *Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code [PRC] Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.*

Pursuant to the CEQA Guidelines, potentially significant effects include both those that are significant and unavoidable and those that are less than significant with mitigation. The alternatives considered within this section aim to provide a means of reducing the level of impact that would otherwise result from implementation of the Program even though no significant impacts were identified. The alternatives were reviewed for their ability to reduce one or more significant effects of the Program. **Table 4.3** includes that assessment.

Table 4.3: Alternatives Impact Comparison

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Aesthetics and Visual Resources	LTS/M	**Lesser Impact** – no change to the aesthetic environment of the City; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and or treatment, which could result in additional impacts.	**Greater Impact** – an additional treatment plant would be constructed introducing a new above-ground feature with greater potential to substantially impact public views and introduce permanent above-ground lighting to the area (Impacts AES-3 and AES-4 respectively). There would be no change to Impacts AES-1 and AES-2 from that described for the Program. Program MM AES-1, AES-2, and AES-3 would apply.	**Greater Impact** – additional treatment facilities would be constructed introducing a new above-ground feature with a greater potential to impact public views in more areas throughout the City (Impact AES-3). The multiple treatment facilities would also increase operational lighting in multiple areas within the City (Impact AES-4). There would be no change to Impacts AES-1 and AES-2 from that described for the Program. Program MM AES-1, AES-2, and AES-3 would apply.	**Similar Impact** – the addition of the trunk sewer within Campus Parkway in the eastern portion of the City would result in similar impacts related to scenic vistas (Impact AES-1), scenic resources (Impact AES-2), public views (Impact AES-3), and nighttime lighting (Impact AES-4) as those described for the Program. Program MM AES-1, AES-2, and AES-3 would apply.	**Greater Impact –** this alternative would result in similar impacts related to scenic vistas (Impact AES-1), scenic resources (Impact AES-2), public views (Impact AES-3), and nighttime lighting (Impact AES-4) as those described for the Program. The additional pipelines needed under this alternative would not substantially change any views in the area; however, the additional pump and lift stations would place additional above-ground structures that would result in additional impacts. It is anticipated that these would be constructed and operated in a similar manner as the pump stations described for the Program. Program MM AES-1, AES-2, and AES-3 would apply.	**Lesser Impact** – this alternative would result in similar impacts related to scenic vistas (Impact AES-1), scenic resources (Impact AES-2), public views (Impact AES-3), and nighttime lighting (Impact AES-4) as those described for the Program, except that the overall amount, intensity and length of construction activities would be slightly less than that described for the Program. Program MM AES-1, AES-2, and AES-3 would apply.	**Greater Impact** –this alternative would result in similar impacts related to scenic vistas (Impact AES-1), scenic resources (Impact AES-2), public views (Impact AES-3), and nighttime lighting (Impact AES-4) as those described for the Program, except that construction and operation of the parallel or upsized system would occur in the developed areas of the City where there are more potential viewers and scenic corridors. Program MM AES-1, AES-2, and AES-3 would apply.
Agricultural and Forestry Resources	LTS	**Lesser Impact** – no change to any agriculture lands or forestry resources; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Lesser Impact** – the additional treatment facility would be constructed on an industrial parcel designated as disturbed land, and there would be shorter trunk pipelines. This would not result in any additional impacts related to designated farmlands or forestry resources (Impacts AG-1 through AG-5).	**Greater Impact** –the additional treatment facilities have the potential to be located on designated farmlands, resulting in conversion to non-agricultural use. The facilities would require more land than the Program and would have a greater potential for impacts (Impact AG-1 through 3 and AG-5). Similar to the Program, no impacts to forestry resources would occur because there are no forestry resources within the City (Impact AG-4).	**Greater Impact** – similar to the Program, much of this alternative would be constructed within the roadway ROW; however, the non-roadway portions would cross designated farmlands, potentially resulting in greater environmental impacts than the Program (Impact AG-1 through AG-5).	**Greater Impact** – placement of additional pump stations and lift stations associated with the recycled water pipelines would have the potential need to be located on designated farmlands, requiring conversion to non-agricultural use. This potential impact would be greater than impacts associated with the Program (Impact AG-1 through 3 and AG-5). No impacts to forestry resources would occur because there are no forestry resources within the City (Impact AG-4).	**Lesser Impact** – this alternative would be constructed within the roadway ROW with the developed areas of the City and would not result in any additional impacts to agricultural or forestry resources beyond those described for the Program (Impact AG-1 through AG-5). Additionally, the limited capacity would limit the extent of the collector infrastructure and thereby the reduce the potential footprint.	**Lesser Impact** – this alternative would be constructed within the roadway ROW within the developed areas of the City and would not result in any additional impacts to agricultural or forestry resources beyond those described for the Program (Impact AG-1 through AG-5). Additionally, the developed nature of the area surrounding the existing system and the urban farmland use designation indicates that potential impacts would be less than those of the Program.

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Air Quality	LTS/M	**Lesser Impact** – no increases in construction or operational emissions would occur; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Greater Impact** – the additional treatment facility would require additional construction activities and transporting of materials to the treatment facility site, and therefore could result in greater impacts related to construction emissions (i.e., Impact AIR-1 through AIR-3). The additional treatment facility would also be located within 300 feet of numerous existing residences and could therefore introduce a potentially significant impact related to odors (Impact AIR-4) to an area that currently does not experience treatment facility odors. Program MMs AIR-1 through AIR-3 would apply. Program MM AIR-4 is specific to the existing WWTF and would not apply.	**Greater Impact** – the additional treatment facilities would require additional construction activities and transporting of materials to the treatment facilities sites, and therefore could result in greater impacts related to construction emissions (i.e., Impact AIR-1 through AIR-3). The additional treatment facilities could also be located near numerous existing residences and could therefore introduce a potentially significant impact related to odors (Impact AIR-4) to areas that currently do not experience treatment facility odors. Program MMs AIR-1 through AIR-3 would apply. Program MM AIR-4 is specific to the existing WWTF and would not apply.	**Similar Impact** – this alternative would not result in additional impacts to air quality (Impact AIR-1 through AIR-4) beyond those described for the Program. Program MMs AIR-1 through AIR-4 would apply.	**Greater Impact** – construction of this alternative would require additional pipes as well as pump and lift stations which could result in greater impacts related to construction emissions (i.e. Impact AIR-1 through AIR-3). No changes to odor impacts (Impact AIR-4) are anticipated for the Recycled Water Reclamation Alternative beyond those described for the Program. Program MMs AIR-1 through AIR-4 would apply.	**Lesser Impact** – this alternative would not result in additional impacts to air quality (Impact AIR-1 through AIR-4) beyond those described for the Program, however, may result in overall less construction-related air quality emissions because the intensity ad length of construction activities would be less under this alternative. Program MMs AIR-1 through AIR-4 would apply.	**Greater Impact** – this alternative would have more complicated construction within the existing City limits in closer proximity to more sensitive receptors resulting in greater impacts related to construction emissions (i.e. Impact AIR-1 through AIR-3). No changes to odor impacts (Impact AIR-4) are anticipated for this alternative beyond those described for the Program. Program MMs AIR-1 through AIR-4 would apply.
Biological Resources	LTS/M	**Lesser Impact** – no construction or operational impacts to special status species, critical habitats, or protected waters would occur; however, inaction to accommodate the sewer service demands of future anticipated growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Greater Impact** – construction of the additional treatment facility could have additional impacts to special status species, critical habitats, and protected waters (Impacts BIO-1 through 5). Program MM BIO-1 through BIO-12 as well as MM GEO-1 would likely still apply to this alternative depending on species, habitats, and waters present within the area.	**Greater Impact** – construction and operation of these additional treatment facilities could have additional impacts to special status species, critical habitats, and protected waters (Impacts BIO-1 through 5). Program MM BIO-1 through 12 as well as MM GEO-1 would likely still apply to this alternative depending on species, habitats, and waters present within the area.	**Similar Impact** – construction of this alternative would result in similar impacts to biological resources as described for the Program (Impact BIO-1 through BIO-5) because it would occur in a linear nature within existing and planned ROW. Program MM BIO-1 through 12 as well as MM GEO-1 would likely still apply.	**Greater Impact** – construction of this alternative would require additional pipes as well as pump or lift stations, which could have additional impacts to special status species, critical habitats, and protected waters (Impacts BIO-1 through 5). Program MM BIO-1 through 12 as well as MM GEO-1 would likely still apply to this alternative depending on species, habitats, and waters present within the area.	**Lesser Impact** – construction of this alternative would result in similar impacts to biological resources as described for the Program (Impact BIO-1 through BIO-5) because it would occur in a similar footprint as the Program. Program MM BIO-1 through 12 as well as MM GEO-1 would likely still apply; however, the reduced capacity would not require as much construction as the Program.	**Lesser Impact** – construction of this alternative would result in similar impacts to biological resources as described for the Program (Impact BIO-1 through BIO-5); however, the alternative may result in less overall impacts to species and habitats because construction activities would occur in more developed portions of the City (i.e., less likelihood to impact species, habitats and waters). Program MM BIO-1 through BIO-12 as well as MM GEO-1 would likely still apply.

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Cultural Resources	LTS/M	**Lesser Impact** – no construction activities would occur; therefore, no cultural resources would be potentially impacted; however, inaction to accommodate the sewer service demands of future growth could result in private or alternative methods of sewer collection and/or treatment, which could result in additional impacts.	**Greater Impact** – the additional treatment facility location would require further cultural resource investigations to determine if there are any known cultural resources (i.e., historical, archaeological, or tribal resources or potential human burial sites) in the area, thus resulting in potentially greater cultural impacts if resources are present (Impact CUL-1 through 4). Additionally, the presence of previously undiscovered cultural resources to be discovered on project sites is a possibility. Program MMs CUL-1 through CUL-5 would apply.	**Greater Impact** – the additional locations for the treatment facility would require further cultural resource investigations to determine if there are any known cultural resources (i.e., historical, archaeological, or tribal resources or potential human burial sites) in the areas, thus resulting in potentially greater cultural impacts if resources are present (Impact CUL-1 through 4). Additionally, the presence of previously undiscovered cultural resources to be discovered on project sites is a possibility. Program MMs CUL-1 through CUL-5 would apply.	**Similar Impact** – construction of the Campus Parkway trunk sewer would result in similar impacts related to cultural resources (i.e., historical, archaeological, or tribal resources or potential human burial sites) (Impact CUL-1 through CUL-4) since it would be constructed in existing and planned ROW. Program MMs CUL-1 through CUL-5 would apply.	**Greater Impact** – this alternative would require additional pipes as well as pump and lift stations, which would require further cultural resource investigations to determine if there are any known cultural resources (i.e., historical, archaeological, or tribal resources or potential human burial sites) in the area, thus resulting in potentially greater cultural impacts if resources are present (Impact CUL-1 through 4). Additionally, the presence of previously undiscovered cultural resources to be discovered on project sites is a possibility. Program MMs CUL-1 through CUL-5 would apply.	**Lesser Impact** – construction of this alternative would result in similar impacts related to cultural resources (i.e., historical, archaeological, or tribal resources or potential human burial sites) (Impact CUL-1 through CUL-4) since it would be constructed in a similar footprint as the Program. Program MMs CUL-1 through CUL-5 would apply. However, the reduced capacity of the alternative would require less construction and thereby less potential for impacting cultural resources.	**Greater Impact** – construction of this alternative would result in similar impacts related to cultural resources (i.e., historical, archaeological, or tribal resources or potential human burial sites) (Impact CUL-1 through CUL-4) since it would be constructed in existing and planned ROW. However, this alternative would be constructed in the more developed portions of the City, which would have a greater potential for impacting historic built environment resources resulting in a greater potential impact than the Program. Also, there is still a potential that undiscovered cultural resources could be encountered during construction activities. Program MMs CUL-1 through CUL-5 would apply.
Geology, Soils, and Minerals	LTS/M	**Greater Impact** – no construction activities would occur; therefore, no erosion or loss of topsoil would occur. No facilities would be constructed; therefore, there would be no impacts related to geological hazards or paleontological resources. However, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and or treatment, which could result in additional impacts such as development of new septic tanks (Impact GEO-5).	**Similar Impact** – construction and operational impacts for this alternative related to geology, soils, and mineral impacts would not change from those described for the Program (Impact GEO-1 through GEO-8). No additional geological hazards or conditions are present within the additional treatment facility location. Program MMs GEO-1 through GEO-3 would apply.	**Greater Impact –** construction and operation of the additional treatment plans could potentially be located on areas with additional geologic hazards such as fault zones (Impact GEO-1), unstable or expansive soils (Impact GEO-3 and GEO-4), or soils with greater potential for paleontological resources (Impact GEO-6). There would be no change related to erosion (Impact GEO-2), septic tanks (Impact GEO-5), and mineral resources (Impact GEO-7 and GEO-8) as described and analyzed for the Program. Program MMs GEO-1 through GEO-3 would apply.	**Similar Impact** – this alternative would be constructed in a similar method as described for the Program and no additional geologic hazards are anticipated for the Campus Parkway trunk sewer, therefore the impacts described for the Program relative to Impacts GEO-1 through GEO-8 would be the same as described for the Program. Program MMs GEO-1 through GEO-3 would apply.	**Similar Impact** – this alternative would be constructed in a similar method as described for the Program, and no additional geologic hazards are anticipated for the additional pipelines and pump stations; therefore, the impacts described for the Program relative to Impacts GEO-1 through GEO-8 would be the same as described for the Program. Program MMs GEO-1 through GEO-3 would apply.	**Similar Impact** – this alternative would be constructed in a similar method as described for the Program, and no additional geologic hazards are anticipated for the Reduced Build-Out Capacity Alternative; therefore, the impacts described for the Program relative to Impacts GEO-1 through GEO-8 would be the same as described for the Program. Program MMs GEO-1 through GEO-3 would apply.	**Similar Impact** – this alternative would be constructed in a similar method as described for the Program, and no additional geologic hazards are anticipated for the Parallel or Upsized Existing System Alternative; therefore, the impacts described for the Program relative to Impacts GEO-1 through GEO-8 would be the same as described for the Program. Program MMs GEO-1 through GEO-3 would apply.

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
GHG and Energy Resources	LTS	**Lesser Impact** – no construction activities would occur; therefore there would be no increases in GHG emissions or increases in energy consumption; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Greater Impact** – the construction of the additional treatment facility would require additional truck trips, materials, and workers, which could increase the overall construction emissions for this alternative (Impact GHG-1 and GHG-2). Additionally, the operation of a second treatment facility could increase energy consumption in the City and thus result in potentially wasteful, inefficient, or unnecessary consumption of energy resources and conflict with state and local energy efficiency standards (Impact GHG-3 and GHG-4).	**Greater Impact** – the construction of additional treatment facilities would require additional truck trips, materials, and workers which could increase the overall construction emissions for this alternative (Impact GHG-1 and GHG-2). Additionally, the operation of multiple treatment facilities could increase energy consumption in the City and thus, result in potentially wasteful, inefficient, or unnecessary consumption of energy resources and conflict with state and local energy efficiency standards (Impact GHG-3 and GHG-4). While pipeline durations would be shorter under this alternative, the number of construction activities and mobilizations would increase.	**Similar Impact** – construction and operation of this alternative would not substantially change from that described for the Program (Impact GHG-1 through GHG-4). No additional construction or operational emissions or energy requirements would be anticipated for the Campus Parkway Alternative beyond those described in the Program.	**Greater Impact** – the construction of this alternative would require additional truck trips, materials, and workers which could increase the overall construction emissions for this alternative (Impact GHG-1 and GHG-2). The Recycled Water Reclamation Alternative is not anticipated to result in any changes related to wasteful, inefficient, or unnecessary consumption of energy resources or conflict with state and local energy efficiency standards beyond what was described for the Program (Impact GHG-3 and GHG-4).	**Lesser Impact** – construction and operation of this alternative would not substantially change from that described for the Program (Impact GHG-1 through GHG-4). A slight reduction in the amount of construction as well as the intensity and length could result in an overall reduction in GHG emissions and energy consumption requirements, however the impact would still remain less than significant as described under the Program.	**Similar Impact** – construction and operation of this alternative would not substantially change from that described for the Program (Impact GHG-1 through GHG-4). No additional construction or operational emissions or energy requirements would be anticipated for the Parallel or Upsized Existing System Alternative beyond those described in the Program.

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Hazards, Hazardous Materials, and Wildfires	LTS/M	**Lesser Impact** – no construction activities would occur; therefore, there would be no potential to increase construction-related hazards and hazardous materials in the area; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Similar Impact** – construction and operation of the additional treatment facility would not substantially increase the use or transport of hazardous materials beyond those analyzed under the Program (Impact HAZ-1). The additional treatment facility would not result in any increases in hazards to the public or the environment (Impact HAZ-3), nor is the additional treatment facility location within 0.25 mile of an existing or proposed school, within a Cortese listed site, within two miles of an airport, within an evacuation plan or area, or an SRA or potential wildfire risk area (Impact HAZ-3 through HAZ-8). Program MMs HAZ-1 through HAZ-4, MM TRA-1, MM AIR-2, and MM AIR-3 would apply.	**Greater Impact** – construction and operation of additional treatment facilities would not substantially increase the use or transport of hazardous materials beyond those analyzed under the Program (Impact HAZ-1). The additional treatment facilities would not result in any increases in hazards to the public or the environment (Impact HAZ-3). However, because the exact locations of the additional treatment facilities are not yet known, they could result in additional impacts related to being located within 0.25 mile of an existing or proposed school, within a Cortese listed site, within two miles of an airport, within an evacuation plan or area, or an SRA and potential high-risk wildfire risk areas. Program MMs HAZ-1 through HAZ-4, MM TRA-1, MM AIR-2, and MM AIR-3 would apply.	**Similar Impact** – construction and operation this alternative would not substantially increase the use or transport of hazardous materials beyond those analyzed under the Program (Impact HAZ-1). The Campus Parkway Alternative would not result in any increases in hazards to the public or the environment (Impact HAZ-3), nor is the Campus Parkway Alternative located within 0.25 mile of existing or proposed schools, within a Cortese listed site, within two miles of an airport, within an evacuation plan or area, or a SRA or potential wildfire risk area (Impact HAZ-3 through HAZ-8) beyond those described for the Program. Program MMs HAZ-1 through HAZ-4, MM TRA-1, MM AIR-2, and MM AIR-3 would apply.	**Greater Impact** – construction and operation of this alternative would not substantially increase the use or transport of hazardous materials beyond those analyzed under the Program (Impact HAZ-1). The Recycled Water Reclamation Alternative would not result in any increases in hazards to the public or the environment (Impact HAZ-3). However, because the exact locations of the additional pump and lift stations are not yet known, they could result in additional impacts related to being located within 0.25 mile of an existing or proposed school, within a Cortese listed site, within two miles of an airport, within an evacuation plan or area, or an SRA and potential high-risk wildfire risk areas. Program MMs HAZ-1 through HAZ-4, MM TRA-1, MM AIR-2, and MM AIR-3 would apply.	**Similar Impact** – construction and operation of this alternative would not substantially increase the use or transport of hazardous materials beyond those analyzed under the Program (Impact HAZ-1). The Reduced Build-Out Capacity Alternative would not result in any increases in hazards to the public or the environment (Impact HAZ-3), nor is the Reduced Build-Out Capacity Alternative located within 0.25 mile of existing or proposed schools, within a Cortese listed site, within two miles of an airport, within an evacuation plan or area, or an SRA or potential wildfire risk area (Impact HAZ-3 through HAZ-8) beyond those described for the Program. Program MMs HAZ-1 through HAZ-4, MM TRA-1, MM AIR-2, and MM AIR-3 would apply.	**Greater Impact** - construction and operation of this alternative would not substantially increase the use or transport of hazardous materials beyond those analyzed under the Program (Impact HAZ-1). The Parallel or Upsized Existing System Alternative would not result in any increases in hazards to the public or the environment (Impact HAZ-3). However, due to the Parallel or Upsized Existing System Alternative's location with the more developed portions of the City, there is a greater potential for this alternative to be located within 0.25 miles of a school, within a Cortese listed site, within two miles of an airport, and within an evacuation plan or area (Impact HAZ-3 through HAZ-7). There would be no change related to being located in an SRA or potential wildfire risk area (HAZ-8) beyond that described for the Program. Program MMs HAZ-1 through HAZ-4, MM TRA-1, MM AIR-2, and MM AIR-3 would apply.

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Hydrology and Water Quality	LTS/M	**Lesser Impact** – no construction activities would occur; therefore, there would be no increases in runoff, and there would be no potential water quality, groundwater, or drainage pattern impacts; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Greater Impact** – operation of two treatment facilities could result in greater impacts to water quality (Impact HYD-1 and Impact HYD-5) because two WDRs permits would be required to be obtained from the RWQCB, which would be less efficient with respect to the City's efforts to simplify its monitoring and compliance efforts. Additionally, the proposed location of the additional treatment facility is within the Lake Yosemite inundation zone and therefore could experience flooding and potential contamination if a dam failure were to occur (Impact HYD-4). Impacts related to groundwater and drainage patterns (Impact HYD-2 and HYD-3) would be similar to those described for the Program. Program MM HYD-1, MM HYD-2, and MM GEO-2 would apply.	**Greater Impact** – operation of multiple treatment facilities could result in greater impacts to water quality (Impact HYD-1 and Impact HYD-5) because multiple WDRs permits would be required to be obtained from the RWQCB, which would be less efficient with respect to the City's efforts to simplify its monitoring and compliance efforts. Additionally, the additional treatment facility locations could be located within inundation zones and therefore could experience flooding and potential contamination if a dam failure were to occur (Impact HYD-4). Impacts related to groundwater and drainage patterns (Impact HYD-2 and HYD-3) would be similar to those described for the Program. Program MM HYD-1, MM HYD-2, and MM GEO-2 would apply.	**Similar Impact** – Potential impacts related to water quality, groundwater resources, flooding, and drainage (Impacts HYD-1 through HYD-5) from the Campus Parkway Alternative would not substantially change from those described in the Program, because the Campus Parkway trunk sewer would largely occur within existing and planned ROW in the eastern portion of the City and would be constructed in a similar manner as described for the Program. Program MM HYD-1, MM HYD-2, and MM GEO-2 would apply.	**Lesser Impact** – Potential impacts related to water quality, groundwater resources, flooding, and drainage (Impacts HYD-1 through HYD-5) from this alternative would not substantially change from those described in the Program; however, by recycling the effluent and pumping back through the system, water could percolate into the North Merced groundwater basins, which could have a minor net benefit. This alternative would be constructed in a similar manner as described for the Program. Program MM HYD-1, MM HYD-2, and MM GEO-2 would apply.	**Similar Impact** – Potential impacts related to water quality, groundwater resources, flooding, and drainage (Impacts HYD-1 through HYD-5) from the Reduced Build-Out Capacity Alternative would not substantially change from those described in the Program because the Reduced Build-Out Capacity Alternative would be constructed in a similar footprint and manner as described for the Program. Program MM HYD-1, MM HYD-2, and MM GEO-2 would apply.	**Similar Impact** – Potential impacts related to water quality, groundwater resources, flooding, and drainage (Impacts HYD-1 through HYD-5) from the Parallel or Upsized Existing System Alternative would not substantially change from those described in the Program, because the Parallel or Upsized Existing System Alternative would largely occur within existing and planned ROWs would be constructed in a similar manner as described for the Program. Program MM HYD-1, MM HYD-2, and MM GEO-2 would apply.
Land Use and Planning	LTS	**Greater Impact** – no facilities would be constructed; however, the wastewater collection and treatment system would continue to operate at existing capacity, which would not be sufficient to serve anticipated future growth identified in the Merced Vision 2030 General Plan and could result in an overall greater impact to land use and planning in the City.	**Greater Impact** – the additional treatment facility could result in inconsistencies with the 2030 General Plan (Impact LU-2), which analyzed growth using only one treatment facility and using existing infrastructure to the maximum extent possible (Policy 1.2 of the 2030 General Plan). The additional treatment facility would not physically divide an established community (Impact LU-1) because it would be located on previously disturbed land, outside of existing communities.	**Greater Impact** – the additional treatment facilities could result in inconsistencies with the 2030 General Plan (Impact LU-2), which analyzed growth using only one treatment facility and using existing infrastructure to the maximum extent possible (Policy 1.2 of the 2030 General Plan). Further, the additional treatment facilities could result in additional impacts related to physically dividing an established community (Impact LU-1) because they could be located in or near current or future communities.	**Greater Impact** – this alternative would require construction of new pipelines outside of the City's SUDP/SOI which could result in greater impacts to land use and consistency with the 2030 General Plan (Impact LU-2). Additional permits and agreements with Merced County would be required for placement and long-term maintenance and operation of these pipelines. No change related to dividing an established community (Impact LU-1) would occur for the Campus Parkway Alternative from that described under the Program.	**Greater Impact** – no change related to dividing an established community (Impact LU-1) would occur for this alternative from that described under the Program. The additional land and approvals required for the additional pipelines and pump/lift stations could result in further land use impacts beyond those described for the Program (Impact LU-2).	**Similar Impact** – no change related to dividing an established community (Impact LU-1) would occur for this alternative from that described under the Program. The Reduced Build-Out Capacity Alternative would also result in similar less than significant impacts related to land use consistency as described for the Program (Impact LU-2).	**Similar Impact** – no change related to dividing an established community (Impact LU-1) would occur for this alternative from that described under the Program. The Parallel or Upsized Existing System Alternative would also result in similar less than significant impacts related to land use consistency as described for the Program (Impact LU-2).
Noise	LTS/M	**Lesser Impact** – no construction activities would occur; therefore, there would be no potential to increase noise in the area; however, inaction to accommodate the sewer service demands of	**Greater Impact** – the construction and operation of the additional treatment facility would require construction activities to occur within 300 feet of multiple residences, thus	**Greater Impact** – the construction and operation of the additional treatment facilities would require construction activities to occur near multiple residences, thus resulting in	**Lesser Impact** – construction of this alternative would involve similar impacts related to noise and vibration (Impact NOS-1 and NOS-2) because this alternative would be	**Greater Impact** – the construction and operation of this alternative would require additional construction activities for the pipes and pump/lift stations (Impact NOS-1 and NOS-2), thus	**Lesser Impact** – construction of this alternative would involve similar impacts related to noise and vibration (Impact NOS-1 and NOS-2) because this alternative would be	**Greater Impact** – construction of this alternative would involve similar impacts related to noise and vibration (Impact NOS-1 and NOS-2) because this alternative would be

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
		anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	resulting in additional permanent and temporary noise and vibration increases (Impact NOS-1 and NOS-2). Program MM NOS-1 through NOS-3 would still apply.	additional permanent and temporary noise and vibration increases (Impact NOS-1 and NOS-2). Program MM NOS-1 through NOS-3 would still apply.	constructed in a similar manner as described for the Program and would be located near sensitive receptors at similar distances as described for the Program. However, the distances from residences and other compounding noise sources such as the airport are greater and thereby potential noise impacts may be slightly less under this alternative.	resulting in an increase in overall noise and vibration impacts that were not analyzed within the Program. Program MM NOS-1 through NOS-3 would still apply.	constructed in a similar footprint and manner as described for the Program and would be located near sensitive receptors at similar distances as described for the Program.	constructed in a similar manner as described for the Program and would be located near sensitive receptors at similar distances as described for the Program.
Population and Housing	LTS	**Greater Impact** – the wastewater treatment and collection facilities would continue to operate under existing conditions and therefore would not allow for future growth identified in the Merced Vision 2030 General Plan, resulting in a greater indirect impact to population and housing.	**Similar Impact** – the additional treatment facility would not result in additional impacts to direct or indirect impacts related to population and housing beyond those analyzed under the Program (Impact POP-1 and POP-2).	**Similar Impact** – the additional treatment facilities would not result in additional impacts to direct or indirect impacts related to population and housing beyond those analyzed under the Program (Impact POP-1 and POP-2).	**Similar Impact** – this alternative would not result in additional impacts to direct or indirect impacts related to population and housing beyond those analyzed under the Program (Impact POP-1 and POP-2).	**Similar Impact** – this alternative would not result in additional impacts to direct or indirect impacts related to population and housing beyond those analyzed under the Program (Impact POP-1 and POP-2).	**Similar Impact** – this alternative would not result in additional impacts to direct or indirect impacts related to population and housing beyond those analyzed under the Program (Impact POP-1 and POP-2).	**Similar Impact** – this alternative would not result in additional impacts to direct or indirect impacts related to population and housing beyond those analyzed under the Program (Impact POP-1 and POP-2).
Public Services and Utilities	LTS	**Greater Impact** – no construction activities would occur, and therefore no changes to public services or utilities would occur; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in service deficiencies.	**Greater Impact** – the additional treatment facility could result in additional environmental effects beyond those analyzed under the Program, as discussed herein (Impact PUB-2). Impacts related to other public services, water infrastructure and supplies, and solid waste (PUB-1, and PUB-3 through PUB-6) would remain unchanged from those analyzed under the Program.	**Greater Impact** – the additional treatment facilities could result in additional environmental effects beyond those analyzed under the Program, as discussed herein (Impact PUB-2). Impacts related to other public services, water infrastructure and supplies, and solid waste (PUB-1, and PUB-3 through PUB-6) would remain unchanged from those analyzed under the Program.	**Similar Impact** – no additional impacts related to public services and utilities (Impact PUB 1 through PUB-6) are anticipated for this alternative beyond those described for the Program.	**Similar Impact** – no additional impacts related to public services and utilities (Impact PUB 1 through PUB-6) are anticipated for this alternative beyond those described for the Program.	**Greater Impact** – the reduction of sewer capacity could result in utilities being developed that would work to serve the SUDP/SOI or alternately would not be developed, in which case greater impacts to public service and utilities (Impact PUB 1 through PUB-6) could occur beyond those described for the Program. It is not anticipated that the reduced capacity would limit impacts further.	**Greater Impact** – conflicts with existing utilities and public services are anticipated under this alternative, and impacts would be greater than those described for the Program (Impact PUB 1 through PUB-6).
Recreation	NI	**Similar Impact** –recreational facilities within the City would continue to operate under existing conditions, which would not change as a result of implementation of the Program or one of the alternatives; however, inaction to accommodate the sewer service demands of future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Similar Impact** –recreational facilities within the City would continue to operate under existing conditions, which would not change as a result of implementation of the Program or one of the alternatives.	**Similar Impact** –recreational facilities within the City would continue to operate under existing conditions, which would not change as a result of implementation of the Program or one of the alternatives.	**Similar Impact** – recreational facilities within the City would continue to operate under existing conditions, which would not change as a result of implementation of the Program or one of the alternatives.	**Similar Impact** –recreational facilities within the City would continue to operate under existing conditions, which would not change as a result of implementation of the Program or one of the alternatives.	**Similar Impact** –recreational facilities within the City would continue to operate under existing conditions, which would not change as a result of implementation of the Program or one of the alternatives.	**Similar Impact** –recreational facilities within the City would continue to operate under existing conditions, which would not change as a result of implementation of the Program or one of the alternatives.

Environmental Resource Area	Program	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Transportation	LTS/M	**Lesser Impact** – no construction activities would occur; therefore, there would no increases in traffic on roadways; however, inaction to accommodate the sewer service demands of anticipated future growth could result in private or alternative methods of wastewater collection and/or treatment, which could result in additional impacts.	**Greater Impact** – the additional treatment facility would require additional construction and operational truck trips to haul materials to and from the site, thus resulting in additional truck trips on the local roadways, greater interaction with emergency access, and potentially more interaction with farm equipment on the local roadways (Impacts TRA-1 through TRA-4). Program MMs TRA-1 and MM TRA-2 would still apply.	**Lesser Impact** – the additional treatment facilities would require additional construction and operational truck trips to haul materials to and from the sites, thus resulting in additional truck trips on the local roadways, greater interaction with emergency access, and potentially more interaction with farm equipment on the local roadways (Impacts TRA-1 through TRA-4). Program MMs TRA-1 and MM TRA-2 would still apply. However, the smaller localized facilities would require less trunk and collector pipelines disturbing less roadways and also are likely to be 'packaged' treatment facilities requiring less total construction all of which could have a lesser impact than the Program.	**Similar Impact** – this alternative would require similar construction and operational truck trips to haul materials and would result in similar impacts related to emergency personnel, and design hazards (Impacts TRA-1 through TRA-4) as described under the Program. The trunk sewer down Campus Parkway would not result in any additional impacts related to these topics. Program MMs TRA-1 and MM TRA-2 would still apply.	**Greater Impact** – this alternative would require additional construction and operational truck trips to haul materials for the additional pipes and pump/lift stations, and could result in greater impacts related to emergency personnel, and design hazards (Impacts TRA-1 through TRA-4) as described under the Program. Program MMs TRA-1 and MM TRA-2 would still apply.	**Lesser Impact** – this alternative would require similar construction and operational truck trips to haul materials and would result in similar impacts related to emergency personnel, and design hazards (Impacts TRA-1 through TRA-4) as described under the Program; however, the amount of construction would be reduced resulting in a lesser impact. Program MMs TRA-1 and MM TRA-2 would still apply.	**Greater Impact** – this alternative would require similar construction and operational truck trips to haul materials; however, construction within the City limits would result in greater potential impacts related to emergency personnel, and design hazards (Impacts TRA-1 through TRA-4) than those described under the Program. Because the Upsized Existing System Alternative would be constructed in the central portion of the City, where more traffic occurs, additional delays from construction activities would likely occur. Program MMs TRA-1 and MM TRA-2 would still apply.
Overall Impact	NI: 1 LTS: 5 LTS/M: 9	Lesser: 10 Similar: 1 Greater: 4	Lesser: 1 Similar: 4 Greater: 10	Lesser: 1 Similar: 2 Greater: 12	Lesser: 1 Similar: 13 Greater: 1	Lesser: 1 Similar: 4 Greater: 10	Lesser: 8 Similar: 6 Greater: 1	Lesser: 2 Similar: 6 Greater: 7
Environmentally Superior Value	n/a	13	-14	-20	13	-14	20	-6

Notes:
Environmentally Superior Values calculated with the following factors: lesser impact = +2 multiplier, similar impact= +1 multiplier, greater impact=-2 multiplier.
City = City of Merced

4.1.6 Environmentally Superior Alternative

CEQA Guidelines Section 15126.6(e)(2) requires an EIR to identify an "environmentally superior alternative." If the No Project Alternative is the environmentally superior alternative, the EIR must also identify an environmentally superior alternative from among the other alternatives.

The qualitative and quantitative environmental effects of each alternative in relation to the Program are included in **Table 4.3**. To quantitatively identify an environmentally superior alternative, the number of Program objectives (**Table 4.1**) the alternative meets was weighted and added to value of the environmental impact **(Table 4.1**). Accordingly, the feasible alternative (**Table 4.2**) with the highest quantitative score is the environmentally superior alternative. **Table 4.4** provides a comparison of these quantitative results and presents the environmentally superior rankings.

Table 4.4: Environmentally Superior Alternative Comparison Summary

	No Project Alternative	North Merced Satellite Treatment Alternative	Decentralized Facilities Alternative	Campus Parkway Alternative	Recycled Water Reclamation Alternative	Reduced Build-Out Sewer Capacity Alternative	Parallel or Upsized Existing System Alternative
Weighted Objective Score	6	12	6	18	12	12	16
Overall Environmental Impact	13	-14	-20	13	-14	20	-6
Alternative Score	19	-2	-14	32	-2	32	10
Feasibility	Feasible	Feasible	Not Feasible	Feasible	Not Feasible	Feasible	Not Feasible
Alternative Ranking	3	5	7	1	5	1	4

Note: Alternative score was calculated by adding the overall environmental impact score with the weighted (by a factor of 2) number of objectives met.

Since the Program would not result in any significant and unavoidable impacts, the environmentally superior alternative is selected based on the discussion in **Table 4-3**, which includes a comparison of whether the alternative would result in a lesser or greater impact than the Program. Overall, the Campus Parkway Alternative and the Reduced Build-Out Sewer Capacity Alternative tied for the best ranking. The Campus Parkway Alternative achieves a decrease in fewer environmental effects (Noise) but meets nine out the ten Program objectives and only has one resource that would increase the magnitude of impact (Land Use and Planning). Conversely, the Reduced Build-Out Sewer Capacity Alternative achieves a decrease in the magnitude of construction-related impacts for eight resources (Aesthetics and Visual Resources, Agricultural and Forestry Resources, Air Quality, Biological Resources, Cultural Resources, GHG and Energy Resources, Noise, and Transportation) but only meets six of the ten Program objectives and increases the environmental impact associated with public services and utilities. Both alternatives met the feasibility screening criteria and would require similar MMs to reduce potential impacts as the Program. Since the alternatives tied, the environmental impact score was used to select the Reduced Build-Out Sewer Capacity Alternative as the environmentally superior alternative.

5.0 OTHER CEQA CONSIDERATIONS

This section describes required topics including growth-inducing impacts, significant and unavoidable impacts, and significant irreversible environmental changes relative to the Program. It also provides an assessment of potential cumulative impacts resulting from the Program in conjunction with recent past, current, and reasonably foreseeable future projects.

5.1 GROWTH-INDUCING IMPACTS

The CEQA Guidelines Section 15126.2(e) requires that an EIR evaluate the growth-inducing impact of a proposed action. The guidelines describe the required growth inducement analysis as follows:

> *Discuss the ways in which the [Program] could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this definition are public works projects which would remove obstacles to population growth, would tax community service facilities, or encourage or facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

Direct growth inducement would result if the Program involved construction of new housing which would facilitate new population in an area. Indirect growth inducement or secondary growth inducement potential would be present if the Program would establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises), remove a barrier to direct growth inducement, or if it would involve a substantial construction effort with substantial long-term employment opportunities which could indirectly stimulate the need for additional housing and services to support the new employment demand.

As a plan for wastewater collection system infrastructure and projects implemented as a result of that plan, the Program would not directly develop housing or foster economic or population growth in the surrounding communities. However, the Program would indirectly accommodate growth by constructing sewer collection and treatment infrastructure that could accommodate additional housing and development. Construction of the Program cannot be considered isolated from immediate development since it would facilitate and serve growth that could occur if the Program is constructed to provide additional wastewater conveyance capacity. As such the Program could be the physical catalyst for future development in the Program Study Area. The growth-inducing potential of the Program would be considered significant if it fosters growth in excess of what is assumed in the local master plans and land use plans, or in projections made by regional planning agencies. However, the Program was developed consistently with the 2030 General Plan, and the Program was designed to meet the reasonable growth projections of the 2030 General Plan (City of Merced 2010, 2012). The 2030 General Plan and the 2030 General Plan EIR are incorporated by reference to this Recirculated Draft EIR (RDEIR) and the analysis in those documents, which considered the growth inducement associated with their adoption, was considered. A SOC for the 2030 General Plan EIR was adopted upon certification of the EIR for those impacts.

Additionally, the Program would require construction efforts over the duration of reasonable build-out, which could result in multiple temporary demands on housing to support construction personnel. Depending on the frequency and duration of construction activities, construction personnel could potentially relocate to the area due to the Program's long-term potential for ongoing new construction projects. However, this potential is speculative and is unlikely due to the uncertainty, irregularity, and unreliability of construction activities. Even if this were to occur, the number of personnel the construction under the Program would support would be inconsequential since it is anticipated that there would only be 55 construction workers maximum per day, which would not substantially induce growth within the area. The potential introduction of construction personnel requiring housing is an indirect effect of implementation of the 2030 General Plan, and the SOC considered indirect effects of implementation of the 2030 General Plan (City of Merced 2012).

The Program would not result in further growth-inducing impacts beyond what was analyzed in the 2030 General Plan EIR; therefore, no impact would occur from implementation of the Program, and no further growth-inducing analysis would be required.

5.2 SIGNIFICANT AND UNAVOIDABLE IMPACTS

CEQA Guidelines Section 15126(b) requires an EIR to "describe any significant impacts, including those which can be mitigated but not reduced to a level of insignificance. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the project is being proposed, notwithstanding their effect, should be described."

No significant and unavoidable impacts were identified to be associated with the Program. Chapter 3.0, Environmental Impact Assessment, identified potentially significant impacts; however, all of these impacts are mitigated to less than significant levels by implementation of the MMs prescribed. Therefore, the Program would not have significant and unavoidable impacts.

5.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines Section 15126.2(d) describes irreversible environmental changes as follows:

> *Uses of nonrenewable resources during the initial and continued phases of a project may be irreversible if it requires a large commitment of such resources or makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

The CEQA Guidelines refer to the need to evaluate and justify the consumption of nonrenewable resources and the extent to which the project commits future generations to similar uses of nonrenewable resources. In addition, CEQA requires that irreversible damage that could result from an environmental accident associated with the Program be evaluated.

Construction of the Program would result in the commitment of nonrenewable natural resources used in the construction process and during operation, including gravel, petroleum products, steel, and other materials. As discussed in Section 3.13, Public Services and Utilities and Service Systems, and Section 3.8, Hazards and Hazardous Materials and Wildfire, the Program would not generate large amounts of construction waste.

Construction and operation of the Program would also result in commitment of energy resources such as fossil fuels and electricity, as discussed in Section 3.7, GHG and Energy Resources. Direct energy use during construction and operation would involve using petroleum products and electricity to operate equipment, and indirect energy use would involve consuming energy to extract raw materials, manufacture items, and transport the goods and people necessary for construction activities. Construction-related energy consumption would be temporary and would be confined to the construction period. Nevertheless, construction and operation activities would, as with any construction project, cause irreversible and irretrievable commitments of finite nonrenewable energy resources, such as gasoline and diesel fuel.

The Program would include all feasible control measures to improve equipment efficiency and reduce energy use as required by the SJVAPCD. These measures include a Construction Emission and Fugitive Dust Control Plan that would reduce unnecessary equipment idling and other policies that would help reduce energy use and are consistent with state and local legislation, and policies to conserve energy would be followed. In addition, the Program would comply with applicable federal, state, and local policies and regulations pertaining to energy standards and would ensure that natural resources are conserved to the maximum extent possible. Therefore, due to the rate and amount of energy consumed, the Program would not result in the unnecessary, inefficient, or wasteful use of resources and energy use would be accomplished in a manner consistent with applicable laws and regulations.

Finally, construction and operation of the Program has the potential to result in accidental release of hazardous materials, which may lead to irreversible damage. However, as stated in Section 3.8, Hazards and Hazardous Materials and Wildfire, hazardous materials used during construction would be typical of common construction activities. They would be handled by the contractor in accordance with applicable federal, state, and local regulations for hazardous substances. Additionally, the amount of these materials needed for onsite equipment maintenance would not be sufficient to cause a significant hazard to the public or any nearby schools if released since the quantity of these hazardous materials onsite at any one given time would amount to a refueling truck and construction equipment.

5.4 CUMULATIVE IMPACTS

CEQA requires an EIR to include a discussion of cumulative effects of a project when the project's incremental effect is "cumulatively considerable." An effect is cumulatively considerable when it is significant viewed in connection with the effects of past projects, other current projects, and future projects (CEQA Guidelines Section 15065(a)(3)).

A "cumulative impact" is an impact that is created as a result of the combination of a project together with other projects causing related impacts. Therefore, the first step in the cumulative analysis is to identify each impact of the project, and in each case, consider whether there are other projects (past, current, or

future) that could have related impacts, and then determine whether the project's contribution to the overall impact is "cumulatively considerable."

For example, a project that constructs and operates a retail center would generate a substantial number of vehicle trips once the center is completed and opened for operation, which would affect road operations and conditions in the vicinity of the project site. A lead agency would be required to not only consider the effects of trips generated by the project, but also those trips in combination with other projects that might contribute vehicle trips to the same roadway system. Thus, CEQA seeks to avoid situations in which a series of small projects with relatively minor effects eventually result in far larger effects as their effects are combined.

The CEQA Guidelines also state that the cumulative impacts discussion does not need to provide as much detail as is provided in the analysis of project-only impacts and should be guided by the standards of practicality and reasonableness.

In addition, Section 15130 of the CEQA Guidelines identifies that at least one of the following two options may be used to complete an adequate cumulative analysis:

List Method – A list of past, present, and reasonable anticipated future projects producing related or cumulative impacts, including those projects outside the control of the lead agency (i.e., the list approach), Section 15130(a).

General Plan Method – A summary of projections contained in an adopted General Plan or related planning document designed to evaluate regional or area-wide conditions. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency (i.e., the plan approach) Section 15130(b).

This RDEIR uses the General Plan Method.

5.4.1 Geographic Scope

The geographic area that is analyzed for cumulative impacts depends on the resource being analyzed. The geographic area associated with a proposed Project's different environmental impacts defines the boundaries of the area used for compiling the list of past, present, and probable future projects considered in the cumulative impact analysis. The geographic area that could be affected by implementation of the Program in combination with other projects varies depending on the type of environmental resource being considered. The general geographic area associated with different types of environmental effects of the Program defines the scope of the area considered in the cumulative impact analysis (**Table 5.1**). Also listed is the method of evaluation used to analyze cumulative impacts for each environmental resource.

Table 5.1: Geographic Scope of Cumulative Impact and Method of Evaluation

Resource Topic	Geographic Area
Aesthetics and Visual Resources	Immediate Program Study Area
Agriculture and Forestry Resources	Immediate Program Study Area

Resource Topic	Geographic Area
Air Quality	Immediate Program Study Area (Toxic Air Contaminants) Air Basin (Construction-Related and Mobile Sources)
Biological Resources	Immediate Program Study Area
Cultural and Tribal Resources	Immediate Program Study Area
Geology, Soils, and Minerals	Immediate Program Study Area
GHG and Energy	Global (greenhouse gas) Statewide (energy)
Hazards and Hazardous Materials	Immediate Program Study Area
Hydrology and Water Quality	Immediate Program Study Area Merced River Watershed
Land Use and Planning	Immediate Program Study Area
Noise	Immediate Program Study Area
Population and Housing	Immediate Program Study Area
Public Services and Utilities	Immediate Program Study Area
Recreation	Immediate Program Study Area
Transportation and Traffic	Immediate Program Study Area Regional Roadway Network

5.4.2 General Plan Method

The 2030 General Plan contains projections for growth and development within the SUDP/SOI (City of Merced 2012). The CEQA Guidelines (Section 15130(d)) state that a discussion of cumulative impacts contained in previously certified EIRs for land use plans may be incorporated by reference pursuant to provisions for tiering and program EIRs, which means that no further analysis of cumulative impacts beyond the incorporated information is required when a project is consistent with the General Plan or "comparable programmatic plan" if the lead agency determines that the regional or area-wide cumulative impacts relevant to the project have already been "adequately addressed" in a certified EIR for the plan (Section 15130(d)). The 2030 General Plan EIR considered the cumulative effects of these SUDP/SOI-wide projections, including the associated impacts associated with development and implementation of the Program (City of Merced 2010). The 2030 General Plan EIR is incorporated by reference to account for the cumulative effects of the Program. The discussion in the remainder of this section is included to supplement the analysis of the 2030 General Plan EIR and where applicable review the adequacy. Where applicable the discussion is supplemented with related past, present, and reasonably foreseeable future projects identified by the City. List of Related Plans and Projects

A list of past, current, and reasonably foreseeable future projects was compiled using information from the City, the county, and other local, state, and federal agencies. The past, present and reasonably foreseeable future projects within the City or directly adjacent to the Program Study Area were identified and categorized in **Table 5.2**. For the purposes of this discussion, these projects that may have a

cumulative effect on the resources of the Program Study Area are often referred to as the "collective projects."

Table 5.2: List of Collective Past, Present, and Reasonably Anticipated Future Projects in the Region

Project/Action	Status *	Location	Acres	Description
City Infrastructure Projects				
Roadway Improvements	Current	Throughout the City's SUDP/SOI	-	Various roadway improvement projects throughout the City of Merced projected to occur after 2024.
Black Rascal Creek Flood Control Project	Current	Merced County	300	This project consists of a new perimeter levee, internal levee, and training levees to create a flood control detention basin and wetland area on Black Rascal Creek, which is a tributary to Bear Creek.
MID Water Resources Management Plan	Current	Throughout MID's service area.	-	MID's Waster Resources Management Plan provides long-term guidance to help optimize MID's water rights, facilities, operations, and finances. It takes into consideration a host of trends for land and water use, as well as existing and upcoming mandated regulations affecting both agriculture and MID operations. Additionally, the modernization of MID facilities will allow more water storage to be conserved in Lake McClure by improving operations and reducing operational water losses at key locations.
Nottingham Sidewalks	Current	Nottingham Lane	-	Demolition and reconstruction of concrete driveways, curb ramps, curb and gutters, fencing, and landscaping. Construction is anticipated 2024 and ongoing.
Sidewalks Along Olive Avenue, Parsons Avenue, Alexander Avenue, and Hansen Avenue	Current	City of Merced	-	Demolition and reconstruction of concrete driveways, curb ramps, curb and gutters, fencing, and landscaping. Construction is anticipated 2024 and ongoing.
Merced Gateway Improvements	Current	SR 140 and SR 59	-	Construction of entry gateway monuments. Construction is anticipated 2024 and ongoing.
Childs Multi-Use Path	Current	Childs Avenue	-	Installation of multi-use path along Childs Avenue for approximately 4,100 linear feet. Construction is anticipated 2024 and ongoing.
Community Park 42	Current	Northwest corner of Mission	-	Construction of soccer/football fields, volleyball courts, tennis courts, concession and restroom

Project/Action	Status *	Location	Acres	Description
		Avenue and Tyler Road		building, and additional structures. Construction ongoing from 2023.
Merced Yosemite Regional Airport Terminal Replacement	Current	Merced Regional Airport	-	Reconstruction of terminal, parking lot, taxiway pavements, utility connections, security, storm drain facilities, and shade structures. Construction ongoing from 2024.
Safe Streets Streetlight Retrofit	Current	City of Merced	-	Replacement of high pressure sodium streetlights with light emitting diodes lights. Construction ongoing from 2024.
WWTF Phase VI Headworks Improvements	Current	WWTF	-	Construction of new influent flow meter manhole, facility mechanisms, piping, and concrete repair for Headworks Improvements. Construction ongoing from 2024.
Campus Parkway Segment III	Completed	Campus Parkway	-	Campus Parkway public works streets and signals project. Segment III is under construction and will extend the expressway to Yosemite Avenue.
Childs Avenue Widening at Highway 99	Completed	Childs Avenue at Highway 99	-	Widening of roadway along Childs Avenue at Highway 99.
Yosemite Avenue at Highway 59	Completed	Yosemite Avenue at Highway 59	-	Yosemite Avenue public works streets and signals project.
Development Projects				
University Village Merced Annexation	Approved 7/18/2024	Northeast Corner of Gardner Avenue and Yosemite	28.6 (Annex Area= 70 ac)	Student housing, mixed-use, and neighborhood commercial.

Source: City of Merced Planning Division 2024

5.4.3 Methods

The analysis below examines the cumulative impacts of the Program for each of the resource topics analyzed in Chapter 3.0, Environmental Impact Assessment. The cumulative impacts are assessed by adequacy of the 2030 General Plan EIR and looking at the short-term (construction) and long-term (operational) impacts of the Program combined with the impacts of the past and planned projects listed in **Table 5-2** (collectively referred to as projects).

The following objectives were set forth to analyze the short-term construction and long-term operational cumulative impacts:

1. Identify if the combined impacts of the Program and the projects in **Table 5-2** are significant. If so:
    a. Determine whether the Program's incremental contribution to that significant impact is cumulatively considerable. If so,
    b. Determine if mitigation is feasible.

"**Cumulatively considerable**" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (CCR Section

It is possible that even when the cumulative impacts of multiple projects are significant, the incremental contribution of the impact for the Program may itself not be cumulatively considerable (CCR Section 15064.H4, Communities for Better Environment Case Law). Furthermore, a project's contribution is less-than-cumulatively considerable if the project implements MMs designed to alleviate the cumulative impact (CEQA Guidelines Section 15130 (a)(3)). In this case, the Program's impact would not be cumulatively considerable.

5.4.4 Resource-Specific Cumulative Analysis

5.4.4.1 Aesthetics and Visual Resources

The 2030 General Plan EIR found the cumulative impact to aesthetic resources from build-out within the SUDP/SOI cumulatively less than significant. For the Program, the geographic scope for potential cumulative impacts to aesthetics and visual resources include foreground views immediately surrounding the Program components, as well as the long distance views of the Program Study Area. As described in Section 3.1, Aesthetics and Visual Resources, the Program requires very few above-ground elements added to the built environment of homes, roadways, shopping centers, and other buildings and was found to be less than significant with mitigation incorporated to blend above-ground features into the environment. When considered with the projects in the cumulative list (**Table 5-2**) there is a slight potential to affect key views and sensitive aesthetic resources within the Program Study Area. As stated in the 2030 General Plan, many of the projects in **Table 5-2** would require above-ground facilities and the conversion of undeveloped land to developed, which could result in a substantial changes in the existing visual environment within the Program Study Area. Consistent with the findings of the 2030 General Plan EIR, compliance with General Plan policies and standards in conjunction with adopted City regulations would reduce project-level significant impacts, but when combined with the overall growth trends, such as those associated with build-out of the SUDP/SOI, the conversion from agricultural feel to a more urban environment could result in a cumulative significant and unavoidable aesthetic impact. However, given the pace and extent of planned development within the City within the last 20 to 30 years and the timeframe of 2030 General Plan, it is unlikely that there would be a significant conversion of agricultural lands to urban uses or substantial changes in visual profiles. Thus, the combined visual effects would not be cumulatively significant.

As such, when Program activities are added to the consideration of a potentially significant visual impact, the effects of the Program would have a very limited incremental contribution to the cumulative impacts

on aesthetic resources since the MMs described in Section 3.1, Aesthetic and Visual Resources, would restore disturbed areas (MM AES-1), set design parameters for above-ground facilities (MM AES-2), and minimize construction and operational lighting (MM AES-3). These measures would reduce any potential contribution from implementation of the Program to any potential significant cumulative aesthetic impacts. Therefore, consistent with the 2030 General Plan EIR analysis, the Program's incremental contribution to aesthetic impacts would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.2 Agriculture and Forestry Resources

The 2030 General Plan EIR found that the cumulative impact to agricultural resources from reasonable build-out within the SUDP/SOI would be cumulatively significant and that new development in conformance with the 2030 General Plan would contribute to these cumulatively significant impacts. For the Program, the geographic scope for potential cumulative impacts to agriculture and forestry resources would include the areas where Program components would be constructed and operated. As discussed in Section 3.2, Agriculture and Forestry Resources, implementation of the Program would occur within existing and proposed ROW and would not convert or conflict with these farmlands. All Program components would be consistent with existing agricultural uses and would not result in substantial conversion of agricultural lands. When the new development projects described in **Table 5-2** occur in combination with the Program, as described in the 2030 General Plan EIR, there would be a significant cumulative effect.

When Program activities are considered for their contribution to the cumulative impact, it is not considered significant because the Program's contribution would be within existing or future road ROWs and would not result in any substantial conversions of agricultural land. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Program's incremental contribution to agricultural impacts would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.3 Air Quality

The 2030 General Plan EIR found the cumulative impact to air quality resources from reasonable build-out within the SUDP/SOI to be cumulatively significant and unavoidable. When the Program's contribution to this impact is considered, the short-term construction-related and long-term operation-related (regional) emissions of ROG, oxides of nitrogen (NO_x), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) all factor into the Program's potential contribution to the cumulative impact. As described in Section 3.3, Air Quality, Ozone and PM_{10} have the potential for severe cumulative concentrations that could result in significant and unavoidable cumulative impacts.

For the evaluation of cumulative impacts, SJVAPCD recommends that lead agencies use the project-level significance standards to determine whether a project's construction or operational emissions of criteria pollutants would have a cumulatively considerable contribution to a significant cumulative impact. Based on this methodology and described in Section 3.3, Air Quality, the Project-level impact of construction emissions associated with construction and operation of the Program would not be cumulatively considerable after implementation of the dust reduction and ozone precursor limiting mitigation incorporated.

Other projects in the cumulative list would be required to analyze construction emissions in a similar manner and if determined emissions are below the thresholds, would also not be cumulatively considerable. If emissions are above the thresholds, then mitigation would be required to reduce potential cumulative impacts from construction emissions to a less than significant level and would be able to incorporate the 2030 General Plan's EIR's significant and unavoidable cumulative impact into their project. Therefore, while land use development in the Program Study Area and the overall air basin would result in a significant and unavoidable impacts, the Program's contribution would not be significant itself and would not result in a cumulatively considerable incremental increase to a cumulative impact related to air quality.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.4 Biological Resources

The 2030 General Plan EIR found the cumulative impact to biological resources from reasonable build-out within the SUDP/SOI cumulatively less than significant. The projects in **Table 5-2,** similar to the 2030 General Plan discussion, would have the potential to effect special status species within the Program Study Area that find habitat within the existing intensive urbanization and agricultural uses. As found in the 2030 General Plan EIR, compliance with General Plan policies and standards as well as agency-mandated surveys and project-level MMs would result in a less than significant cumulative impact to biological resources.

As described in Section 3.4, Biological Resources, the Program would avoid or mitigate impacts to sensitive biological resources through its placement in existing and proposed disturbed areas such as road ROWs, the use of trenchless technology for stream crossings, and implementation of MMs. Additionally, the avoidance and mitigation of potential impacts to special status species would not result in a significant contribution to any potential cumulative effect. Therefore, when combined, these projects would not result in a substantial cumulative impact to biological resources and the Program would not substantially contribute to an incremental cumulative impact related to biological resources.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.5 Cultural and Tribal Resources

The 2030 General Plan EIR found there was no cumulative impact to cultural resources from reasonable build-out within the SUDP/SOI. The projects in the cumulative list would have the potential to result in potentially significant impacts to cultural or tribal resources if any of the projects listed in **Table 5-2** would substantially disrupt or change the significance or importance of any cultural or tribal resources. The projects listed in **Table 5-2** would be located within fixed locations and would require environmental review and related identification of known cultural resources within their individual footprints. All of these sites would either be located in areas that do not contain significant cultural or tribal resources or would require mitigation to avoid any known resources. Additionally, as part of the stipulations of the permits required for these projects and provided through state and local requirements, any unknown cultural or tribal resources discovered onsite during construction of these projects would require evaluation and subsequent analysis if deemed necessary by an archaeologist, thus preventing any significant impacts to cultural or tribal resources.

As discussed in Section 3.5, Cultural and Tribal Cultural Resources, impacts from the Program would be less than significant with mitigation incorporated. Consistent with the 2030 General Plan EIR, the Program and other projects within the Program Study Area would comply with federal, state, and local laws and regulations protecting cultural resources, including historical resources, and as such, the Program's incremental effect to the combined cumulative effect would not be substantial. Therefore, the Program's incremental contribution to cumulative impacts would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.6 Geology, Soils, and Mineral Resources

The 2030 General Plan EIR found the cumulative impact to geology and soil resources from reasonable build-out within the SUDP/SOI to be cumulatively less than significant with no cumulative impact to mineral resources. For the Program, as described in Section 3.6, Geology, Soils, and Mineral Resources, construction would involve excavation and grading that would disturb soils and potentially expose them to erosion or topsoil loss.

When combined, projects in the cumulative list have the potential to result in cumulative impacts to geologic, soil, and seismic conditions if substantial erosion and overall lack of stability of soils occurs from combined actions. In particular, the projects listed in **Table 5-2** consist of commercial, residential, and infrastructure projects within the Program Study Area and areas immediately adjacent to it. Based on comparison of the project locations, none of the projects listed in **Table 5-2** would be located in geologic hazard zones or liquefaction, landslide, or MRZ. As such, consistent with the 2030 General Plan EIR, impacts associated with geology, soils and seismicity for related projects would not combine to create a greater impact.

The Program's incremental effect to the combined cumulative scenario is not substantial because the Program, along with other projects implemented under the 2030 General Plan and the projects in **Table 5-2**, would meet the policies of the 2030 General Plan along with compliance with federal, state,

and local regulations addressing building construction, engineering regulations, and permitting conditions that would restrict the Program's contribution to cumulative significance. These impacts would be site-specific, and when considered together with related projects, would not combine to create greater cumulative impacts due to geology, soils, seismicity, or paleontological resources. Therefore, the Program's incremental effect to cumulative geology and soils impacts would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.7 GHG and Energy Resources

Cumulative effects of GHG were addressed with the air quality evaluation of cumulative impacts in the 2030 General Plan EIR which found a significant an unavoidable impact to GHGs and looked at energy resources for the plans ability to irreversibly commit energy resources. Relevant to the Program, GHG and energy resources are global and in their very nature cumulative. As discussed in Section 3.7, GHG and Energy Resources, impacts would result in a less than significant impact with mitigation incorporated. Although the Program would involve the use of increased electricity and fuel during construction and operation, it is intended to improve or replace aging wastewater collection system infrastructure with newer, more efficient machinery that would provide reliable future wastewater infrastructure necessary to meet the projected growth of the City's SUDP/SOI service area. For the full analysis of cumulative impacts related to GHGs from the Program, see Section 3.7. The Program's incremental contribution to cumulative GHG and energy impacts would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.8 Hazards, Hazardous Materials, and Wildfire

The 2030 General Plan EIR found the cumulative impact to hazards and hazardous material resources from reasonable build-out within the SUDP/SOI cumulatively less than significant. As the 2030 General Plan evaluated, local, region, state, and federal regulations and policies of the 2030 General Plan would limit the potential cumulative impacts by limiting the risk of exposure to hazardous materials, wastes, safety hazards near airports and airstrips, and wildland fires. When combined, projects in **Table 5-2** have the potential to generate hazards and hazardous materials or place people at risk from them as identified in Section 3.8, Hazards and Hazardous Materials and Wildfire, this temporary risk of increase in short-duration hazards transport in compliance with governing laws and regulations and MMs, the combined impacts to hazards and hazardous materials within the geographic scope would not be cumulatively significant.

The Program's incremental effect to the combined cumulative impact is also not substantial because the Program would not result in substantial impacts and would not contribute to the worsening of impacts caused overall because of the implementation of the project-level mitigation and compliance with regulations incorporated. Therefore, when considered in addition to the anticipated impacts of other

projects and evaluation of cumulative impacts in the 2030 General Plan EIR, the Program's incremental contribution to cumulative hazards and hazardous material impacts would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.9 Hydrology and Water Quality

The 2030 General Plan EIR found the cumulative impact to hydrology and water quality resources from reasonable build-out within the SUDP/SOI cumulatively less than significant for hydrology, water quality, and flooding, but cumulatively significant for groundwater. When combined, projects listed in **Table 5-2** have the potential to affect surface and groundwater hydrology and water quality within the watershed and groundwater basin. Construction and operation of these projects could introduce sediment and other pollutants to surface waters or groundwater and could impact water quality or disrupt the existing drainage and flood patterns, causing damage to structures or people. These projects, along with projects under the 2030 General Plan, would be required to comply with local and state regulations, such as the SWPPP and BMP to regulate water quality and drainage patterns such that receiving water bodies are not impaired. As a result of adherence to these regulations, the combined effects from the construction and operation-related to water quality and surface water drainage would not be considered cumulatively significant.

As described in the 2030 General Plan EIR, groundwater depletion and recharge have the potential for overdraft if not properly managed, resulting in the potential for a significant cumulative impact. With the passage of the SGMA since certification of the 2030 General Plan EIR, local agencies are addressing this cumulative impact through GSPs. These plans, in conjunction with the implementation of project-specific MMs, would help reduce the impacts within the Program Study Area to less-than-cumulatively significant.

The Program's incremental effect to these combined effects is not substantial because the Program would also implement mitigation that would reduce any potential project or cumulative effect to a less than significant level. Additionally, compliance with applicable federal, state, and local regulations described in Section 3.9, Hydrology and Water Quality, would reduce the likelihood of impacts to water quality, drainage, and groundwater management. Therefore, the Program's incremental effect to cumulative hydrology and water quality impacts would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.10 Land Use and Planning

The 2030 General Plan EIR found that there would be no cumulative impact to land use and planning resources from reasonable build-out within the SUDP/SOI. For the Program, impacts involving land use plans or policies and zoning generally would not combine to result in cumulative impacts. The determination of significance for impacts related to these issues as considered in Appendix G of the

CEQA Guidelines is whether a project would conflict with any applicable land use plan or policy adopted for the purpose of reducing or avoiding environmental impacts. Such a conflict is site-specific and is addressed on a project-by-project basis. As described in Section 3.10, Land Use and Planning, implementing the Program is consistent with the existing land use designation and zoning, and land use plans and policies and would not result in a significant impact. The Program is also consistent with the 2030 General Plan, and components under the Program would be developed as needed, consistent with approved land use plans, policies, and zoning. Therefore, the Program would not contribute to any incremental cumulative impacts regarding this issue.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.11 Noise

The 2030 General Plan EIR found the cumulative impact to noise resources from reasonable build-out within the SUDP/SOI to be less than significant. When combined with the projects listed in **Table 5-2,** there is the potential for the Program to result in substantial increases in noise or vibration levels beyond acceptable levels defined by the 2030 General Plan and Merced County Noise Ordinance if multiple noise sources were occurring at the same time. The City would have discretion with approvals of projects that could cumulatively generate noise, and the 2030 General Plan Noise Element has several specific development policies and standards to minimize and mitigate noise impacts. Specifically, the development projects and some of the transportation projects listed in **Table 5-2** would result in increases in operational noise or vibration, which could result in a cumulatively considerable effect if appropriate design measures and construction noise reduction measures are not taken. Prior to issuance of any building permits for these projects, environmental reviews would be required to determine construction and operational noise levels for nearby sensitive receptors. Permanent or temporary noise and vibration measures (e.g., sound barriers) could be required. All of the projects would be required to show compliance with the 2030 General Plan policies and to ensure combability with surrounding land uses.

The Program's incremental effect to the combined cumulative scenario is not substantial because the Program construction activities would adhere to the existing policy's noise regulations and would implement MMs, which would reduce impacts from construction-related noise and vibration to a less than significant level. Further, as described in Section 3.11, Noise and Vibration, because construction of the Program includes largely linear activities and activities away from receptors in rural areas, no single sensitive receptor would be substantially affected by construction noise for extended periods of time. It is unlikely that noise impacts as a result of Program construction activities would occur. Therefore, the Program would not contribute to substantial incremental cumulative impacts related to construction noise or vibration.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.12 Population and Housing

The 2030 General Plan EIR found there would be no contribution to cumulative impacts to population and housing from reasonable build-out within the SUDP/SOI. The 2030 General Plan sets forth policies that control and direct growth in a well-planned manner, which would improve jobs and housing opportunities and as a result would not have the potential to result in a significant cumulative impact. The Program would not involve construction or operation of any new residential or commercial uses that would increase population or necessitate the need for housing. The increase in capacity of the wastewater collection system was analyzed based on reasonable build-out identified in the 2030 General Plan and thus would not cumulatively contribute to any effect. Therefore, the Program would not contribute to any incremental cumulative effects related to population and housing.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.13 Public Services and Utilities

The 2030 General Plan EIR found the cumulative impact to public services from reasonable build-out within the SUDP/SOI to be less than significant, and the 2030 General Pan would not contribute to a significant cumulative impact. The Program would not involve construction or operation of any new residential or commercial uses that would require increased fire or police protection, new parks or schools, or increased demand for wastewater, water, or other public services or utilities. Consistent with the 2030 General Plan, the Program proposes conveyance and treatment wastewater facilities. Therefore, the Program would not contribute to any incremental cumulative effects related to these resources.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.14 Recreation

The 2030 General Plan EIR found there would be no contribution to cumulative impacts to recreation from reasonable build-out within the SUDP/SOI. The Program would not involve the construction or operation of any new parks, or demolition or removal of any existing parks. Therefore, it would not contribute to any substantial cumulative effects related these resources. No impact would occur.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

5.4.4.15 Transportation

The 2030 General Plan EIR found there would be a cumulatively considerable impact to transportation and traffic from reasonable build-out within the SUDP/SOI. Senate Bill 375 was passed after the General

Plan EIR was published, however as discussed in Section 3.15, Transportation and Traffic, construction would result in a temporary increase of vehicle trips, however these trips are short in duration and temporary in nature. The projects identified in **Table 5-2** likely have the potential to contribute to the cumulatively considerable impacts identified in the 2030 General Plan; however, the Program's contribution to this impact is not considerable because transportation impacts related to the Program are primarily limited to construction activities, which are temporary and apply project-based MMs as well as comply with local regulations and the 2030 General Plan Circulation element.

Future development in the area would be subject to additional environmental review and determination by the City for potential cumulative impacts related to transportation. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Program's incremental contribution to traffic and transportation would not be cumulatively considerable.

Cumulative MMs: None Required

Cumulatively Considerable Impact? No

6.0 LIST OF PREPARERS

As required by the CEQA, this chapter identifies the preparers of this EIR.

Table 6.1: Draft EIR Preparers and Reviewers

City Staff		
Ken Elwin		
Kim Espinosa		
Scott McBride		
Consultant Staff		
CEQA Section	Authors	Technical Reviewer
Executive Summary/Introduction	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Project Description	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Aesthetics	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Agricultural and Forestry Resources	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Air Quality	Zoryana Pope, Kaitlyn Heck, Shea Briette	Heather Waldrop, Sarah Spann
Biological Resources	Emily Eppinger, Meghan Oats, Lisel Ballmer	Heather Waldrop, Sarah Spann
Cultural Resources and Tribal Cultural Resources	Lora Holland, Rebecca Riggs, Jenna Santy	Heather Waldrop, Sarah Spann
Geology, Soils, and Minerals	Morgan Kennedy, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
GHG and Energy Resources	Zoryana Pope, Kaitlyn Heck, Shea Briette	Heather Waldrop, Sarah Spann
Hazards and Hazardous Materials	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Hydrology and Water Quality	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Land Use and Planning	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Noise and Vibration	Zoryana Pope, Michael Barrientez, Owen Green, Lisel Ballmer	Heather Waldrop, Sarah Spann
Population and Housing	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann

Public Services and Utilities	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Recreation	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Transportation and Traffic	Zoryana Pope, Michael Barrientez, Lisel Ballmer	Heather Waldrop, Sarah Spann
Alternatives	Zoryana Pope, Lisel Ballmer	Heather Waldrop, Sarah Spann
Cumulative/other considerations	Zoryana Pope, Lisel Ballmer	Heather Waldrop, Sarah Spann
Acronym List/Distribution List	Zoryana Pope, Lisel Ballmer	Heather Waldrop, Sarah Spann
Literature Cited	Zoryana Pope, Lisel Ballmer	Heather Waldrop, Sarah Spann
Technical Editing	Tina Davis	
Document PM and QA/QC	Sarah Spann, PM; Brianna Pilkington, QA/QC	
Formatting	Tina Davis	
Cover Graphic Arts CD Labels Figures	Mike Maddux, Robert Hunter	

The following includes the title and qualifications of each preparer and/or reviewer:

Table 6.2: Preparer's Qualifications

Name	Expertise and Education
Consultant Staff	
Heather Waldrop	Project Manager, Principal Environmental Planner, BS, Environmental Studies
Sarah Spann	Project Manager, Principal Environmental Planner BS, Forestry and Natural Resources Management
Zoryana Pope	Environmental Planner BS, Environmental Protection and Management
Michael Barrientez	Environmental Planner BS, Environmental Science
Lisel Ballmer	Environmental Scientist MS, Environmental Sciences and Management; BS, Environmental Management and Protection
Kaitlyn Heck	Air Quality Specialist BS, Environmental Science
Shea Briette	Air Quality and Climate Change Specialist BS, Environmental Science
Emily Eppinger	Wildlife Biologist BS, Wildlife Management; GIS Certificate
Meghan Oats	Environmental Scientist, Botanist BS, Biology and Environmental Science
Lora Holland	Senior Associate Archaeologist

Name	Expertise and Education
Consultant Staff	
	MA, Anthropology; BA, History
Rebecca Riggs	Senior Associate and Architectural Historian MA, Public History; BA, History
Jenna Santy	Archaeologist Ph.D, Anthropology; MA, Anthropology; BA, Anthropology; BA, Art History
Morgan Kennedy	Wetlands Scientist BS, Geography
Owen Green	Acoustics Technician BS, Mechanical Engineering
Tracie Ferguson	Senior Acoustics Associate MS, Acoustics; BA, Music
Mike Maddux	Technical Illustrator GIS/CAD/Graphics Specialist BS, Graphic Design
Robert Hunter	GIS Analyst AS, Geographic Information Systems/Global Positioning Systems

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Please refer to Appendix D for the Stantec 2024 Archaeological Resources Study Report and Historical Resources Technical Report.

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APPENDICES

Appendix A NOTICE OF PREPARATION

City of Merced

Notice of Preparation of a Draft Environmental Impact Report

Date: June 26, 2018

Project Title: City of Merced Sewer Master Plan Update

To: Responsible Agencies, Organizations, and Interested Parties

Lead Agency: City of Merced City Council
678 W 18th St
Merced, CA 95340
(209) 385-6800

Contact: Ken Elwin, PE, Public Works Director, City of Merced

INTRODUCTION

The City of Merced (City) will prepare an Environmental Impact Report (EIR) that addresses the potential impacts of implementing the proposed Updated Wastewater Collection System (WCS) Master Plan (Master Plan or proposed Project) to address key wastewater infrastructure needs within the City. Your input is requested in the form of written comments regarding the scope of the EIR including potential environmental impacts and alternatives to be considered.

The EIR is being prepared in compliance with the California Environmental Quality Act (CEQA). Under CEQA, upon deciding to prepare and EIR, the City, as lead agency, must issue a Notice of Preparation (NOP) to inform trustee agencies, the public, and responsible agencies of the decision. Accordingly, the purpose of this NOP is to provide information describing the Master Plan including associated potential environmental effects to those in the public who may wish to comment regarding the scope and content of the information to be included in the EIR. Agencies should comment on such information as is related to their statutory responsibilities in connection with the Master Plan.

The EIR will provide an evaluation of potential environmental impacts associated with implementation of the Master Plan at a project- and program-level where appropriate. The Master Plan location, description, and environmental resource areas that may be affected by development of the Master Plan are described below. The EIR will evaluate potentially significant environmental impacts of the Master Plan, on both a direct and indirect, and cumulative basis; identify mitigation measures that may be feasible to lessen or avoid such impacts; and identify alternatives that may lessen one or more potentially significant impact to the Master Plan.

PROJECT LOCATION/SETTING

Figure 1, Project Vicinity, shows the setting of the proposed Project area in the Merced County region. The proposed Project is located entirely within the boundaries shown in the City's *Merced Vision 2030 General Plan*, including the University of California at Merced (UC Merced) campus and additional community planning areas (Figure 2). This area includes the area within existing City limits, as well as the authorized sphere-of-influence (SOI) for the City, as recognized by the Merced County Local Agency Formation Commission (LAFCo).

PROJECT DESCRIPTION

Development of the WCS Master Plan has been an iterative process from 2002 to 2017 to evaluate and assess function, expansion, and replacement of the wastewater collection system within the City to accommodate existing and future development. Wastewater generated within the City is collected in a series of pipelines which the City owns, operates, and maintains. The system includes over 400 miles of gravity sewers which collect wastewater from a majority of residential users, as well as, commercial users, industrial users, and public uses.

The current Master Plan identifies potential capacity constraints within the existing sewer system, assesses the future demand for these services, and develops recommendations for short- and long-term Capital Improvement Projects (CIP) to address the identified issues needed to serve the anticipated future capacity. During preparation of the Master Plan the City attempted to minimize impacts to the four natural streams that flow through the City: Fahrens Creek, Black Rascal Creek, Cottonwood Creek and Bear Creek, while working to maximize gravity flow of the sewer system to reduce energy and pump station costs.

This most recent draft Master Plan, released in December 2017, incorporated elements from other planning documents that have been developed, including the *Merced Vision 2030 General Plan* and the University of California (UC) Merced 2020 Project Addendum Long Range Development EIS/EIR. These planning documents, combined with the Master Plan, have led to the identification of Alternative Plan A as the preferred alternative to address the long-range sewer system planning needs for the City.

PROJECT ELEMENTS

The purpose of the Master Plan is to:

1. Update land use and wastewater flows accommodating the *Merced Vision 2030 General Plan*;
2. Assess the available capacity of the City's major sewers;
3. Determine the best means to sewer the build-out of the *Merced Vision 2030 General Plan* SUDP;
4. Develop an interim service plan and CIP for City growth; and
5. Establish a sewer repair and replacement program.

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City of Merced
Wastewater Collection System Master Plan
Environmental Impact Report

Figure 1
Project Vicinity

V:\1840\active\184030360 - City of Merced Master Plan\drawing\graphics\oct_2016\merc_eir_proposed_project.ai mlm 5-25-2018

N

0 0.2 0.4 0.6 0.8 1.0
APPROXIMATE SCALE IN MILES

Stantec

FAHRENS CREEK
59
W BELLEVUE RD
E BELLEVUE RD
'G' ST
UC MERCED CAMPUS
Bellevue-1: 24 in ø
Bellevue-1A2: 27 in ø
18271-2: 24 in ø
G STREET TRUNK
E CARDELLA RD
W.G: 54 in ø
W.F: 48 in ø
W.E: 42 in ø
W.D: 42 in ø
W.C: 27 in ø
W.B: 24 in ø
W.A: 24 in ø
PS
LAKE RD
W.H: 54 in ø
21 in ø
W YOSEMITE AVE
MCKEE RD
BLACK RASCAL CREEK
HIGHWAY 59 PUMP STATION
W OLIVE DR
E OLIVE DR
99
WESTERN INDUSTRIAL PARK
BEAR CREEK
E SANTA FE DR
KIBBY RD
DEDICATED HIGH STRENGTH/HIGH VOLUME INDUSTRIAL WASTE LINE
30 in ø
WEST AVE TRUNK
WEST AVE
140
E.D: 18 in ø
MERCED MUNICIPAL AIRPORT
E CHILDS RD
W.I: 60 in ø
S THORNTON RD
E GERARD AVE
E.E: 21 in ø
48-INCH INTERCEPTOR
GERARD TRUNK
E MISSION AVE
E.H: 36 in ø
E.G: 36 in ø
E.F: 27 in ø
HARTLEY SLOUGH
MILES CREEK
COVE RD
W.J: 60 in ø
E.I: 36 in ø
59
99
OWENS CREEK
E.J: 36 in ø
W REILLY RD
REILLY RD
E.K: 36 in ø
E.L: 36 in ø
E.M: 36 in ø
CITY OF MERCED WWTRF

LEGEND

- FORCEMAINS
- PS LIFT STATIONS
- PROPOSED UPGRADES
- EXISTING CITY LIMITS
- MERCED VISION 2030 GP SUDP BOUNDARY
- PARCELS IDENTIFIED IN EITHER NMSD OR TSAM
- SUDP BUILDOUT SEWERSHED
- EXISTING SEWER SYSTEM
- CREEKS

City of Merced
Wastewater Collection System Master Plan
Environmental Impact Report

Figure 2
Proposed Project

ENVIRONMENTAL EFFECTS AND SCOPE OF THE EIR

The EIR will analyze potentially significant impacts that result from construction and operation of the Master Plan. Pursuant to section 15063(a) of the CEQA Guidelines, the EIR will evaluate the full range of environmental issues contemplated for consideration under CEQA statute and the CEQA Guidelines including:

- Aesthetics and Visual Resources
- Agriculture and Forestry Resources
- Air Quality and Greenhouse Gases
- Biological Resources
- Cultural and Tribal Resources
- Energy Resources
- Geology, Soils, and Mineral Resources
- Hazards, Hazardous Materials, and Wildfires
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services and Utilities
- Recreation
- Transportation and Traffic

Potential environmental impacts associated with implementation of the Master Plan are anticipated to be analyzed at project-level where feasible and a program-level for all other considerations. Preliminary screenings indicate that any potential adverse effects can be avoided, redesigned, minimized and/or mitigated through the development of alternatives or adoption of appropriate mitigation measures. The EIR will consider a range of potential temporary construction-period impacts, permanent impacts, and cumulative impacts.

SUBMITTING COMMENTS

Comments and suggestions as to the appropriate scope of analysis in the EIR are invited from all interested parties. Written comments or questions concerning the EIR for the WCS Master Plan should be directed to the City's public works director at the following address by **5:00 PM on July 26, 2018**.

Ken Elwin, PE, City of Merced Public Works Director
678 W 18th Street
Merced, CA 95340
E-mail: elwink@cityofmerced.org

All comments should please include the name, email address, phone number, and mailing address of the contact person submitting the written response. In the event no response or request for additional time is received by any responsible agency or trustee agency by the end of the review period on **July 26, 2018**, the City may presume that the responsible agency or trustee agency has no response.

SCOPING MEETING

A public scoping meeting will be held to receive comments on environmental issues that should be addressed in the Draft EIR as well as the range of practicable alternatives to be evaluated in the Draft EIR. The address, date, and time of this meeting are as follows:

Date: **Tuesday, July 10, 2018**
Time: **5:00 – 8:00 pm**
Place: City of Merced City Council Chambers
678 W. 18th Street
Merced, CA 39540

Appendix B AIR QUALITY

B.1 AIR QUALITY AND GREENHOUSE GAS EMISSIONS MODELING ASSUMPTIONS FOR THE CITY OF MERCED WASTEWATER COLLECTION SYSTEM MASTER PLAN UPDATE

Stantec

Technical Memorandum

To:	City of Merced 1776 Grogan Avenue Merced, CA 95340	From:	Briette Shea, Air Quality and Climate Change Consultant Stantec – Sacramento
Project:	City of Merced Wastewater Collection System Master Plan Update Project	Date:	August 26, 2024

Reference: Air Quality and Greenhouse Gas Emissions Modeling Assumptions for the City of Merced Wastewater Collection System Master Plan Update Project

PURPOSE

The intent of this Technical Memorandum (Memo) is to document the assumptions and estimates applied in the air quality and greenhouse gas (GHG) emissions modeling conducted to evaluate the City of Merced 2022 Wastewater Collection System Master Plan (2022 WCSMP). The information contained in this Memo supports the analysis and conclusions presented in Section 3.3, Air Quality, and Section 3.7, Greenhouse Gases and Energy Resources, of the Environmental Impact Report for the 2022 WCSMP.

MODELING APPROACH

The 2022 WCSMP update sets forth a strategy to meet both interim and build-out wastewater collection system needs that are consistent with the City's 2030 General Plan. The four following specific components identified in the 2022 WCSMP were modeled:

1. Interim System Improvements (Capital Improvement Projects [CIPs] 1-6)
    - CIP 1: Bellevue Ranch Pump Station (BRPS) Discharge
    - CIP 2: Parallel Sewer and Bear Creek Crossing
    - CIPs 3 and 4: Replace 48-inch Interceptor and West Avenue Sewer
    - CIP 5: Yosemite Sewer Extension
    - CIP 6: Parallel G Street Sewer
2. North Merced Major Sewer Improvements
    - Highway 59 Pump Station (H59PS) Expansion and Force Main
    - South Highway 59 Trunk
    - West Cardella Trunk

- East Cardella Trunk
- G Street Extension 1
- G Street Extension 2

3. South Merced Major Sewer Improvements
    - South Mission Trunk
    - Gerard Relief Sewer
    - Gove Road Sewer
    - Thornton Road Sewer 1
4. City of Merced WWTF Expansion Projects (3- to 4-Mgal/d)

Emissions were estimated using the California Emissions Estimator Model (CalEEMod) Version 2022.1.1.6 within four separate models (one model per project component). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. CalEEMod quantifies direct GHG emissions, such as construction and operational activities and vehicle use, and indirect emissions, such as energy use, solid waste disposal, vegetation planting and/or removal, and water use.

The Program is located within the of the San Joaquin Valley Air Basin governed by the San Joaquin Valley Air Pollution Control District (SJVAPCD). Modeled emissions were compared to SJVAPCD's adopted thresholds of significance.

MODELING ASSUMPTIONS

The following assumptions were used as inputs into CalEEMod to quantify air quality and GHG emissions.

Construction Assumptions

Construction Footprint Assumptions

For each model run, the estimated disturbance footprint was estimated by multiplying the length of the new sewer segment by the diameter of the sewer pipe plus a 1-foot buffer. The hauling volumes were estimated by calculating the volume of material that would be exported to accommodate the installation of each pipeline segment, based on the segment length and pipeline radius.

The Interim System Improvements would require soil export for each CIP. Table 1, below, presents the estimated disturbance footprint and hauling volume for the Interim System Improvements. For CIPs 3 and 4, it was assumed that soil would only be exported to account for the expansion of the pipeline diameter.

Reference: Air Quality and Greenhouse Gas Emissions Modeling Assumptions for the City of Merced Wastewater Collection System Master Plan Update Project

Table 1. Interim System Improvements, Footprint and Export Assumptions

CIP	Notes	Estimated Disturbance Footprint (acres)	Estimated Soil Export (CY)
CIP 1: BRPS Discharge and Fahrens Creek Crossing	• No construction	N/A	N/A
CIP 2: Parallel Sewer and Bear Creek Crossing	• Project will construct approximately 1.2 miles of new 48-inch-diameter sewer.	0.73	2,959
CIPs 3 and 4: Replace 48-inch Interceptor and West Avenue Sewer	• Removal and replacement of the existing 48-inch interceptor and 42-inch trunk sewer in West Avenue, downstream of the connection point of CIP 2 and extending to the WWTF. • Project will construct approximately 3.1 miles of 60-inch sewer.	2.25	6,071
CIP 5: Yosemite Sewer Extension and Fahrens Creek Crossing	• Project will construct approximately 1.5 miles of 27-inch sewer.	0.59	1,166
CIP 6: Parallel G Street Sewer and Cottonwood Creek Crossing	• Project will construct approximately 1.5 miles of 27-inch sewer.	0.59	1,166
	Totals	*4.16*	*11,362*

The North Merced Major Sewer Improvements would include a total of 7.4 miles of pipeline installation/improvements, with a maximum pipe diameter of 48 inches, resulting in a disturbance footprint of approximately 4.5 acres and soil export volume of approximately 18,185 CY. In addition, to account for the expansion or replacement of H59PS, a new 2,000-square-foot structure was assumed in the model.

The South Merced Major Sewer Improvements would include a total of 5.8 miles of pipeline installation/improvements, with a maximum pipe diameter of 30 inches, resulting in a disturbance footprint of approximately 2.5 acres and soil export volume of approximately 5,568 CY.

For the City of Merced WWTF Expansion Projects, the disturbance footprint was assumed to be 22.5 acres and the building square footage was set to 50,000 square feet.

Construction Schedule

Construction of the Program would generally occur as development occurs in accordance with the 2030 General Plan. However, for this analysis, conservative estimates were used to consider construction activities. In general, construction would occur between 7 a.m. and 8 p.m., Monday through Friday. It is expected that the Interim System Improvements (CIPs 1–6) would be installed first, followed by the North Merced and South Merced Major Sewer Improvements projects, with associated infrastructure and smaller collectors and laterals developed as needed. Tables 2 through 5 provide the estimated construction schedule for each modeled activity.

Reference: **Air Quality and Greenhouse Gas Emissions Modeling Assumptions for the City of Merced Wastewater Collection System Master Plan Update Project**

Table 2. Interim System Improvements, Estimated Construction Activity Schedule

Construction Phase	Start Date	End Date	Phase Duration (Working Days)
Site Preparation/Grading	1/1/2026	4/30/2026	86
Pipeline Construction	5/1/2026	4/19/2027	252
Paving	4/20/2027	7/7/2027	57

Note: As described in the Project Description, each CIP within the Interim System Improvements is estimated to take approximately 18 months (395 workdays). This analysis conservatively assumes that all components are built during the same timeframe.

Table 3. North Merced Major Sewer Improvements, Estimated Construction Activity Schedule

Construction Phase	Start Date	End Date	Phase Duration (Working Days)
Site Preparation/Grading	7/8/2027	9/29/2027	60
Pipeline Construction	9/30/2027	8/29/2029	500
Paving	8/30/2029	9/19/2029	15
Architectural Coating	9/20/2029	10/31/2029	30

Table 4. South Merced Major Sewer Improvements, Estimated Construction Activity Schedule

Construction Phase	Start Date	End Date	Phase Duration (Working Days)
Site Preparation/Grading	7/8/2027	9/29/2027	60
Pipeline Construction	9/30/2027	1/3/2029	330
Paving	1/4/2029	1/24/2029	15

Table 5. City of Merced WWTF Expansion Improvements, Estimated Construction Activity Schedule

Construction Phase	Start Date	End Date	Phase Duration (Working Days)
Site Preparation/Grading	1/1/2026	5/6/2026	90
Facility Construction	5/7/2026	5/11/2027	264
Paving	5/12/2027	8/3/2027	60
Architectural Coating	8/4/2027	10/26/2027	60

For the purpose of the air quality modeling, construction of all components in the same timeframe would result in the most conservative (worst case) scenario for air quality emissions. It is likely that construction of individual components would not happen concurrently, but to achieve disclosure of the most significant potential impact that could occur, model inputs were set up to assume all activities would occur simultaneously. If individual projects are undertaken in a step-wise manner, Program and proposed Project construction emissions would be less than those modeled because the emissions would be spread out over time instead of occurring all at once.

Reference: **Air Quality and Greenhouse Gas Emissions Modeling Assumptions for the City of Merced Wastewater Collection System Master Plan Update Project**

Off-Road Equipment

The construction equipment lists for typical types of projects associated with the Program are provided in Tables 6 through 9. The construction fleet is based on CalEEMod default values for the disturbance area, and is often overestimated to produce conservative model results. Pipeline construction was conservatively assumed to require welding, but may equipment needs may vary based on pipe material selection. Additionally, the pipeline construction phase included generator sets to represent pumps for dewatering.

Table 6. Interim System Improvements, Construction Equipment Assumptions

Construction Stage	Equipment	Unit Amount	Hours Per Day	Horsepower	Load Factor
Site Preparation / Grading	Rubber Tired Dozers	1	8	367	0.40
	Tractors/Loaders/Backhoes	3	8	84	0.37
	Excavators	1	8	36	0.38
	Graders	1	8	148	0.38
	Trenchers	2	8	40	0.50
Pipeline Construction	Cranes	1	7	367	0.29
	Forklifts	3	8	82	0.20
	Generator Sets	1	8	14	0.74
	Tractors/Loaders/Backhoes	3	7	84	0.37
	Welders	2	8	46	0.45
Paving	Pavers	1	8	81	0.42
	Paving Equipment	2	6	89	0.36
	Rollers	2	6	36	0.38
	Cement and Mortar Mixers	2	6	10	0.56
	Tractors/Loaders/Backhoes	1	8	84	0.37

Table 7. North Merced Major Sewer Improvements, Construction Equipment Assumptions

Construction Stage	Equipment	Unit Amount	Hours Per Day	Horsepower	Load Factor
Site Preparation / Grading	Rubber Tired Dozers	1	8	367	0.40
	Tractors/Loaders/Backhoes	3	8	84	0.37
	Excavators	1	8	36	0.38
	Trenchers	2	8	40	0.50
	Graders	1	8	148	0.41
Pipeline Construction	Cranes	1	1	367	0.29
	Forklifts	1	5	82	0.2

Reference: **Air Quality and Greenhouse Gas Emissions Modeling Assumptions for the City of Merced Wastewater Collection System Master Plan Update Project**

Construction Stage	Equipment	Unit Amount	Hours Per Day	Horsepower	Load Factor
	Generator Sets	1	8	14	0.74
	Tractors/Loaders/Backhoes	3	4	84	0.37
	Welders	2	8	46	0.45
Paving	Pavers	1	8	81	0.42
	Cement and Mortar Mixers	2	6	10	0.56
	Paving Equipment	2	7	89	0.36
	Rollers	2	7	36	0.38
Architectural Coating	Air Compressors	1	6	37	0.48

Table 8. South Merced Major Sewer Improvements, Construction Equipment Assumptions

Construction Stage	Equipment	Unit Amount	Hours Per Day	Horsepower	Load Factor
Site Preparation / Grading	Rubber Tired Dozers	1	8	367	0.40
	Tractors/Loaders/Backhoes	3	8	84	0.37
	Excavators	1	8	36	0.38
	Trenchers	2	8	40	0.50
	Graders	1	8	148	0.41
Pipeline Construction	Cranes	1	1	367	0.29
	Forklifts	1	5	82	0.2
	Generator Sets	1	8	14	0.74
	Tractors/Loaders/Backhoes	3	4	84	0.37
	Welders	2	8	46	0.45
Paving	Pavers	1	8	81	0.42
	Cement and Mortar Mixers	2	6	10	0.56
	Paving Equipment	2	7	89	0.36
	Rollers	2	7	36	0.38

Table 9. City of Merced WWTF Expansion Projects, Construction Equipment Assumptions

Construction Stage	Equipment	Unit Amount	Hours Per Day	Horsepower	Load Factor
Site Preparation / Grading	Rubber Tired Dozers	1	2	367	0.4
	Tractors/Loaders/Backhoes	3	2	84	0.37
	Scraper	2	1	423	0.48
	Excavators	3	2	36	0.38
	Graders	1	2	148	0.41
Facility Construction	Cranes	1	1	367	0.29
	Forklifts	2	1	82	0.20
	Generator Sets	1	8	14	0.74
	Tractors/Loaders/Backhoes	2	2	84	0.37
	Welders	1	1	46	0.45
Paving	Pavers	1	4	81	0.42
	Paving Equipment	4	4	89	0.36
	Rollers	2	4	36	0.38
Architectural Coating	Air Compressors	4	4	37	0.48

On-Road Vehicle Trips

On-road construction emissions are caused by motor vehicle exhaust from delivery vehicles, worker traffic, and road dust (PM_{10}). Tables 10 through 13 provide a summary of the estimated construction-related on-road vehicle trips.

The fleet mix for worker trips is light-duty passenger vehicles to light-duty trucks (LDA, LDT1, and LDT2). The vendor trips fleet mix is composed of a mixture of medium and heavy-duty diesel trucks (MHDT and HHDT). The hauling trips are assumed to be 100 percent heavy-duty diesel truck (HHDT) trips.[1] Based on CalEEMod default values for the Program area, the trip lengths were assumed to be 10.85 miles one-way for worker trips, 8.27 miles one-way for vendor trips, and 20.00 miles one-way for haul truck trips.

[1] These estimates are provided for conservative air quality modeling purposes, and may differ from what is included for traffic impacts in the Draft EIR.

Reference: **Air Quality and Greenhouse Gas Emissions Modeling Assumptions for the City of Merced Wastewater Collection System Master Plan Update Project**

Table 10. Interim System Improvements, Construction Vehicle Assumptions

Construction Phase	Worker Trips/Day	Vendor Trips/Day	Haul Trips/Day
Site Preparation / Grading	20	5	17
Pipeline Construction	50	60	0
Paving	20	5	0

Table11. North Merced Major Sewer Improvements, Construction Vehicle Assumptions

Construction Phase	Worker Trips/Day	Vendor Trips/Day	Haul Trips/Day
Site Preparation / Grading	20	5	38
Pipeline Construction	50	60	0
Paving	18	5	0
Architectural Coating	5	0	0

Table12. South Merced Major Sewer Improvements, Construction Vehicle Assumptions

Construction Phase	Worker Trips/Day	Vendor Trips/Day	Haul Trips/Day
Site Preparation / Grading	20	5	12
Pipeline Construction	50	60	0
Paving	18	5	0

Table13. City of Merced WWTF Expansion Project, Construction Vehicle Assumptions

Construction Phase	Worker Trips/Day	Vendor Trips/Day	Haul Trips/Day
Site Preparation / Grading	15	5	0
Facility Construction	50	60	2
Paving	10	5	0
Architectural Coating	5	0	0

Operational Modeling Assumptions

Operational emissions are those emissions that occur during operation of the Program. The only substantial new sources of operational air quality emissions associated with operation of the Program would be potential increased truck trips associated with solids handling and disposal from the WWTF and occasional worker trips associated with maintenance and upkeep of the Program components throughout the City. Maintenance and additional worker trips would equate to approximately 10 additional trips per year which would result in a negligible amount of annual emissions and, as a result, are not included in the model.

The increase in truck trips for the biosolids could reach a maximum of 621 truck trips per year, approximately 2 additional trips per day as compared to existing conditions if all biosolids would require hauling offsite to a disposal facility. The trip length was assumed to be 22 miles, which is the distance to the

Reference: Air Quality and Greenhouse Gas Emissions Modeling Assumptions for the City of Merced Wastewater Collection System Master Plan Update Project

Synagro Central Valley Compost Facility, and the fleet was assumed to be 100 percent HHDT. In addition, during pump station operations, a backup generator would be installed. The model included installation of a 600-horsepower emergency generator that was assumed to operate for up to 100 hours per year for routine maintenance and inspections. Operational emissions were estimated using CalEEMod and were included in the City of Merced WWTF Expansion Projects model run.

Regards,

STANTEC CONSULTING SERVICES INC.

Briette Shea
Air Quality and Climate Change Consultant
Phone: (916) 716-4110
briette.shea@stantec.com

Attachment A: CalEEMod Results

Attachment A

CalEEMod Results

B.2 2022 WCSMP- NORTH MERCED MAJOR SEWER IMPROVEMENT DETAILED REPORT

2022 WCSMP - North Merced Major Sewer Improvement Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	2022 WCSMP - North Merced Major Sewer Improvement
Construction Start Date	7/8/2027
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	23.4
Location	37.30190428288776, -120.48696695622269
County	Merced
City	Merced
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2303
EDFZ	14
Electric Utility	Merced Irrigation District
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.26

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	2.00	1000sqft	4.50	2,000	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.46	2.06	19.8	21.9	0.05	0.74	7.99	8.73	0.68	3.67	4.35	—	6,170	6,170	0.17	0.45	6.50	6,314
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.08	0.91	7.80	10.4	0.02	0.19	0.80	0.99	0.18	0.20	0.38	—	3,036	3,036	0.08	0.24	0.13	3,111
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.75	0.63	5.35	7.35	0.02	0.16	1.46	1.61	0.14	0.64	0.78	—	2,150	2,150	0.05	0.17	1.35	2,203
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.14	0.11	0.98	1.34	< 0.005	0.03	0.27	0.29	0.03	0.12	0.14	—	356	356	0.01	0.03	0.22	365

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	2.46	2.06	19.8	21.9	0.05	0.74	7.99	8.73	0.68	3.67	4.35	—	6,170	6,170	0.17	0.45	6.50	6,314

2028	1.07	0.90	7.36	10.8	0.02	0.17	0.80	0.97	0.16	0.20	0.36	—	3,033	3,033	0.08	0.23	4.37	3,109
2029	1.03	0.87	7.15	10.5	0.02	0.19	0.80	0.95	0.18	0.20	0.35	—	2,986	2,986	0.07	0.23	3.79	3,061
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.08	0.91	7.80	10.4	0.02	0.19	0.80	0.99	0.18	0.20	0.38	—	3,036	3,036	0.08	0.24	0.13	3,111
2028	1.04	0.87	7.53	10.2	0.02	0.17	0.80	0.97	0.16	0.20	0.36	—	2,992	2,992	0.08	0.23	0.11	3,064
2029	0.99	0.84	7.29	10.0	0.02	0.15	0.80	0.95	0.14	0.20	0.35	—	2,946	2,946	0.08	0.23	0.10	3,018
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.60	0.50	4.69	5.47	0.01	0.16	1.46	1.61	0.14	0.64	0.78	—	1,567	1,567	0.04	0.12	0.85	1,604
2028	0.75	0.63	5.35	7.35	0.02	0.12	0.56	0.69	0.11	0.14	0.26	—	2,150	2,150	0.05	0.17	1.35	2,203
2029	0.54	0.46	3.70	5.20	0.01	0.08	0.38	0.46	0.08	0.10	0.17	—	1,466	1,466	0.04	0.11	0.79	1,501
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.11	0.09	0.86	1.00	< 0.005	0.03	0.27	0.29	0.03	0.12	0.14	—	259	259	0.01	0.02	0.14	266
2028	0.14	0.11	0.98	1.34	< 0.005	0.02	0.10	0.13	0.02	0.03	0.05	—	356	356	0.01	0.03	0.22	365
2029	0.10	0.08	0.68	0.95	< 0.005	0.01	0.07	0.08	0.01	0.02	0.03	—	243	243	0.01	0.02	0.13	249

3. Construction Emissions Details

3.1. Site Prep/Grading (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.28	1.92	16.7	20.1	0.03	0.68	—	0.68	0.63	—	0.63	—	3,375	3,375	0.14	0.03	—	3,387

Dust From Material Movement	—	—	—	—	—	—	7.10	7.10	—	3.43	3.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.31	2.74	3.30	0.01	0.11	—	0.11	0.10	—	0.10	—	555	555	0.02	< 0.005	—	557
Dust From Material Movement	—	—	—	—	—	—	1.17	1.17	—	0.56	0.56	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.50	0.60	< 0.005	0.02	—	0.02	0.02	—	0.02	—	91.9	91.9	< 0.005	< 0.005	—	92.2
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.10	0.10	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.06	1.07	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	163	163	0.01	0.01	0.58	165

Vendor	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	< 0.005	0.02	0.29	131
Hauling	0.07	0.05	2.97	0.64	0.02	0.05	0.70	0.75	0.05	0.19	0.24	—	2,508	2,508	0.02	0.40	5.64	2,632
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.01	0.14	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	24.6	24.6	< 0.005	< 0.005	0.04	25.0
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20.5	20.5	< 0.005	< 0.005	0.02	21.4
Hauling	0.01	0.01	0.51	0.11	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	412	412	< 0.005	0.06	0.40	432
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.07	4.07	< 0.005	< 0.005	0.01	4.14
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.40	3.40	< 0.005	< 0.005	< 0.005	3.55
Hauling	< 0.005	< 0.005	0.09	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	68.3	68.3	< 0.005	0.01	0.07	71.6

3.3. Pipeline Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.78	0.65	5.60	7.67	0.01	0.17	—	0.17	0.15	—	0.15	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.78	0.65	5.60	7.67	0.01	0.17	—	0.17	0.15	—	0.15	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.12	1.02	1.40	< 0.005	0.03	—	0.03	0.03	—	0.03	—	214	214	0.01	< 0.005	—	214
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.19	0.25	< 0.005	0.01	—	0.01	0.01	—	0.01	—	35.4	35.4	< 0.005	< 0.005	—	35.5
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.25	0.24	0.15	2.68	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	406	406	0.02	0.02	1.44	413
Vendor	0.08	0.05	1.89	0.69	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,498	1,498	0.02	0.22	3.46	1,567
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	0.19	2.05	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	363	363	0.01	0.02	0.04	368
Vendor	0.07	0.05	2.01	0.70	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,500	1,500	0.02	0.22	0.09	1,565
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.04	0.04	0.03	0.39	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	68.1	68.1	< 0.005	< 0.005	0.11	69.2
Vendor	0.01	0.01	0.36	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	—	273	273	< 0.005	0.04	0.27	285
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.3	11.3	< 0.005	< 0.005	0.02	11.5
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	45.2	45.2	< 0.005	0.01	0.04	47.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Pipeline Construction (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.75	0.62	5.43	7.66	0.01	0.15	—	0.15	0.13	—	0.13	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.75	0.62	5.43	7.66	0.01	0.15	—	0.15	0.13	—	0.13	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.54	0.45	3.89	5.48	0.01	0.11	—	0.11	0.10	—	0.10	—	840	840	0.03	0.01	—	843
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.08	0.71	1.00	< 0.005	0.02	—	0.02	0.02	—	0.02	—	139	139	0.01	< 0.005	—	140
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.24	0.22	0.13	2.46	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	398	398	0.01	0.02	1.31	405
Vendor	0.08	0.05	1.80	0.65	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,462	1,462	0.02	0.21	3.07	1,527
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.20	0.17	1.88	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	356	356	0.01	0.02	0.03	361
Vendor	0.07	0.05	1.93	0.67	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,463	1,463	0.02	0.21	0.08	1,526
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.15	0.11	1.40	0.00	0.00	0.27	0.27	0.00	0.06	0.06	—	263	263	0.01	0.01	0.40	267
Vendor	0.05	0.04	1.35	0.47	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,047	1,047	0.01	0.15	0.95	1,093
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.25	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	43.5	43.5	< 0.005	< 0.005	0.07	44.2
Vendor	0.01	0.01	0.25	0.09	< 0.005	< 0.005	0.05	0.06	< 0.005	0.01	0.02	—	173	173	< 0.005	0.02	0.16	181

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Pipeline Construction (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.72	0.60	5.31	7.64	0.01	0.13	—	0.13	0.12	—	0.12	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.72	0.60	5.31	7.64	0.01	0.13	—	0.13	0.12	—	0.12	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.34	0.28	2.50	3.60	0.01	0.06	—	0.06	0.06	—	0.06	—	553	553	0.02	< 0.005	—	555
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	0.06	0.05	0.46	0.66	< 0.005	0.01	—	0.01	0.01	—	0.01	—	91.6	91.6	< 0.005	< 0.005	—	91.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	0.12	2.26	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	390	390	0.01	0.02	1.18	396
Vendor	0.08	0.05	1.73	0.62	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,423	1,423	0.02	0.21	2.61	1,488
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.19	0.19	0.15	1.73	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	349	349	0.01	0.02	0.03	354
Vendor	0.07	0.05	1.84	0.65	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,424	1,424	0.02	0.21	0.07	1,487
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.09	0.06	0.85	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	170	170	< 0.005	0.01	0.24	172
Vendor	0.03	0.02	0.85	0.30	0.01	0.01	0.19	0.20	0.01	0.05	0.06	—	671	671	0.01	0.10	0.53	701
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.15	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	28.1	28.1	< 0.005	< 0.005	0.04	28.5
Vendor	0.01	< 0.005	0.15	0.05	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	111	111	< 0.005	0.02	0.09	116
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Paving (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.69	0.58	5.26	7.62	0.01	0.19	—	0.19	0.17	—	0.17	—	1,170	1,170	0.05	0.01	—	1,174
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.22	0.31	< 0.005	0.01	—	0.01	0.01	—	0.01	—	48.1	48.1	< 0.005	< 0.005	—	48.2
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	< 0.005	0.04	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.96	7.96	< 0.005	< 0.005	—	7.99
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.08	0.07	0.04	0.79	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	137	137	< 0.005	0.01	0.41	139
Vendor	0.01	< 0.005	0.14	0.05	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	119	119	< 0.005	0.02	0.22	124
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.17	5.17	< 0.005	< 0.005	0.01	5.25
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.88	4.88	< 0.005	< 0.005	< 0.005	5.09
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.86	0.86	< 0.005	< 0.005	< 0.005	0.87
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.81	0.81	< 0.005	< 0.005	< 0.005	0.84
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Architectural Coating (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	0.31	0.31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	0.31	0.31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11.0	11.0	< 0.005	< 0.005	—	11.0
Architectural Coatings	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.82	1.82	< 0.005	< 0.005	—	1.82
Architectural Coatings	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.23	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	39.0	39.0	< 0.005	< 0.005	0.12	39.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.17	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	34.9	34.9	< 0.005	< 0.005	< 0.005	35.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.95	2.95	< 0.005	< 0.005	< 0.005	3.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.49	0.49	< 0.005	< 0.005	< 0.005	0.50
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Prep/Grading	Grading	7/8/2027	9/29/2027	5.00	60.0	—
Pipeline Construction	Building Construction	9/30/2027	8/29/2029	5.00	500	—
Paving	Paving	8/30/2029	9/19/2029	5.00	15.0	—
Architectural Coating	Architectural Coating	9/20/2029	10/31/2029	5.00	30.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Site Prep/Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Prep/Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Site Prep/Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Site Prep/Grading	Trenchers	Diesel	Average	2.00	8.00	40.0	0.50
Pipeline Construction	Cranes	Diesel	Average	1.00	1.00	367	0.29
Pipeline Construction	Forklifts	Diesel	Average	1.00	5.00	82.0	0.20
Pipeline Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Pipeline Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	4.00	84.0	0.37
Pipeline Construction	Welders	Diesel	Average	2.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	7.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	7.00	36.0	0.38

Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/Grading	—	—	—	—
Site Prep/Grading	Worker	20.0	10.9	LDA,LDT1,LDT2
Site Prep/Grading	Vendor	5.00	8.27	HHDT,MHDT
Site Prep/Grading	Hauling	37.9	20.0	HHDT
Site Prep/Grading	Onsite truck	—	—	HHDT
Pipeline Construction	—	—	—	—
Pipeline Construction	Worker	50.0	10.9	LDA,LDT1,LDT2
Pipeline Construction	Vendor	60.0	8.27	HHDT,MHDT
Pipeline Construction	Hauling	0.00	20.0	HHDT
Pipeline Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	17.5	10.9	LDA,LDT1,LDT2
Paving	Vendor	5.00	8.27	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	5.00	10.9	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.27	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	3,000	1,000	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Prep/Grading	—	18,185	86.0	0.00	—
Paving	0.00	0.00	0.00	0.00	0.00

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Light Industry	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2027	0.00	453	0.03	< 0.005

2028	0.00	453	0.03	< 0.005
2029	0.00	453	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	25.1	annual days of extreme heat
Extreme Precipitation	1.90	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth

Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A

Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	72.5
AQ-PM	88.9
AQ-DPM	75.0
Drinking Water	62.8
Lead Risk Housing	88.3
Pesticides	51.6
Toxic Releases	15.4
Traffic	66.7
Effect Indicators	—
CleanUp Sites	58.5

Groundwater	95.2
Haz Waste Facilities/Generators	67.0
Impaired Water Bodies	23.9
Solid Waste	0.00
Sensitive Population	—
Asthma	97.1
Cardio-vascular	99.5
Low Birth Weights	95.2
Socioeconomic Factor Indicators	—
Education	72.9
Housing	88.3
Linguistic	53.4
Poverty	79.5
Unemployment	97.6

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	15.64224304
Employed	4.516874118
Median HI	4.504042089
Education	—
Bachelor's or higher	31.19466188
High school enrollment	100
Preschool enrollment	1.873476197
Transportation	—
Auto Access	4.18324137

Active commuting	30.89952521
Social	—
2-parent households	43.38508918
Voting	9.624021558
Neighborhood	—
Alcohol availability	53.49672783
Park access	46.72141666
Retail density	80.59797254
Supermarket access	75.45232901
Tree canopy	51.62325164
Housing	—
Homeownership	31.90042346
Housing habitability	60.51584756
Low-inc homeowner severe housing cost burden	85.02502246
Low-inc renter severe housing cost burden	50.78916977
Uncrowded housing	66.9190299
Health Outcomes	—
Insured adults	65.67432311
Arthritis	15.6
Asthma ER Admissions	0.5
High Blood Pressure	8.1
Cancer (excluding skin)	32.7
Asthma	19.7
Coronary Heart Disease	12.2
Chronic Obstructive Pulmonary Disease	13.3
Diagnosed Diabetes	29.7
Life Expectancy at Birth	10.9
Cognitively Disabled	4.9

Physically Disabled	3.3
Heart Attack ER Admissions	0.4
Mental Health Not Good	27.0
Chronic Kidney Disease	10.6
Obesity	17.5
Pedestrian Injuries	93.6
Physical Health Not Good	24.5
Stroke	17.3
Health Risk Behaviors	—
Binge Drinking	54.2
Current Smoker	24.8
No Leisure Time for Physical Activity	26.6
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	28.6
Elderly	32.8
English Speaking	52.8
Foreign-born	7.6
Outdoor Workers	86.0
Climate Change Adaptive Capacity	—
Impervious Surface Cover	68.3
Traffic Density	57.5
Traffic Access	0.0
Other Indices	—
Hardship	69.6
Other Decision Support	—
2016 Voting	28.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	98.0
Healthy Places Index Score for Project Location (b)	7.00
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	See AQ Memo for assumptions.
Land Use	See AQ Memo for assumptions.
Construction: Off-Road Equipment	See AQ Memo for assumptions.
Construction: Trips and VMT	See AQ Memo for assumptions.
Construction: Architectural Coatings	See AQ Memo for assumptions.
Operations: Fleet Mix	See AQ Memo for assumptions.
Operations: Refrigerants	See AQ Memo for assumptions.
Construction: Dust From Material Movement	See AQ Memo for assumptions

B.3 2022 WCSMP- SOUTH MERCED MAJOR SEWER IMPROVEMENT DETAILED REPORT

2022 WCSMP - South Merced Major Sewer Improvement Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	2022 WCSMP - South Merced Major Sewer Improvement
Construction Start Date	7/8/2027
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	23.4
Location	37.30190428288776, -120.48696695622269
County	Merced
City	Merced
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2303
EDFZ	14
Electric Utility	Merced Irrigation District
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.26

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	1.00	1000sqft	2.50	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.41	2.03	17.8	21.4	0.04	0.70	7.49	8.19	0.65	3.53	4.18	—	4,430	4,430	0.15	0.24	4.90	4,488
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.08	0.91	7.80	10.4	0.02	0.19	0.80	0.99	0.18	0.20	0.38	—	3,036	3,036	0.08	0.24	0.13	3,111
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.75	0.63	5.35	7.35	0.02	0.15	1.37	1.52	0.14	0.62	0.76	—	2,150	2,150	0.05	0.17	1.35	2,203
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.14	0.11	0.98	1.34	< 0.005	0.03	0.25	0.28	0.03	0.11	0.14	—	356	356	0.01	0.03	0.22	365

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	2.41	2.03	17.8	21.4	0.04	0.70	7.49	8.19	0.65	3.53	4.18	—	4,430	4,430	0.15	0.24	4.90	4,488

2028	1.07	0.90	7.36	10.8	0.02	0.17	0.80	0.97	0.16	0.20	0.36	—	3,033	3,033	0.08	0.23	4.37	3,109
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.08	0.91	7.80	10.4	0.02	0.19	0.80	0.99	0.18	0.20	0.38	—	3,036	3,036	0.08	0.24	0.13	3,111
2028	1.04	0.87	7.53	10.2	0.02	0.17	0.80	0.97	0.16	0.20	0.36	—	2,992	2,992	0.08	0.23	0.11	3,064
2029	0.99	0.84	7.29	10.0	0.02	0.19	0.80	0.95	0.18	0.20	0.35	—	2,946	2,946	0.08	0.23	0.10	3,018
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.59	0.50	4.34	5.39	0.01	0.15	1.37	1.52	0.14	0.62	0.76	—	1,281	1,281	0.04	0.07	0.57	1,304
2028	0.75	0.63	5.35	7.35	0.02	0.12	0.56	0.69	0.11	0.14	0.26	—	2,150	2,150	0.05	0.17	1.35	2,203
2029	0.04	0.03	0.27	0.40	< 0.005	0.01	0.01	0.02	0.01	< 0.005	0.01	—	75.5	75.5	< 0.005	< 0.005	0.02	76.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.11	0.09	0.79	0.98	< 0.005	0.03	0.25	0.28	0.03	0.11	0.14	—	212	212	0.01	0.01	0.09	216
2028	0.14	0.11	0.98	1.34	< 0.005	0.02	0.10	0.13	0.02	0.03	0.05	—	356	356	0.01	0.03	0.22	365
2029	0.01	0.01	0.05	0.07	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.5	12.5	< 0.005	< 0.005	< 0.005	12.6

3. Construction Emissions Details

3.1. Site Prep/Grading (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.28	1.92	16.7	20.1	0.03	0.68	—	0.68	0.63	—	0.63	—	3,375	3,375	0.14	0.03	—	3,387

Dust From Material Movement	—	—	—	—	—	—	7.09	7.09	—	3.43	3.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.31	2.74	3.30	0.01	0.11	—	0.11	0.10	—	0.10	—	555	555	0.02	< 0.005	—	557
Dust From Material Movement	—	—	—	—	—	—	1.17	1.17	—	0.56	0.56	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.50	0.60	< 0.005	0.02	—	0.02	0.02	—	0.02	—	91.9	91.9	< 0.005	< 0.005	—	92.2
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.10	0.10	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.06	1.07	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	163	163	0.01	0.01	0.58	165

Vendor	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	< 0.005	0.02	0.29	131
Hauling	0.02	0.01	0.91	0.20	0.01	0.02	0.22	0.23	0.02	0.06	0.07	—	768	768	0.01	0.12	1.73	806
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.01	0.14	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	24.6	24.6	< 0.005	< 0.005	0.04	25.0
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20.5	20.5	< 0.005	< 0.005	0.02	21.4
Hauling	< 0.005	< 0.005	0.16	0.03	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	126	126	< 0.005	0.02	0.12	132
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.07	4.07	< 0.005	< 0.005	0.01	4.14
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.40	3.40	< 0.005	< 0.005	< 0.005	3.55
Hauling	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20.9	20.9	< 0.005	< 0.005	0.02	21.9

3.3. Pipeline Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.78	0.65	5.60	7.67	0.01	0.17	—	0.17	0.15	—	0.15	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.78	0.65	5.60	7.67	0.01	0.17	—	0.17	0.15	—	0.15	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.12	1.02	1.40	< 0.005	0.03	—	0.03	0.03	—	0.03	—	214	214	0.01	< 0.005	—	214
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.19	0.25	< 0.005	0.01	—	0.01	0.01	—	0.01	—	35.4	35.4	< 0.005	< 0.005	—	35.5
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.25	0.24	0.15	2.68	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	406	406	0.02	0.02	1.44	413
Vendor	0.08	0.05	1.89	0.69	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,498	1,498	0.02	0.22	3.46	1,567
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	0.19	2.05	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	363	363	0.01	0.02	0.04	368
Vendor	0.07	0.05	2.01	0.70	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,500	1,500	0.02	0.22	0.09	1,565
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.04	0.04	0.03	0.39	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	68.1	68.1	< 0.005	< 0.005	0.11	69.2
Vendor	0.01	0.01	0.36	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	—	273	273	< 0.005	0.04	0.27	285
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.3	11.3	< 0.005	< 0.005	0.02	11.5
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	45.2	45.2	< 0.005	0.01	0.04	47.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Pipeline Construction (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.75	0.62	5.43	7.66	0.01	0.15	—	0.15	0.13	—	0.13	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.75	0.62	5.43	7.66	0.01	0.15	—	0.15	0.13	—	0.13	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.54	0.45	3.89	5.48	0.01	0.11	—	0.11	0.10	—	0.10	—	840	840	0.03	0.01	—	843
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.08	0.71	1.00	< 0.005	0.02	—	0.02	0.02	—	0.02	—	139	139	0.01	< 0.005	—	140
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.24	0.22	0.13	2.46	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	398	398	0.01	0.02	1.31	405
Vendor	0.08	0.05	1.80	0.65	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,462	1,462	0.02	0.21	3.07	1,527
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.20	0.17	1.88	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	356	356	0.01	0.02	0.03	361
Vendor	0.07	0.05	1.93	0.67	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,463	1,463	0.02	0.21	0.08	1,526
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.15	0.11	1.40	0.00	0.00	0.27	0.27	0.00	0.06	0.06	—	263	263	0.01	0.01	0.40	267
Vendor	0.05	0.04	1.35	0.47	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,047	1,047	0.01	0.15	0.95	1,093
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.25	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	43.5	43.5	< 0.005	< 0.005	0.07	44.2
Vendor	0.01	0.01	0.25	0.09	< 0.005	< 0.005	0.05	0.06	< 0.005	0.01	0.02	—	173	173	< 0.005	0.02	0.16	181

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Pipeline Construction (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.72	0.60	5.31	7.64	0.01	0.13	—	0.13	0.12	—	0.12	—	1,173	1,173	0.05	0.01	—	1,177
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.89	6.89	< 0.005	< 0.005	—	6.91
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.14	1.14	< 0.005	< 0.005	—	1.14
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.19	0.19	0.15	1.73	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	349	349	0.01	0.02	0.03	354
Vendor	0.07	0.05	1.84	0.65	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,424	1,424	0.02	0.21	0.07	1,487
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.11	2.11	< 0.005	< 0.005	< 0.005	2.14
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.36	8.36	< 0.005	< 0.005	0.01	8.73
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.35	0.35	< 0.005	< 0.005	< 0.005	0.35
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.38	1.38	< 0.005	< 0.005	< 0.005	1.45
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Paving (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.69	0.58	5.26	7.62	0.01	0.19	—	0.19	0.17	—	0.17	—	1,170	1,170	0.05	0.01	—	1,174
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.22	0.31	< 0.005	0.01	—	0.01	0.01	—	0.01	—	48.1	48.1	< 0.005	< 0.005	—	48.2
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	< 0.005	0.04	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.96	7.96	< 0.005	< 0.005	—	7.99
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.05	0.61	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	122	122	< 0.005	0.01	0.01	124
Vendor	0.01	< 0.005	0.15	0.05	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	119	119	< 0.005	0.02	0.01	124
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.17	5.17	< 0.005	< 0.005	0.01	5.25
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.88	4.88	< 0.005	< 0.005	< 0.005	5.09
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.86	0.86	< 0.005	< 0.005	< 0.005	0.87
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.81	0.81	< 0.005	< 0.005	< 0.005	0.84
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Prep/Grading	Grading	7/8/2027	9/29/2027	5.00	60.0	—
Pipeline Construction	Building Construction	9/30/2027	1/3/2029	5.00	330	—
Paving	Paving	1/4/2029	1/24/2029	5.00	15.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Prep/Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Site Prep/Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Site Prep/Grading	Trenchers	Diesel	Average	2.00	8.00	40.0	0.50
Site Prep/Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Pipeline Construction	Cranes	Diesel	Average	1.00	1.00	367	0.29
Pipeline Construction	Forklifts	Diesel	Average	1.00	5.00	82.0	0.20
Pipeline Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Pipeline Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	4.00	84.0	0.37
Pipeline Construction	Welders	Diesel	Average	2.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	7.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	7.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/Grading	—	—	—	—
Site Prep/Grading	Worker	20.0	10.9	LDA,LDT1,LDT2
Site Prep/Grading	Vendor	5.00	8.27	HHDT,MHDT
Site Prep/Grading	Hauling	11.6	20.0	HHDT
Site Prep/Grading	Onsite truck	—	—	HHDT

Pipeline Construction	—	—	—	—
Pipeline Construction	Worker	50.0	10.9	LDA,LDT1,LDT2
Pipeline Construction	Vendor	60.0	8.27	HHDT,MHDT
Pipeline Construction	Hauling	0.00	20.0	HHDT
Pipeline Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	17.5	10.9	LDA,LDT1,LDT2
Paving	Vendor	5.00	8.27	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Prep/Grading	—	5,568	86.0	0.00	—
Paving	0.00	0.00	0.00	0.00	0.00

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Light Industry	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2027	0.00	453	0.03	< 0.005
2028	0.00	453	0.03	< 0.005
2029	0.00	453	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	25.1	annual days of extreme heat
Extreme Precipitation	1.90	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	72.5

AQ-PM	88.9
AQ-DPM	75.0
Drinking Water	62.8
Lead Risk Housing	88.3
Pesticides	51.6
Toxic Releases	15.4
Traffic	66.7
Effect Indicators	—
CleanUp Sites	58.5
Groundwater	95.2
Haz Waste Facilities/Generators	67.0
Impaired Water Bodies	23.9
Solid Waste	0.00
Sensitive Population	—
Asthma	97.1
Cardio-vascular	99.5
Low Birth Weights	95.2
Socioeconomic Factor Indicators	—
Education	72.9
Housing	88.3
Linguistic	53.4
Poverty	79.5
Unemployment	97.6

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—

Above Poverty	15.64224304
Employed	4.516874118
Median HI	4.504042089
Education	—
Bachelor's or higher	31.19466188
High school enrollment	100
Preschool enrollment	1.873476197
Transportation	—
Auto Access	4.18324137
Active commuting	30.89952521
Social	—
2-parent households	43.38508918
Voting	9.624021558
Neighborhood	—
Alcohol availability	53.49672783
Park access	46.72141666
Retail density	80.59797254
Supermarket access	75.45232901
Tree canopy	51.62325164
Housing	—
Homeownership	31.90042346
Housing habitability	60.51584756
Low-inc homeowner severe housing cost burden	85.02502246
Low-inc renter severe housing cost burden	50.78916977
Uncrowded housing	66.9190299
Health Outcomes	—
Insured adults	65.67432311
Arthritis	15.6

Asthma ER Admissions	0.5
High Blood Pressure	8.1
Cancer (excluding skin)	32.7
Asthma	19.7
Coronary Heart Disease	12.2
Chronic Obstructive Pulmonary Disease	13.3
Diagnosed Diabetes	29.7
Life Expectancy at Birth	10.9
Cognitively Disabled	4.9
Physically Disabled	3.3
Heart Attack ER Admissions	0.4
Mental Health Not Good	27.0
Chronic Kidney Disease	10.6
Obesity	17.5
Pedestrian Injuries	93.6
Physical Health Not Good	24.5
Stroke	17.3
Health Risk Behaviors	—
Binge Drinking	54.2
Current Smoker	24.8
No Leisure Time for Physical Activity	26.6
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	28.6
Elderly	32.8
English Speaking	52.8
Foreign-born	7.6

Outdoor Workers	86.0
Climate Change Adaptive Capacity	—
Impervious Surface Cover	68.3
Traffic Density	57.5
Traffic Access	0.0
Other Indices	—
Hardship	69.6
Other Decision Support	—
2016 Voting	28.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	98.0
Healthy Places Index Score for Project Location (b)	7.00
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	See AQ Memo for assumptions.
Land Use	See AQ Memo for assumptions.
Construction: Off-Road Equipment	See AQ Memo for assumptions.
Construction: Trips and VMT	See AQ Memo for assumptions.
Construction: Architectural Coatings	See AQ Memo for assumptions.
Operations: Fleet Mix	See AQ Memo for assumptions.
Operations: Refrigerants	See AQ Memo for assumptions.
Construction: Dust From Material Movement	See AQ Memo for assumptions

B.4 2022 WCSMP- INTERIM SYSTEM IMPROVEMENTS DETAILED REPORT

2022 WCSMP - Interim System Improvements Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	2022 WCSMP - Interim System Improvements
Construction Start Date	1/1/2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	23.4
Location	37.30190428288776, -120.48696695622269
County	Merced
City	Merced
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2303
EDFZ	14
Electric Utility	Merced Irrigation District
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.26

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	1.00	1000sqft	4.16	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.54	2.13	19.0	21.8	0.04	0.77	7.59	8.35	0.71	3.56	4.27	—	4,787	4,787	0.16	0.26	5.49	4,864
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.52	2.12	19.1	21.5	0.04	0.77	7.59	8.35	0.71	3.56	4.27	—	4,770	4,770	0.16	0.26	0.14	4,843
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.47	1.23	10.9	13.5	0.03	0.39	2.16	2.55	0.36	0.93	1.29	—	3,292	3,292	0.11	0.18	1.50	3,349
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.27	0.22	1.99	2.47	< 0.005	0.07	0.39	0.47	0.07	0.17	0.24	—	545	545	0.02	0.03	0.25	554

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.54	2.13	19.0	21.8	0.04	0.77	7.59	8.35	0.71	3.56	4.27	—	4,787	4,787	0.16	0.26	5.49	4,864

2027	1.75	1.48	12.7	17.9	0.04	0.39	0.80	1.19	0.36	0.20	0.56	—	4,509	4,509	0.15	0.26	4.90	4,594
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.52	2.12	19.1	21.5	0.04	0.77	7.59	8.35	0.71	3.56	4.27	—	4,770	4,770	0.16	0.26	0.14	4,843
2027	1.72	1.45	12.9	17.3	0.04	0.39	0.80	1.19	0.36	0.20	0.56	—	4,467	4,467	0.14	0.26	0.13	4,547
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.47	1.23	10.9	13.5	0.03	0.39	2.16	2.55	0.36	0.93	1.29	—	3,292	3,292	0.11	0.18	1.50	3,349
2027	0.51	0.43	3.71	5.23	0.01	0.12	0.20	0.32	0.11	0.05	0.16	—	1,209	1,209	0.04	0.06	0.51	1,228
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.27	0.22	1.99	2.47	< 0.005	0.07	0.39	0.47	0.07	0.17	0.24	—	545	545	0.02	0.03	0.25	554
2027	0.09	0.08	0.68	0.95	< 0.005	0.02	0.04	0.06	0.02	0.01	0.03	—	200	200	0.01	0.01	0.08	203

3. Construction Emissions Details

3.1. Site Prep/Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.38	2.00	17.5	20.3	0.03	0.75	—	0.75	0.69	—	0.69	—	3,375	3,375	0.14	0.03	—	3,386
Dust From Material Movement	—	—	—	—	—	—	7.09	7.09	—	3.43	3.43	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.38	2.00	17.5	20.3	0.03	0.75	—	0.75	0.69	—	0.69	—	3,375	3,375	0.14	0.03	—	3,386
Dust From Material Movement	—	—	—	—	—	—	7.09	7.09	—	3.43	3.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.56	0.47	4.12	4.78	0.01	0.18	—	0.18	0.16	—	0.16	—	795	795	0.03	0.01	—	798
Dust From Material Movement	—	—	—	—	—	—	1.67	1.67	—	0.81	0.81	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.09	0.75	0.87	< 0.005	0.03	—	0.03	0.03	—	0.03	—	132	132	0.01	< 0.005	—	132
Dust From Material Movement	—	—	—	—	—	—	0.30	0.30	—	0.15	0.15	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.11	0.07	1.16	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	167	167	0.01	0.01	0.63	170
Vendor	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	< 0.005	0.02	0.33	133
Hauling	0.04	0.02	1.32	0.29	0.01	0.02	0.31	0.33	0.02	0.08	0.11	—	1,118	1,118	0.01	0.18	2.66	1,175
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.09	0.89	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	149	149	0.01	0.01	0.02	151
Vendor	0.01	< 0.005	0.17	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.01	133
Hauling	0.04	0.02	1.41	0.29	0.01	0.02	0.31	0.33	0.02	0.08	0.11	—	1,119	1,119	0.01	0.18	0.07	1,173
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.22	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	36.2	36.2	< 0.005	< 0.005	0.06	36.8
Vendor	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	30.1	30.1	< 0.005	< 0.005	0.03	31.4
Hauling	0.01	< 0.005	0.33	0.07	< 0.005	0.01	0.07	0.08	0.01	0.02	0.02	—	264	264	< 0.005	0.04	0.27	277
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.99	5.99	< 0.005	< 0.005	0.01	6.09
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.98	4.98	< 0.005	< 0.005	0.01	5.19
Hauling	< 0.005	< 0.005	0.06	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	43.6	43.6	< 0.005	0.01	0.04	45.8

3.3. Pipeline Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	1.49	1.24	11.2	14.6	0.03	0.41	—	0.41	0.38	—	0.38	—	2,605	2,605	0.11	0.02	—	2,614
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.49	1.24	11.2	14.6	0.03	0.41	—	0.41	0.38	—	0.38	—	2,605	2,605	0.11	0.02	—	2,614
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.71	0.59	5.35	7.00	0.01	0.20	—	0.20	0.18	—	0.18	—	1,249	1,249	0.05	0.01	—	1,253
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.98	1.28	< 0.005	0.04	—	0.04	0.03	—	0.03	—	207	207	0.01	< 0.005	—	207
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.26	0.17	2.90	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	417	417	0.02	0.02	1.58	424
Vendor	0.09	0.05	1.97	0.74	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,530	1,530	0.02	0.22	3.91	1,599
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.24	0.22	0.22	2.21	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	372	372	0.03	0.02	0.04	378
Vendor	0.08	0.05	2.10	0.75	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,532	1,532	0.02	0.22	0.10	1,597
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.09	1.10	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	184	184	0.01	0.01	0.33	187
Vendor	0.04	0.03	0.98	0.35	0.01	0.01	0.20	0.21	0.01	0.05	0.06	—	734	734	0.01	0.10	0.81	766
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.20	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	30.5	30.5	< 0.005	< 0.005	0.05	31.0
Vendor	0.01	< 0.005	0.18	0.06	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	122	122	< 0.005	0.02	0.13	127
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Pipeline Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.42	1.19	10.7	14.6	0.03	0.37	—	0.37	0.34	—	0.34	—	2,605	2,605	0.11	0.02	—	2,613
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	1.42	1.19	10.7	14.6	0.03	0.37	—	0.37	0.34	—	0.34	—	2,605	2,605	0.11	0.02	—	2,613
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.30	0.25	2.27	3.11	0.01	0.08	—	0.08	0.07	—	0.07	—	556	556	0.02	< 0.005	—	557
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.41	0.57	< 0.005	0.01	—	0.01	0.01	—	0.01	—	92.0	92.0	< 0.005	< 0.005	—	92.3
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.25	0.24	0.15	2.68	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	406	406	0.02	0.02	1.44	413
Vendor	0.08	0.05	1.89	0.69	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,498	1,498	0.02	0.22	3.46	1,567
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	0.19	2.05	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	363	363	0.01	0.02	0.04	368
Vendor	0.07	0.05	2.01	0.70	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,500	1,500	0.02	0.22	0.09	1,565
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.05	0.05	0.04	0.45	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	79.8	79.8	< 0.005	< 0.005	0.13	81.1
Vendor	0.02	0.01	0.42	0.15	< 0.005	< 0.005	0.09	0.09	< 0.005	0.02	0.03	—	320	320	< 0.005	0.05	0.32	334
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.2	13.2	< 0.005	< 0.005	0.02	13.4
Vendor	< 0.005	< 0.005	0.08	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	52.9	52.9	< 0.005	0.01	0.05	55.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.79	0.66	6.09	8.83	0.01	0.24	—	0.24	0.22	—	0.22	—	1,350	1,350	0.05	0.01	—	1,355
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.95	1.38	< 0.005	0.04	—	0.04	0.03	—	0.03	—	211	211	0.01	< 0.005	—	212
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.17	0.25	< 0.005	0.01	—	0.01	0.01	—	0.01	—	34.9	34.9	< 0.005	< 0.005	—	35.0
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.06	1.07	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	163	163	0.01	0.01	0.58	165
Vendor	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	< 0.005	0.02	0.29	131
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	23.4	23.4	< 0.005	< 0.005	0.04	23.8
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	19.5	19.5	< 0.005	< 0.005	0.02	20.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.87	3.87	< 0.005	< 0.005	0.01	3.93
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.23	3.23	< 0.005	< 0.005	< 0.005	3.37
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Prep/Grading	Grading	1/1/2026	4/30/2026	5.00	86.0	—
Pipeline Construction	Building Construction	5/1/2026	4/19/2027	5.00	252	—
Paving	Paving	4/20/2027	7/7/2027	5.00	57.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Site Prep/Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Prep/Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Site Prep/Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Site Prep/Grading	Trenchers	Diesel	Average	2.00	8.00	40.0	0.50
Pipeline Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Pipeline Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Pipeline Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74

Pipeline Construction	Tractors/Loaders/Back	Diesel	Average	3.00	7.00	84.0	0.37
Pipeline Construction	Welders	Diesel	Average	2.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	6.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	6.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/Grading	—	—	—	—
Site Prep/Grading	Worker	20.0	10.9	LDA,LDT1,LDT2
Site Prep/Grading	Vendor	5.00	8.27	HHDT,MHDT
Site Prep/Grading	Hauling	16.5	20.0	HHDT
Site Prep/Grading	Onsite truck	—	—	HHDT
Pipeline Construction	—	—	—	—
Pipeline Construction	Worker	50.0	10.9	LDA,LDT1,LDT2
Pipeline Construction	Vendor	60.0	8.27	HHDT,MHDT
Pipeline Construction	Hauling	0.00	20.0	HHDT
Pipeline Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	20.0	10.9	LDA,LDT1,LDT2
Paving	Vendor	5.00	8.27	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Prep/Grading	—	11,362	86.0	0.00	—
Paving	0.00	0.00	0.00	0.00	0.00

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Light Industry	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	453	0.03	< 0.005
2027	0.00	453	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	25.1	annual days of extreme heat
Extreme Precipitation	1.90	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A

Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	72.5
AQ-PM	88.9
AQ-DPM	75.0
Drinking Water	62.8
Lead Risk Housing	88.3
Pesticides	51.6
Toxic Releases	15.4
Traffic	66.7
Effect Indicators	—
CleanUp Sites	58.5
Groundwater	95.2

Haz Waste Facilities/Generators	67.0
Impaired Water Bodies	23.9
Solid Waste	0.00
Sensitive Population	—
Asthma	97.1
Cardio-vascular	99.5
Low Birth Weights	95.2
Socioeconomic Factor Indicators	—
Education	72.9
Housing	88.3
Linguistic	53.4
Poverty	79.5
Unemployment	97.6

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	15.64224304
Employed	4.516874118
Median HI	4.504042089
Education	—
Bachelor's or higher	31.19466188
High school enrollment	100
Preschool enrollment	1.873476197
Transportation	—
Auto Access	4.18324137
Active commuting	30.89952521

Social	—
2-parent households	43.38508918
Voting	9.624021558
Neighborhood	—
Alcohol availability	53.49672783
Park access	46.72141666
Retail density	80.59797254
Supermarket access	75.45232901
Tree canopy	51.62325164
Housing	—
Homeownership	31.90042346
Housing habitability	60.51584756
Low-inc homeowner severe housing cost burden	85.02502246
Low-inc renter severe housing cost burden	50.78916977
Uncrowded housing	66.9190299
Health Outcomes	—
Insured adults	65.67432311
Arthritis	15.6
Asthma ER Admissions	0.5
High Blood Pressure	8.1
Cancer (excluding skin)	32.7
Asthma	19.7
Coronary Heart Disease	12.2
Chronic Obstructive Pulmonary Disease	13.3
Diagnosed Diabetes	29.7
Life Expectancy at Birth	10.9
Cognitively Disabled	4.9
Physically Disabled	3.3

Heart Attack ER Admissions	0.4
Mental Health Not Good	27.0
Chronic Kidney Disease	10.6
Obesity	17.5
Pedestrian Injuries	93.6
Physical Health Not Good	24.5
Stroke	17.3
Health Risk Behaviors	—
Binge Drinking	54.2
Current Smoker	24.8
No Leisure Time for Physical Activity	26.6
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	28.6
Elderly	32.8
English Speaking	52.8
Foreign-born	7.6
Outdoor Workers	86.0
Climate Change Adaptive Capacity	—
Impervious Surface Cover	68.3
Traffic Density	57.5
Traffic Access	0.0
Other Indices	—
Hardship	69.6
Other Decision Support	—
2016 Voting	28.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	98.0
Healthy Places Index Score for Project Location (b)	7.00
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	See AQ Memo for assumptions.
Land Use	See AQ Memo for assumptions.
Construction: Off-Road Equipment	See AQ Memo for assumptions.
Construction: Trips and VMT	See AQ Memo for assumptions.
Construction: Architectural Coatings	See AQ Memo for assumptions.
Operations: Fleet Mix	See AQ Memo for assumptions.
Operations: Refrigerants	See AQ Memo for assumptions.

B.5 2022 WCSMP- WWTF IMPROVEMENTS (3- TO 4-MGAL/D) DETAILED REPORT

2022 WCSMP - WWTF Improvements (3- to 4-Mgal/d) Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	2022 WCSMP - WWTF Improvements (3- to 4-Mgal/d)
Construction Start Date	1/1/2026
Operational Year	2030
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	23.4
Location	37.30190428288776, -120.48696695622269
County	Merced
City	Merced
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2303
EDFZ	14
Electric Utility	Merced Irrigation District
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.26

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	50.0	1000sqft	22.5	50,000	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.85	0.72	5.95	7.18	0.02	0.24	2.19	2.43	0.22	0.92	1.14	—	2,512	2,512	0.06	0.26	5.79	2,596
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.83	0.71	5.97	6.98	0.02	0.24	2.19	2.43	0.22	0.92	1.14	—	2,469	2,469	0.06	0.26	0.15	2,548
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.50	0.42	3.56	4.25	0.01	0.11	0.92	1.03	0.10	0.33	0.43	—	1,540	1,540	0.04	0.13	1.26	1,581
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.09	0.08	0.65	0.78	< 0.005	0.02	0.17	0.19	0.02	0.06	0.08	—	255	255	0.01	0.02	0.21	262

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.85	0.72	5.95	7.18	0.02	0.24	2.19	2.43	0.22	0.92	1.14	—	2,512	2,512	0.06	0.26	5.79	2,596

2027	0.61	0.52	4.19	6.46	0.02	0.16	0.83	0.93	0.15	0.21	0.31	—	2,466	2,466	0.06	0.26	5.18	2,550
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.83	0.71	5.97	6.98	0.02	0.24	2.19	2.43	0.22	0.92	1.14	—	2,469	2,469	0.06	0.26	0.15	2,548
2027	0.58	0.49	4.36	5.10	0.02	0.10	0.83	0.93	0.09	0.21	0.31	—	2,424	2,424	0.05	0.26	0.13	2,503
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.50	0.42	3.56	4.25	0.01	0.11	0.92	1.03	0.10	0.33	0.43	—	1,540	1,540	0.04	0.13	1.26	1,581
2027	0.31	0.27	2.14	2.90	0.01	0.06	0.24	0.30	0.06	0.06	0.12	—	871	871	0.03	0.07	0.63	894
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.09	0.08	0.65	0.78	< 0.005	0.02	0.17	0.19	0.02	0.06	0.08	—	255	255	0.01	0.02	0.21	262
2027	0.06	0.05	0.39	0.53	< 0.005	0.01	0.04	0.05	0.01	0.01	0.02	—	144	144	< 0.005	0.01	0.10	148

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	53.5	48.8	133	123	0.23	7.00	0.07	7.07	7.00	0.02	7.02	55.6	25,673	25,728	6.69	0.29	0.43	25,981
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	53.1	48.4	133	121	0.23	6.99	0.07	7.06	6.99	0.02	7.01	55.6	25,664	25,720	6.69	0.29	0.01	25,972
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.98	1.88	2.27	2.90	0.01	0.12	0.07	0.19	0.12	0.02	0.14	55.6	1,766	1,822	5.73	0.10	0.19	1,995
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.36	0.34	0.41	0.53	< 0.005	0.02	0.01	0.03	0.02	< 0.005	0.03	9.20	292	302	0.95	0.02	0.03	330

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	< 0.005	0.24	0.04	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	226	226	< 0.005	0.04	0.43	237
Area	1.52	1.49	0.02	2.17	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.94	8.94	< 0.005	< 0.005	—	8.97
Energy	0.05	0.03	0.49	0.42	< 0.005	0.04	—	0.04	0.04	—	0.04	—	1,213	1,213	0.10	0.01	—	1,218
Water	—	—	—	—	—	—	—	—	—	—	—	22.2	46.8	69.0	2.28	0.05	—	142
Waste	—	—	—	—	—	—	—	—	—	—	—	33.4	0.00	33.4	3.34	0.00	—	117
Stationary	51.9	47.3	132	121	0.23	6.95	0.00	6.95	6.95	0.00	6.95	0.00	24,178	24,178	0.97	0.19	0.00	24,259
Total	53.5	48.8	133	123	0.23	7.00	0.07	7.07	7.00	0.02	7.02	55.6	25,673	25,728	6.69	0.29	0.43	25,981
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	< 0.005	0.26	0.04	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	226	226	< 0.005	0.04	0.01	237
Area	1.13	1.13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.05	0.03	0.49	0.42	< 0.005	0.04	—	0.04	0.04	—	0.04	—	1,213	1,213	0.10	0.01	—	1,218
Water	—	—	—	—	—	—	—	—	—	—	—	22.2	46.8	69.0	2.28	0.05	—	142
Waste	—	—	—	—	—	—	—	—	—	—	—	33.4	0.00	33.4	3.34	0.00	—	117
Stationary	51.9	47.3	132	121	0.23	6.95	0.00	6.95	6.95	0.00	6.95	0.00	24,178	24,178	0.97	0.19	0.00	24,259
Total	53.1	48.4	133	121	0.23	6.99	0.07	7.06	6.99	0.02	7.01	55.6	25,664	25,720	6.69	0.29	0.01	25,972
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	< 0.005	0.25	0.04	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	226	226	< 0.005	0.04	0.19	237
Area	1.32	1.31	0.01	1.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.41	4.41	< 0.005	< 0.005	—	4.43
Energy	0.05	0.03	0.49	0.42	< 0.005	0.04	—	0.04	0.04	—	0.04	—	1,213	1,213	0.10	0.01	—	1,218

Water	—	—	—	—	—	—	—	—	—	—	—	22.2	46.8	69.0	2.28	0.05	—	142
Waste	—	—	—	—	—	—	—	—	—	—	—	33.4	0.00	33.4	3.34	0.00	—	117
Stationary	0.59	0.54	1.51	1.38	< 0.005	0.08	0.00	0.08	0.08	0.00	0.08	0.00	276	276	0.01	< 0.005	0.00	277
Total	1.98	1.88	2.27	2.90	0.01	0.12	0.07	0.19	0.12	0.02	0.14	55.6	1,766	1,822	5.73	0.10	0.19	1,995
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	0.05	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	37.4	37.4	< 0.005	0.01	0.03	39.2
Area	0.24	0.24	< 0.005	0.20	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.73	0.73	< 0.005	< 0.005	—	0.73
Energy	0.01	< 0.005	0.09	0.08	< 0.005	0.01	—	0.01	0.01	—	0.01	—	201	201	0.02	< 0.005	—	202
Water	—	—	—	—	—	—	—	—	—	—	—	3.67	7.75	11.4	0.38	0.01	—	23.5
Waste	—	—	—	—	—	—	—	—	—	—	—	5.53	0.00	5.53	0.55	0.00	—	19.4
Stationary	0.11	0.10	0.28	0.25	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	45.7	45.7	< 0.005	< 0.005	0.00	45.8
Total	0.36	0.34	0.41	0.53	< 0.005	0.02	0.01	0.03	0.02	< 0.005	0.03	9.20	292	302	0.95	0.02	0.03	330

3. Construction Emissions Details

3.1. Site Prep/Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.76	0.63	5.71	6.25	0.01	0.23	—	0.23	0.22	—	0.22	—	1,284	1,284	0.05	0.01	—	1,289
Dust From Material Movement	—	—	—	—	—	—	2.04	2.04	—	0.88	0.88	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.76	0.63	5.71	6.25	0.01	0.23	—	0.23	0.22	—	0.22	—	1,284	1,284	0.05	0.01	—	1,289
Dust From Material Movement	—	—	—	—	—	—	2.04	2.04	—	0.88	0.88	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.19	0.16	1.41	1.54	< 0.005	0.06	—	0.06	0.05	—	0.05	—	317	317	0.01	< 0.005	—	318
Dust From Material Movement	—	—	—	—	—	—	0.50	0.50	—	0.22	0.22	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.26	0.28	< 0.005	0.01	—	0.01	0.01	—	0.01	—	52.4	52.4	< 0.005	< 0.005	—	52.6
Dust From Material Movement	—	—	—	—	—	—	0.09	0.09	—	0.04	0.04	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.08	0.05	0.87	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	125	125	0.01	< 0.005	0.47	127
Vendor	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	< 0.005	0.02	0.33	133
Hauling	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	15.0	15.0	< 0.005	< 0.005	0.04	15.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.06	0.66	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	112	112	0.01	< 0.005	0.01	113
Vendor	0.01	< 0.005	0.17	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.01	133
Hauling	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	15.0	15.0	< 0.005	< 0.005	< 0.005	15.8
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.17	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	28.4	28.4	< 0.005	< 0.005	0.05	28.9
Vendor	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.5	31.5	< 0.005	< 0.005	0.03	32.8
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.71	3.71	< 0.005	< 0.005	< 0.005	3.89
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	4.70	4.70	< 0.005	< 0.005	0.01	4.78
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.21	5.21	< 0.005	< 0.005	0.01	5.44
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.61	0.61	< 0.005	< 0.005	< 0.005	0.64

3.3. Facility Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.28	0.23	2.07	2.32	< 0.005	0.08	—	0.08	0.07	—	0.07	—	437	437	0.02	< 0.005	—	438
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.28	0.23	2.07	2.32	< 0.005	0.08	—	0.08	0.07	—	0.07	—	437	437	0.02	< 0.005	—	438
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.97	1.09	< 0.005	0.04	—	0.04	0.03	—	0.03	—	204	204	0.01	< 0.005	—	205
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.18	0.20	< 0.005	0.01	—	0.01	0.01	—	0.01	—	33.8	33.8	< 0.005	< 0.005	—	33.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.26	0.17	2.90	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	417	417	0.02	0.02	1.58	424
Vendor	0.09	0.05	1.97	0.74	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,530	1,530	0.02	0.22	3.91	1,599
Hauling	< 0.005	< 0.005	0.15	0.03	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.30	134

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.24	0.22	0.22	2.21	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	372	372	0.03	0.02	0.04	378
Vendor	0.08	0.05	2.10	0.75	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,532	1,532	0.02	0.22	0.10	1,597
Hauling	< 0.005	< 0.005	0.16	0.03	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.01	134
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.09	1.08	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	180	180	0.01	0.01	0.32	183
Vendor	0.04	0.02	0.96	0.34	0.01	0.01	0.19	0.20	0.01	0.05	0.06	—	716	716	0.01	0.10	0.79	747
Hauling	< 0.005	< 0.005	0.07	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	59.9	59.9	< 0.005	0.01	0.06	62.8
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.20	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	29.7	29.7	< 0.005	< 0.005	0.05	30.2
Vendor	0.01	< 0.005	0.18	0.06	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	119	119	< 0.005	0.02	0.13	124
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.91	9.91	< 0.005	< 0.005	0.01	10.4

3.5. Facility Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	0.23	2.01	2.32	< 0.005	0.07	—	0.07	0.07	—	0.07	—	437	437	0.02	< 0.005	—	438
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.27	0.23	2.01	2.32	< 0.005	0.07	—	0.07	0.07	—	0.07	—	437	437	0.02	< 0.005	—	438
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.07	0.06	0.51	0.59	< 0.005	0.02	—	0.02	0.02	—	0.02	—	112	112	< 0.005	< 0.005	—	112
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.01	0.01	0.09	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18.5	18.5	< 0.005	< 0.005	—	18.6
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.25	0.24	0.15	2.68	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	406	406	0.02	0.02	1.44	413
Vendor	0.08	0.05	1.89	0.69	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,498	1,498	0.02	0.22	3.46	1,567
Hauling	< 0.005	< 0.005	0.15	0.03	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	125	125	< 0.005	0.02	0.28	131
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	0.19	2.05	0.00	0.00	0.38	0.38	0.00	0.09	0.09	—	363	363	0.01	0.02	0.04	368
Vendor	0.07	0.05	2.01	0.70	0.01	0.02	0.42	0.44	0.02	0.11	0.14	—	1,500	1,500	0.02	0.22	0.09	1,565
Hauling	< 0.005	< 0.005	0.16	0.03	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	125	125	< 0.005	0.02	0.01	131
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.06	0.06	0.04	0.54	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	95.9	95.9	0.01	< 0.005	0.16	97.5
Vendor	0.02	0.01	0.50	0.18	< 0.005	0.01	0.11	0.11	0.01	0.03	0.03	—	384	384	< 0.005	0.06	0.38	401
Hauling	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	32.1	32.1	< 0.005	0.01	0.03	33.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.9	15.9	< 0.005	< 0.005	0.03	16.1
Vendor	< 0.005	< 0.005	0.09	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	63.6	63.6	< 0.005	0.01	0.06	66.5
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.31	5.31	< 0.005	< 0.005	0.01	5.57

3.7. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.48	0.40	3.88	5.87	0.01	0.16	—	0.16	0.14	—	0.14	—	896	896	0.04	0.01	—	899
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.64	0.96	< 0.005	0.03	—	0.03	0.02	—	0.02	—	147	147	0.01	< 0.005	—	148
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.12	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.4	24.4	< 0.005	< 0.005	—	24.5
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.03	0.54	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	81.3	81.3	< 0.005	< 0.005	0.29	82.7
Vendor	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	< 0.005	0.02	0.29	131
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.3	12.3	< 0.005	< 0.005	0.02	12.5
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20.5	20.5	< 0.005	< 0.005	0.02	21.4
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.82	1.82	< 0.005	< 0.005	< 0.005	1.90
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.04	2.04	< 0.005	< 0.005	< 0.005	2.07
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.40	3.40	< 0.005	< 0.005	< 0.005	3.55
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.30	0.30	< 0.005	< 0.005	< 0.005	0.32

3.9. Architectural Coating (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.30	2.22	3.00	< 0.005	0.05	—	0.05	0.05	—	0.05	—	356	356	0.01	< 0.005	—	357
Architectural Coatings	0.08	0.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.30	2.22	3.00	< 0.005	0.05	—	0.05	0.05	—	0.05	—	356	356	0.01	< 0.005	—	357
Architectural Coatings	0.08	0.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.36	0.49	< 0.005	0.01	—	0.01	0.01	—	0.01	—	58.5	58.5	< 0.005	< 0.005	—	58.7
Architectural Coatings	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.69	9.69	< 0.005	< 0.005	—	9.72
Architectural Coatings	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.01	0.27	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40.6	40.6	< 0.005	< 0.005	0.14	41.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.20	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	36.3	36.3	< 0.005	< 0.005	< 0.005	36.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.15	6.15	< 0.005	< 0.005	0.01	6.25
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.02	1.02	< 0.005	< 0.005	< 0.005	1.03

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Mobile source emissions results are presented in Sections 2.6. No further detailed breakdown of emissions is available.

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	623	623	0.05	0.01	—	626
Total	—	—	—	—	—	—	—	—	—	—	—	—	623	623	0.05	0.01	—	626
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	623	623	0.05	0.01	—	626
Total	—	—	—	—	—	—	—	—	—	—	—	—	623	623	0.05	0.01	—	626
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	103	103	0.01	< 0.005	—	104

Total	—	—	—	—	—	—	—	—	—	—	—	—	103	103	0.01	< 0.005	—	104

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.05	0.03	0.49	0.42	< 0.005	0.04	—	0.04	0.04	—	0.04	—	590	590	0.05	< 0.005	—	592
Total	0.05	0.03	0.49	0.42	< 0.005	0.04	—	0.04	0.04	—	0.04	—	590	590	0.05	< 0.005	—	592
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.05	0.03	0.49	0.42	< 0.005	0.04	—	0.04	0.04	—	0.04	—	590	590	0.05	< 0.005	—	592
Total	0.05	0.03	0.49	0.42	< 0.005	0.04	—	0.04	0.04	—	0.04	—	590	590	0.05	< 0.005	—	592
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.01	< 0.005	0.09	0.08	< 0.005	0.01	—	0.01	0.01	—	0.01	—	97.7	97.7	0.01	< 0.005	—	98.0
Total	0.01	< 0.005	0.09	0.08	< 0.005	0.01	—	0.01	0.01	—	0.01	—	97.7	97.7	0.01	< 0.005	—	98.0

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	1.07	1.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.06	0.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.39	0.36	0.02	2.17	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.94	8.94	< 0.005	< 0.005	—	8.97
Total	1.52	1.49	0.02	2.17	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.94	8.94	< 0.005	< 0.005	—	8.97
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	1.07	1.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.06	0.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	1.13	1.13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.20	0.20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape	0.03	0.03	< 0.005	0.20	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.73	0.73	< 0.005	< 0.005	—	0.73
Total	0.24	0.24	< 0.005	0.20	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.73	0.73	< 0.005	< 0.005	—	0.73

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	22.2	46.8	69.0	2.28	0.05	—	142
Total	—	—	—	—	—	—	—	—	—	—	—	22.2	46.8	69.0	2.28	0.05	—	142
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	22.2	46.8	69.0	2.28	0.05	—	142
Total	—	—	—	—	—	—	—	—	—	—	—	22.2	46.8	69.0	2.28	0.05	—	142
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	3.67	7.75	11.4	0.38	0.01	—	23.5
Total	—	—	—	—	—	—	—	—	—	—	—	3.67	7.75	11.4	0.38	0.01	—	23.5

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	33.4	0.00	33.4	3.34	0.00	—	117
Total	—	—	—	—	—	—	—	—	—	—	—	33.4	0.00	33.4	3.34	0.00	—	117
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	33.4	0.00	33.4	3.34	0.00	—	117
Total	—	—	—	—	—	—	—	—	—	—	—	33.4	0.00	33.4	3.34	0.00	—	117
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	5.53	0.00	5.53	0.55	0.00	—	19.4
Total	—	—	—	—	—	—	—	—	—	—	—	5.53	0.00	5.53	0.55	0.00	—	19.4

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	51.9	47.3	132	121	0.23	6.95	0.00	6.95	6.95	0.00	6.95	0.00	24,178	24,178	0.97	0.19	0.00	24,259
Total	51.9	47.3	132	121	0.23	6.95	0.00	6.95	6.95	0.00	6.95	0.00	24,178	24,178	0.97	0.19	0.00	24,259
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	51.9	47.3	132	121	0.23	6.95	0.00	6.95	6.95	0.00	6.95	0.00	24,178	24,178	0.97	0.19	0.00	24,259
Total	51.9	47.3	132	121	0.23	6.95	0.00	6.95	6.95	0.00	6.95	0.00	24,178	24,178	0.97	0.19	0.00	24,259
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.11	0.10	0.28	0.25	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	45.7	45.7	< 0.005	< 0.005	0.00	45.8
Total	0.11	0.10	0.28	0.25	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	45.7	45.7	< 0.005	< 0.005	0.00	45.8

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Prep/Grading	Grading	1/1/2026	5/6/2026	5.00	90.0	—
Facility Construction	Building Construction	5/7/2026	5/11/2027	5.00	264	—
Paving	Paving	5/12/2027	8/3/2027	5.00	60.0	—
Architectural Coating	Architectural Coating	8/4/2027	10/26/2027	5.00	60.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/Grading	Excavators	Diesel	Average	3.00	2.00	36.0	0.38
Site Prep/Grading	Graders	Diesel	Average	1.00	2.00	148	0.41

Site Prep/Grading	Rubber Tired Dozers	Diesel	Average	1.00	2.00	367	0.40
Site Prep/Grading	Scrapers	Diesel	Average	2.00	1.00	423	0.48
Site Prep/Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	2.00	84.0	0.37
Facility Construction	Cranes	Diesel	Average	1.00	1.00	367	0.29
Facility Construction	Forklifts	Diesel	Average	2.00	1.00	82.0	0.20
Facility Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Facility Construction	Tractors/Loaders/Backhoes	Diesel	Average	2.00	2.00	84.0	0.37
Facility Construction	Welders	Diesel	Average	1.00	1.00	46.0	0.45
Paving	Pavers	Diesel	Average	1.00	4.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	4.00	4.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	4.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	4.00	4.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/Grading	—	—	—	—
Site Prep/Grading	Worker	15.0	10.9	LDA,LDT1,LDT2
Site Prep/Grading	Vendor	5.00	8.27	HHDT,MHDT
Site Prep/Grading	Hauling	0.22	20.0	HHDT
Site Prep/Grading	Onsite truck	—	—	HHDT
Facility Construction	—	—	—	—
Facility Construction	Worker	50.0	10.9	LDA,LDT1,LDT2
Facility Construction	Vendor	60.0	8.27	HHDT,MHDT
Facility Construction	Hauling	1.89	20.0	HHDT
Facility Construction	Onsite truck	—	—	HHDT

Paving	—	—	—	—
Paving	Worker	10.0	10.9	LDA,LDT1,LDT2
Paving	Vendor	5.00	8.27	HHDT,MHDT
Paving	Hauling	0.17	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	5.00	10.9	LDA,LDT1,LDT2
Architectural Coating	Vendor	0.00	8.27	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	1,000	1,000	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Prep/Grading	—	—	45.0	0.00	—
Paving	0.00	0.00	0.00	0.00	0.00

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Light Industry	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	453	0.03	< 0.005
2027	0.00	453	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Total all Land Uses	1.70	1.70	1.70	621	74.8	74.8	74.8	27,302

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	75,000	25,000	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Light Industry	501,721	453	0.0330	0.0040	1,841,547

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Light Industry	11,562,500	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Light Industry	62.0	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor
Emergency Generator	Diesel	1.00	24.0	100	600	0.73

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	25.1	annual days of extreme heat
Extreme Precipitation	1.90	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	72.5
AQ-PM	88.9
AQ-DPM	75.0
Drinking Water	62.8
Lead Risk Housing	88.3
Pesticides	51.6
Toxic Releases	15.4
Traffic	66.7
Effect Indicators	—
CleanUp Sites	58.5
Groundwater	95.2
Haz Waste Facilities/Generators	67.0
Impaired Water Bodies	23.9
Solid Waste	0.00
Sensitive Population	—
Asthma	97.1
Cardio-vascular	99.5
Low Birth Weights	95.2
Socioeconomic Factor Indicators	—

Education	72.9
Housing	88.3
Linguistic	53.4
Poverty	79.5
Unemployment	97.6

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	15.64224304
Employed	4.516874118
Median HI	4.504042089
Education	—
Bachelor's or higher	31.19466188
High school enrollment	100
Preschool enrollment	1.873476197
Transportation	—
Auto Access	4.18324137
Active commuting	30.89952521
Social	—
2-parent households	43.38508918
Voting	9.624021558
Neighborhood	—
Alcohol availability	53.49672783
Park access	46.72141666
Retail density	80.59797254
Supermarket access	75.45232901

Tree canopy	51.62325164
Housing	—
Homeownership	31.90042346
Housing habitability	60.51584756
Low-inc homeowner severe housing cost burden	85.02502246
Low-inc renter severe housing cost burden	50.78916977
Uncrowded housing	66.9190299
Health Outcomes	—
Insured adults	65.67432311
Arthritis	15.6
Asthma ER Admissions	0.5
High Blood Pressure	8.1
Cancer (excluding skin)	32.7
Asthma	19.7
Coronary Heart Disease	12.2
Chronic Obstructive Pulmonary Disease	13.3
Diagnosed Diabetes	29.7
Life Expectancy at Birth	10.9
Cognitively Disabled	4.9
Physically Disabled	3.3
Heart Attack ER Admissions	0.4
Mental Health Not Good	27.0
Chronic Kidney Disease	10.6
Obesity	17.5
Pedestrian Injuries	93.6
Physical Health Not Good	24.5
Stroke	17.3
Health Risk Behaviors	—

Binge Drinking	54.2
Current Smoker	24.8
No Leisure Time for Physical Activity	26.6
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	28.6
Elderly	32.8
English Speaking	52.8
Foreign-born	7.6
Outdoor Workers	86.0
Climate Change Adaptive Capacity	—
Impervious Surface Cover	68.3
Traffic Density	57.5
Traffic Access	0.0
Other Indices	—
Hardship	69.6
Other Decision Support	—
2016 Voting	28.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	98.0
Healthy Places Index Score for Project Location (b)	7.00
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	See AQ Memo for assumptions.
Land Use	See AQ Memo for assumptions.
Construction: Off-Road Equipment	See AQ Memo for assumptions.
Construction: Trips and VMT	See AQ Memo for assumptions.
Construction: Architectural Coatings	See AQ Memo for assumptions.
Operations: Fleet Mix	See AQ Memo for assumptions.
Operations: Refrigerants	See AQ Memo for assumptions.

Appendix C BIOLOGICAL RESOURCES

C.1 SPECIAL STATUS SPECIES POTENTIAL FOR OCCURRENCE ASSESSMENT

SPECIAL STATUS SPECIES POTENTIAL FOR OCCURRENCE ASSESSMENT

The table below lists the special status plant and wildlife species identified to occur within the Biological Study Area (BSA) (within five miles of the Program Study Area) or in database queries as described in the Draft EIR environmental setting (Section 3.4.3) and evaluated for potential impacts in the Draft EIR impact analysis (Section 3.4.4).

Appendix C.1 Special Status Species Determined to Have a Low or Very Low to Nonexistent Potential to Occur within the Program Study Area.

Common name Scientific name	Legal status			Geographic distribution/ Floristic province	Preferred habitat	Identification period	Level of potential to occur within the Program Study Area
	Federal	State	CNPS				
Plants							
Alkali milk-vetch *Astragalus tener var. tener*	–	–	1B.2	5–195 feet (1–60 meters)	Playas; valley and foothill grassland; vernal pools.	March–June	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Alkali-sink goldfields *Lasthenia chrysantha*	–	–	1B.1	0–655 feet (0–200 meters)	Vernal pools.	February–April	**Very Low to Nonexistent.** Limited to no suitable habitat within the Program Study Area. One known occurrence (1936) within the BSA five miles south of Merced in an area where the majority of the land has since been converted for agricultural purposes (CDFW 2024f).
Beaked clarkia *Clarkia rostrata*	–	–	1B.3	196–1,641 feet (60–500 meters)	Cismontane woodland; valley and foothill grassland.	April–May	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Boggs Lake hedge-hyssop *Gratiola heterosepala*	–	E	1B.2	32–7,791 feet (10–2,375 meters)	Vernal pools; marshes, swamps; lake margins; clay.	April–August	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
California alkali grass *Puccinellia simplex*	–	–	1B.2	7–3,051 feet (2–930 meters)	Chenopod scrub; meadows and seeps; valley and foothill grassland; vernal pools; alkaline, vernally mesic; sinks, flats, and lake margins.	March–May	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. One known occurrence (1935) within the BSA.
Colusa grass *Neostapfia colusana*	T, X	E	1B.1	16–656 feet (5–200 meters)	Large vernal pools; adobe.	May–August	**Low**. Limited to no suitable habitat within the Program Study Area. Known occurrences (1986, 2008, 2011, 2016) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Coulter's goldfields *Lasthenia glabrata ssp. coulteri*	–	–	1B.1	5–4,005 feet (1–1,220 meters)	Marshes and swamps (coastal salt); playas; vernal pools.	February–June	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Crownscale *Atriplex coronata var. coronata*	–	–	4.2	5–1,935 feet (1–590 meters)	Chenopod scrub; valley and foothill grassland; vernal pools.	March–October	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Delta button-celery *Eryngium racemosum*	–	E	1B.1	10–98 feet (3–30 meters)	Riparian scrub; vernally mesic clay depressions.	June–October	**Very Low to Nonexistent**. No suitable habitat within the Program Study Area. No known occurrences within the BSA.
Dwarf downingia *Downingia pusilla*	–	–	2B.2	3–1,459 feet (1–445 meters)	Valley and foothill grassland; vernal pools; mesic.	March–May	**Low**. Limited suitable habitat within the Program Study Area. Two known occurrences (1999) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Ewan's larkspur *Delphinium hansenii ssp. ewanianum*	–	–	4.2	197–1,968 feet (60–600 meters)	Cismontane woodland; valley and foothill grassland; rocky	March–May	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Ferris' goldfields *Lasthenia ferrisiae*	–	–	4.2	65–2,295 feet (20–700 meters)	Vernal pools (alkaline, clay).	February–May	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Fleshy owl's-clover *Castilleja campestris ssp. succulenta*	T	CE	1B.2	165–2,460 feet (50–750 meters)	Vernal pools (often acidic).	March–May	**Very Low to Nonexistent.** Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.

Common name Scientific name	Legal status			Geographic distribution/ Floristic province	Preferred habitat	Identification period	Level of potential to occur within the Program Study Area
	Federal	State	CNPS				
Forked hareleaf *Lagophylla dichotoma*	–	–	1B.1	147–1,100 feet (45–335 meters)	Cismontane woodland; valley and foothill grassland; clay.	April–May	**Low**. Limited suitable habitat within the Program Study Area. One known occurrence (1915) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Greene's Tuctoria *Tuctoria greenei*	E, X	R	1B.1	98–3,510 feet (30–1,070 meters)	Vernal pools.	May–September	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Hairy Orcutt grass *Orcuttia pilosa*	E	E	1B.1	151–656 feet (46–200 meters)	Vernal pools.	May–September	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. One known occurrence (1938) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B.1	49–492 feet (15–150 meters)	Cismontane woodland; valley and foothill grassland; clay, acidic.	March–April	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Heartscale *Atriplex cordulata* var. *cordulata*	–	–	1B.2	0–1,837 feet (0–560 meters)	Chenopod scrub; meadows and seeps; valley and foothill grassland; sandy, saline, alkaline.	April–October	**Low**. Limited suitable habitat within the Program Study Area. One known occurrence (1988) within the BSA (CDFW 2024f).
Heckard's pepper-grass *Lepidium latipes* var.*heckardii*	–	–	1B.2	5–655 feet (2–200 meters)	Valley and foothill grassland (alkaline flats).	March–May	**Low.** Limited suitable habitat within the Program Study Area. No known occurrences within the BSA.
Henderson's bent grass *Agrostis hendersonii*	–	–	3.2	230–1,001 feet (70–305 meters)	Valley and foothill grassland; vernal pools; mesic.	April–June	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. One known occurrence (1937) within the BSA (CDFW 2024f).
Hogwallow starfish *Hesperevax caulescens*	–	–	4.2	0–1,656 feet (0–505 meters)	Valley and foothill grassland; shallow vernal pools; mesic, clay, alkaline.	March–June	**Low**. Limited suitable habitat within the Program Study Area. No known occurrences within the BSA. However, there are documented occurrences within the Merced Quad.
Hoover's calycadenia *Calycadenia hooveri*	–	–	1B.3	213–984 feet (65–300 meters)	Cismontane woodland; valley and foothill grassland; rocky.	July–September	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Hoover's spurge *Euphorbia hooveri*	T, X	–	1B.2	80–820 feet (25–250 meters)	Vernal pools.	July–October	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Keck's checkerbloom *Sidalcea keckii*	E	–	1B.1	246–2,132 feet (75–650 meters)	Cismontane woodland; valley and foothill grassland; serpentinite, clay.	April–June	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. Two known occurrences (2005, 2016) within the BSA (CDFW 2024f).
Lesser saltscale *Atriplex minuscula*	–	–	1B.1	49–656 feet (15–200 meters)	Chenopod scrub; playas; valley and foothill grassland; alkaline, sandy.	May–October	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Little mousetail *Myosurus minimus* ssp. *apus*	–	–	3.1	65–2,100 feet (20–640 meters)	Valley and foothill grassland; vernal pools (alkaline).	March–June	**Low.** Limited suitable habitat within the Program Study Area. No known occurrences within the BSA.
Merced phacelia *Phacelia ciliata* var. *opaca*	–	–	3.2	196–492 feet (60–150 meters)	Valley and foothill grassland; clay, alkaline.	February–May	**Low**. Limited suitable habitat within the Program Study Area. Three known occurrences (1929, 1937, and 1977) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Parry's rough tarplant *Centromadia parryi* ssp. *rudis*	–	–	4.2	0–100 feet (0–300 meters)	Valley and foothill grassland; vernal pools.	May –October	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Pincushion navarretia *Navarretia myersii* ssp. *myersii*	–	–	1B.1	66–1,083 feet (20–330 meters)	Vernal pools; acidic.	April–May	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Prostrate vernal pool navarrentia *Navarretia prostrata*	–	–	1B.2	10–3,970 feet (3–1,210 meters)	Coastal scrub; meadows and seeps; valley and foothill grassland (alkaline); vernal pools.	April–June	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.

Common name Scientific name	Legal status			Geographic distribution/ Floristic province	Preferred habitat	Identification period	Level of potential to occur within the Program Study Area
	Federal	State	CNPS				
Recurved larkspur *Delphinium recurvatum*	–	–	1B.2	10–2,592 feet (3–790 meters)	Valley and foothill grassland; chenopod scrub; cismontane woodland; alkaline.	March–June	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
San Joaquin spearscale *Extriplex joaquinana*	–	–	1B.2	5–2,740 feet (1–835 meters)	Chenopod scrub; meadows and seeps; playas; valley and foothill grassland.	April–October	**Very Low to Nonexistent.** Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T, X	E	1B.1	33–2,478 feet (10–755 meters)	Vernal pools.	April–September	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. Known occurrences (1980, 1987, 2001, 2016) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Sanford's arrowhead *Sagittaria sanfordii*	–	–	1B.2	0–2,133 feet (0–650 meters)	Marshes and swamps; shallow freshwater.	May–November	**Low**. Limited suitable habitat within the Program Study Area. Three known occurrences (1980, 2010, 2012) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Shining navarretia *Navarretia nigelliformis ssp. radians*	–	–	1B.2	249–3,280 feet (76–1,000 meters)	Cismontane woodland; valley and foothill grassland; vernal pools; clay.	March–July	**Low**. Limited suitable habitat within the Program Study Area. Known occurrences (1999, 2001, 2006, 2009, 2017) within the BSA and documented occurrences within the Merced Quad. However, the Program Study Area is not within the elevation range for this species (CDFW 2024f).
Small-flowered morning-glory *Convolvulus simulans*	–	–	4.2	95–2,430 feet (30–740 meters)	Chaparral; openings; coastal scrub; valley and foothill grassland; clay; serpentinite seeps.	March–July	**Low**. Limited suitable habitat within the Program Study Area. No known occurrences within the BSA. However, there are documented occurrences within the Merced Quad.
Spiny-sepaled button-celery *Eryngium spinosepalum*	–	–	1B.2	262–3,198 feet (80–975 meters)	Valley and foothill grassland; vernal pools.	April–June	**Very Low to Nonexistent**. Limited suitable habitat within the Program Study Area. Known occurrences (2001) within the BSA (CDFW 2024f). However, the Program Area is not within the elevation range for this species.
Stinkbells *Fritillaria agrestis*	–	–	4.2	35–5,100 feet (10–1,555 meters)	Chaparral; Cismontane woodland; pinyon and juniper woodland; valley and foothill grassland.	March–June	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Subtle orache *Atriplex subtilis*	–	–	1B.2	131–328 feet (40–100 meters)	Valley and foothill grassland; alkaline.	June–October	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Succulent owl's-clover *Castilleja campestris ssp. succulenta*	T, X	E	1B.2	164–2,461 feet (50–750 meters)	Vernal pools; acidic.	March–May	**Low**. Limited suitable habitat within the Program Study Area. Known occurrences (1997, 1999, 2001, 2004, 2008) within the BSA and documented occurrences within the Merced Quad (CDFW 2024f).
Vernal pool smallscale *Atriplex persistens*	–	–	1B.2	33–377 feet (10–115 meters)	Vernal pools; alkaline.	June–October	**Low**. Limited suitable habitat within the Program Study Area. Two known occurrences (1926, 2011) within the BSA (CDFW 2024f).
Watershield *Brasenia*	–	–	2B.3	95–7,220 feet (30–2,200 meters)	Freshwater marshes and swamp.	June–September	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. One known occurrence (1915) within the BSA (CDFW 2024f).
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	–	–	2B.1	15–1,425 feet (5–435 meters)	Meadows and seeps; marshes and swamps; riparian forest; vernal pools.	May–September	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Invertebrates							
American bumble bee *Bombus pensylvanicus*	–	–	N/A	Absent from much of the U.S. Mountain West, this species is found in the Desert West and adjacent areas of California and Oregon.	Farmlands and open fields where they nest below the grass or underground. Pollinate on various native plants including crops.	Spring−Summer	**Low.** Limited suitable foraging and nesting habitat exists within the Program Study Area; however, suitable habitat may exists within the agricultural fields in the eastern part of Merced County and in areas within and adjacent to the Program Study Area. According to the desktop review, there are multiple records of collected individuals in the vicinity of Merced from 1943 through 1975 (CDFW 2024f).
California linderiella *Linderiella occidentalis*	–	–	N/A	California's Central Valley and up to elevations as high as 3,770 feet (1,150 meters).	Vernal pools.	December–May	**Very Low to Nonexistent.** Limited to no suitable habitat within the Program Study Area. Multiple known occurrences within the BSA from 1999 through 2017 (CDFW 2024f).

Common name Scientific name	Legal status			Geographic distribution/ Floristic province	Preferred habitat	Identification period	Level of potential to occur within the Program Study Area
	Federal	State	CNPS				
Conservancy fairy shrimp *Branchinecta conservatio*	E, X	–	N/A	Six disjoint populations in Tehama, Butte, Jepson, Solano, Sacramento, Glenn, Merced, and Ventura Counties.	Vernal pools.	November–April	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. Two known occurrences within the BSA from 2000 and 2019 (CDFW 2024f).
Midvalley fairy shrimp *Branchinecta mesovallensis*	–	–	N/A	California's Central Valley; Southeastern Sacramento, Southern Sierra Foothill, San Joaquin, and Solano-Colusa Vernal Pool Regions.	Vernal pools.	Winter–Spring	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. Multiple known occurrences within the BSA (CDFW 2024f).
Molestan blister beetle *Lytta moesta*	–	–	N/A	Central California.	Associated with *Lupinus,* and *Trifolium wormskioldii* in dry vernal pools, and *Eriodium.*	April–July	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. One known occurrence (unknown date) within the BSA (CDFW 2024f).
Monarch butterfly *Danaus plexippus*	C	–	N/A	Throughout North America to southern Canada as well as Hawaii and other Pacific islands, Australia, New Zealand, Spain, and Portugal.	Fields, roadsides, open areas, wet areas, or urban gardens including their only hostplant, milkweed, and various other nectar-producing flowering plants.	Spring−early Fall	**Low.** Limited to no suitable habitat (host plants) observed within the Program Study Area. No known occurrences within the BSA.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–	N/A	California Central Valley and foothills, majority below 500 feet (152 meters) elevation.	Elderberry shrubs (*Sambucus* sp.), with stems at least about one inch in diameter, along rivers and streams.	March–July	**Low**. Limited suitable habitat within the Program Study Area. No known occurrences within the BSA.
Vernal pool fairy shrimp *Branchinecta lynchi*	T, X	–	N/A	Scattered throughout Central Valley, Coast Range, and Southern California.	Vernal pools.	December–May	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. Multiple known occurrences within the BSA (CDFW 2024f).
Vernal pool tadpole shrimp *Lepidurus packardi*	E, X	–	N/A	Scattered throughout Central Valley. Shasta through Tulare Counties, and Alameda and Contra Costa Counties.	Ephemeral freshwater habitats. Alkaline pools; clay flats; vernal lakes; vernal pools; vernal swales; seasonal wetlands.	Winter–Spring	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. Four known occurrences within the BSA from 1999 through 2013 (CDFW 2024f).
Reptiles and Amphibians							
California red-legged frog *Rana draytonii*	T	SSC	N/A	Coastal Range of California, foothill range of Sierra Nevada mountains.	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Require animal burrows or other moist refuges for estivation.	Year-round, breed November–April	**Low**. No suitable breeding habitat within the Program Study Area. No known occurrences within the BSA.
Giant gartersnake *Thamnophis gigas*	T	T	N/A	Central Valley from Glenn County to the southern edge of San Francisco Bay Delta, and from Merced County to northern Fresno County. 0–400 feet (0–122 meters)	Highly aquatic, found in marshes, sloughs, irrigation ditches, canals, rice fields, slow-moving creeks with nearby vegetation.	Active March−October, breed in spring	**Low**. Limited suitable habitat within the Program Study Area. One known occurrence (1908) within the BSA (CDFW 2024f).
Northwestern pond turtle *Actinemys marmorata*	PT	SSC	N/A	West of the Sierra and Cascade Mountains and desert regions. 0–4,690 feet (0–1,430 meters)	Slow moving streams, marshes, wetlands, and ponds, at least 1.6 feet deep with overhanging vegetation and rock outcrops, and associated upland habitat, usually grasslands.	Year-round, breed April−May	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. One known occurrence (2006) within the BSA (CDFW 2024f).
Western spadefoot *Spea hammondii*	PT	SSC	N/A	California Central Valley and adjacent foothills, southern Coastal Range. 0–4,460 feet (0–1,360 meters)	Occurs primarily in grassland habitats but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	Active October −May, breed January–May	**Low**. Limited suitable habitat within the Program Study Area. Two known occurrences (2018) within the BSA specifically at the Deadman Creek Conservation Bank (CDFW 2024f).
Birds							
Bald eagle *Haliaeetus leucocephalus*	D	E, FP	N/A	Breeds in northern California, Sierra Nevada mountains and foothills, central coast range, inland southern California, and Santa Catalina Island. Winters throughout California except in arid southeastern areas.	Foraging areas include rivers, reservoirs, lakes, estuaries, and coastal marine ecosystems. Nests in large, old-growth, or dominant trees within one mile of foraging habitat.	Year-round	**Very Low to Nonexistent**. No suitable habitat within the Program Study Area. One known occurrence within the BSA at Yosemite Lake northeast of the Program Study Area (CDFW 2024f).

Common name Scientific name	Legal status			Geographic distribution/ Floristic province	Preferred habitat	Identification period	Level of potential to occur within the Program Study Area
	Federal	State	CNPS				
Ferruginous hawk *Buteo regalis*	BCC	WL	N/A	Modoc Plateau, Central Valley, Coast Ranges, and the deserts of southwestern California.	Open grasslands, agricultural areas, sagebrush, desert scrub, low foothills, and pinyon-juniper woodland.	Wintering (September–April)	**Low**. No suitable nesting habitat and limited to no suitable foraging habitat within the Program Study Area. One known occurrence (2006) within the BSA (CDFW 2024f).
Mountain plover *Charadrius montanus*	BCC	SSC	N/A	Central Valley, San Joaquin foothills, southern California.	Valley and foothill or other short grasslands, agricultural fields, grazed areas, chenopod scrub.	Wintering (September–March)	**Low**. Limited suitable nesting habitat within the Program Study Area. One known occurrence (1999) within the BSA (CDFW 2024f).
Mammals							
Fresno kangaroo rat *Dipodomys nitratoides exilis*	E	E, SH	N/A	San Joaquin Valley floor, 200–1,800 feet (60–550 meters). Fresno County.	Chenopod scrub, alkali sink, dry, sandy grassland.	Year-round	**Very Low to Nonexistent**. Limited to no suitable habitat within the Program Study Area. No known occurrences within the BSA.
Merced kangaroo rat *Dipodomys heermanni dixoni*	–	–	N/A	San Joaquin Valley, eastern Merced and Stanislaus counties.	Valley and foothill grassland with fine, deep, well-drained soil.	Year-round	**Low**. Limited suitable habitat within the Program Study Area. However, there are five known occurrences within the BSA from 1999 within the UC Merced planning area northeast of the Program Study Area (CDFW 2024f).
Western mastiff bat *Eumops perotis californicus*	–	SSC	N/A	Central Valley, Coastal Range, southern and eastern California.	Open semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	Year-round	**Low**. Limited suitable habitat within the Program Study Area. There is one known occurrence (from 1991) within 5 miles of the Program Study Area (CDFW 2024f). During the field surveys conducted on February 11, 2019 and May 23–24, 2024, no evidence of special status bat species was observed within or immediately adjacent to the Program Study Area or proposed Project areas. However, limited potential foraging habitat as well as potential roosting habitat such as tree foliage and human-made structures were observed within areas immediately adjacent to the proposed Project areas and within the Program Study Area.

Key

Federal

C = Candidate under federal Endangered Species Act

T = Threatened under federal Endangered Species Act

E = Tndangered under federal Endangered Species Act

BCC = Bird of Conservation Concern

MBTA = Migratory Bird Treaty Act

– = No Listing

CNPS = California Native Plant Society

NWR = National Wildlife Refuge

State

T = Threatened under the California Endangered Species Act

CE = Candidate Endangered

SSC = Species of Special Concern

FGC = Fish and Game Code

– = no listing

Source: Calflora 2024. CDFW 2020, CDFW 2021, CDFW 2024f, CDFW 2024g, CDFW 2024h, CDFW 2024i, CDFW 2024j, CDFW 2024l, CDPR 2024, CNPS 2024b, CornellLab 2024, iNaturalist 2024, Nafis 2024, UC Davis 2022, UC Davis 2024, USDA 2019, USFS 2024, USEPA 2010, USFWS 2006, USFWS 2017b, USFWS 2024f, USFWS 2024g, USFWS 2024i, USFWS 2024k, and WBWG 2024.

C.2 FIELD SURVEY PHOTOGRAPHS

CIP 1

CIP 1 Photographic Record

Photograph 1: Field Survey CIP 1. Fahrens Creek. 5/23/24.

Photograph 2: Field Survey CIP 1. Fahrens Creek. 5/23/24.

Photograph 3: Field Survey CIP 1. Fahrens Creek. 5/23/24.

Photograph 4: Field Survey CIP 1. Dirt road adjacent to Fahrens Creek. 5/23/24.

CIP 2

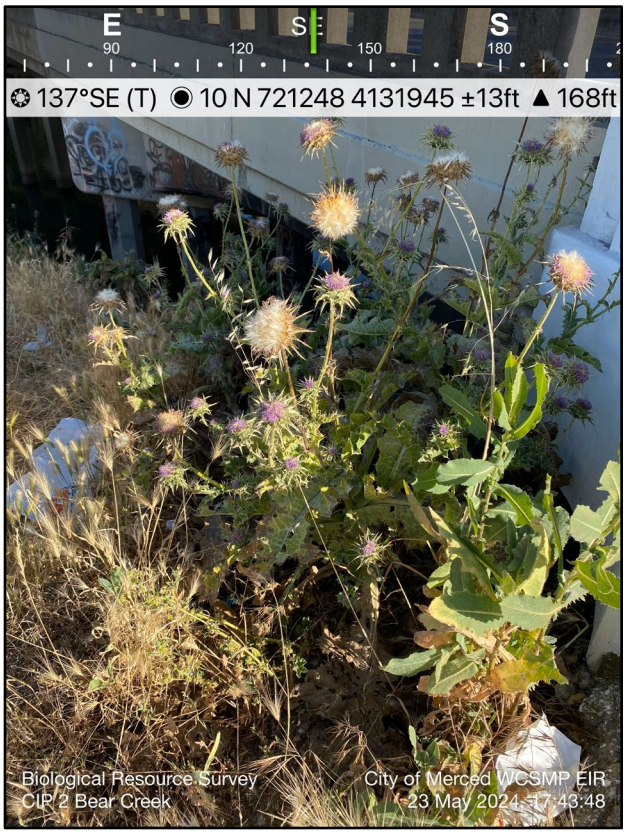
CIP 2 Photographic Record

Photograph 1: Field Survey CIP 2. Bear Creek crossing. 5/23/24.

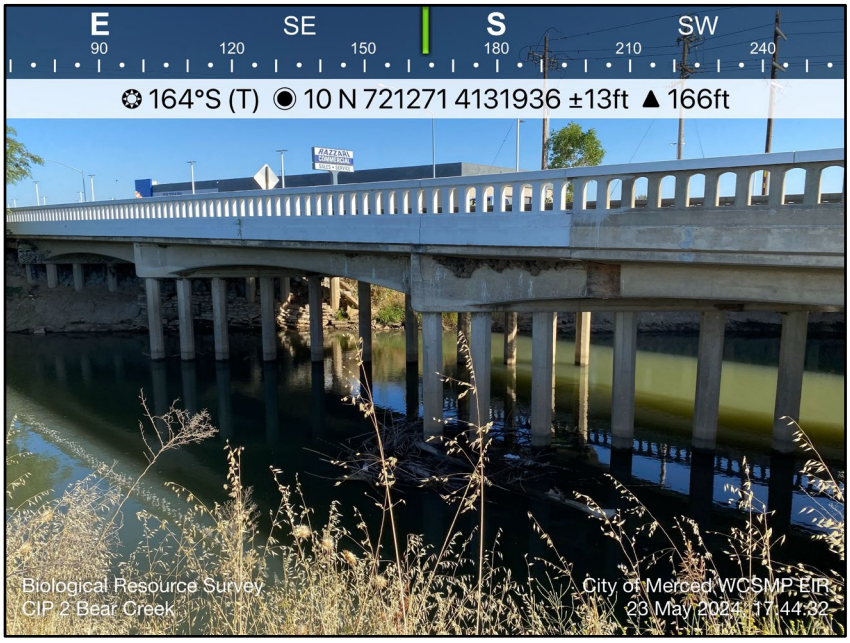
Photograph 2: Field Survey CIP 2. Bear Creek crossing. 5/23/24.

Photograph 3: Field Survey CIP 2. Bear Creek crossing. 5/23/24.

Photograph 4: Field Survey CIP 2. Bear Creek crossing. 5/23/24.



Photograph 5: Field Survey CIP 2. Bear Creek crossing. 5/23/24.



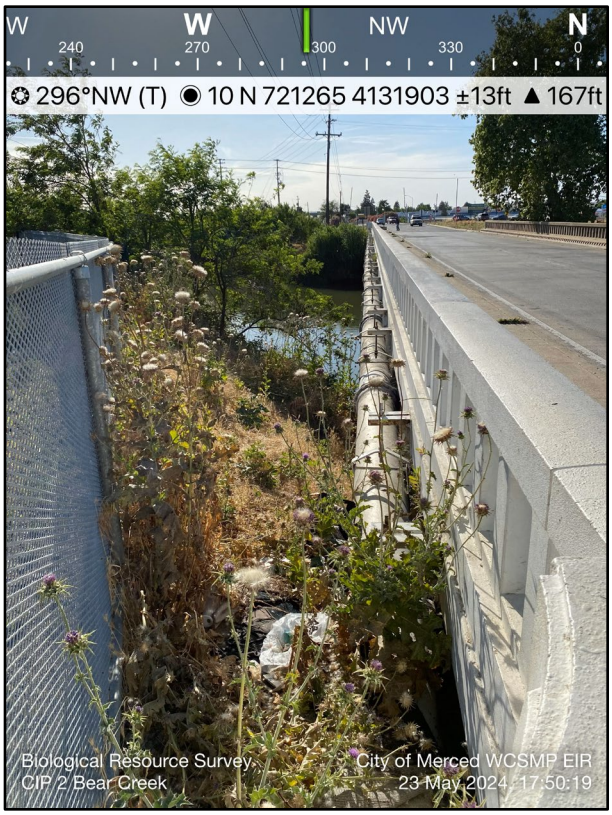
Photograph 6: Field Survey CIP 2. Bear Creek crossing. 5/23/24.

Photograph 7: Field Survey CIP 2. Bear Creek crossing. 5/23/24.

Photograph 8: Field Survey CIP 2. Bear Creek crossing. 5/23/24.

Photograph 9: Field Survey CIP 2. Area just north of Bear Creek crossing. 5/23/24.

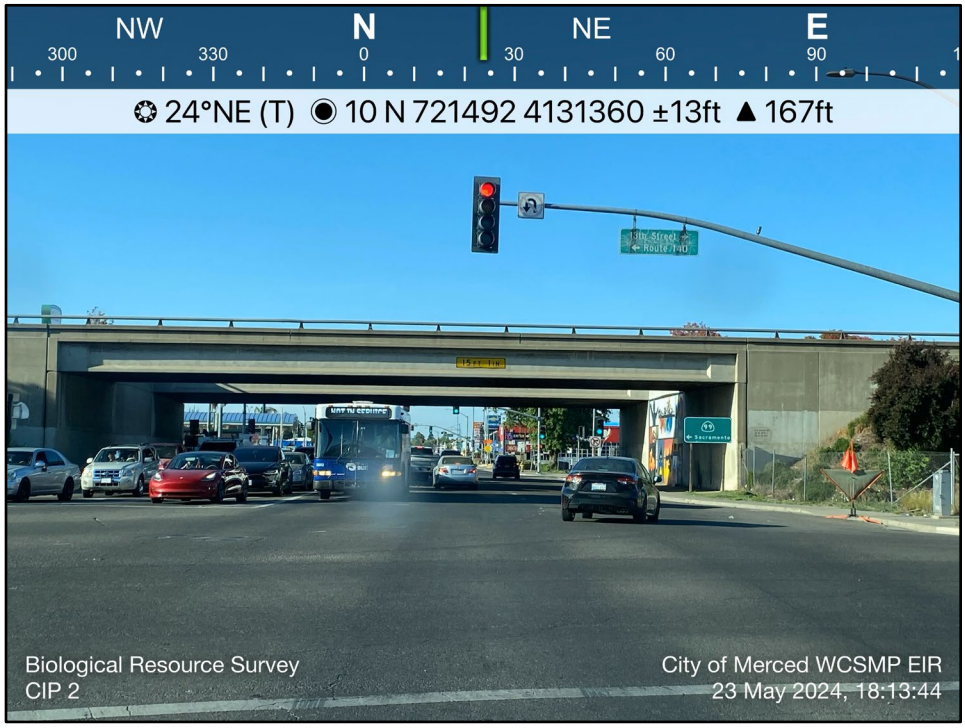
Photograph 10: Field Survey CIP 2. Bear Creek crossing. 5/23/24.



Photograph 11: Field Survey CIP 2. Bear Creek crossing. 5/23/24.

Photograph 12: Field Survey CIP 2. V Street. 5/23/24.

Photograph 13: Field Survey CIP 2. V Street. 5/23/24.



Photograph 14: Field Survey CIP 2. V Street at Hwy 140 overpass. 5/23/24.

CIP 3

CIP 3 Photographic Record

Photograph 1: Field Survey CIP 3. West Street. 5/23/24.

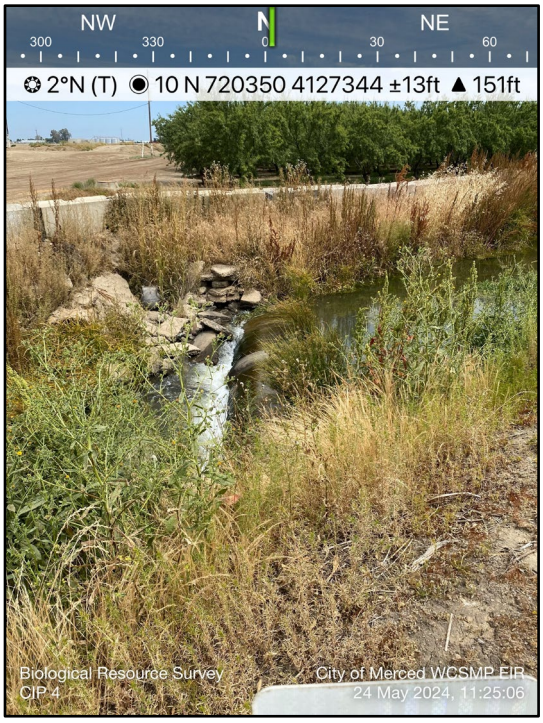
Photograph 2: Field Survey CIP 3. West Street. 5/23/24.

Photograph 3: Field Survey CIP 3. West Street. 5/23/24.

CIP 4

CIP 4 Photographic Record

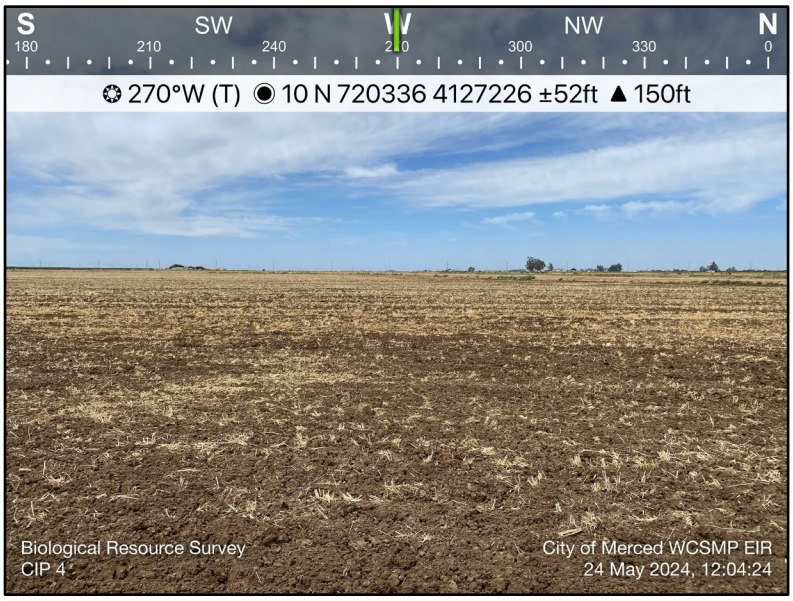
Photograph 1: Field Survey CIP 4. Hartley Slough adjacent to Hartley Road. 5/24/24.



Photograph 2: Field Survey CIP 4. Hartley Slough adjacent to Hartley Road. 5/24/24.

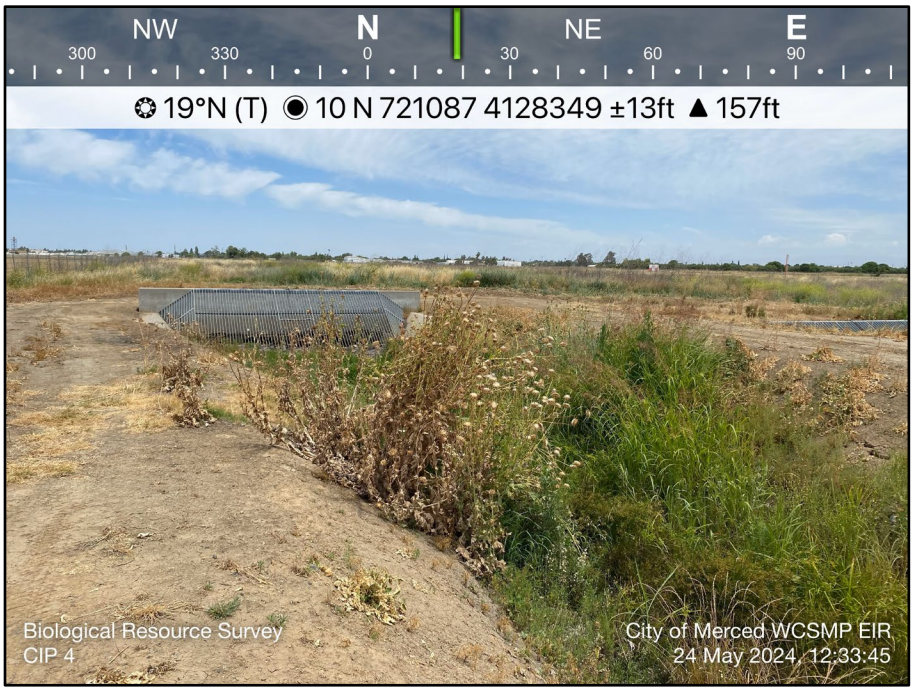
Photograph 3: Field Survey CIP 4. Hartley Slough. 5/24/24.

Photograph 4: Field Survey CIP 4. Hartley Slough just west of S West Avenue. 5/24/24.



Photograph 5: Field Survey CIP 4. Agricultural fields. 5/24/24.

Photograph 6: Field Survey CIP 4. Hartley Slough. 5/24/24.



Photograph 7: Field Survey CIP 4. Hartley Slough north of West Dickenson Ferry Road. 5/24/24.

Photograph 8: Field Survey CIP 4. Hartley Slough north of West Dickenson Ferry Road. 5/24/24.

CIP 5

CIP 5 Photographic Record

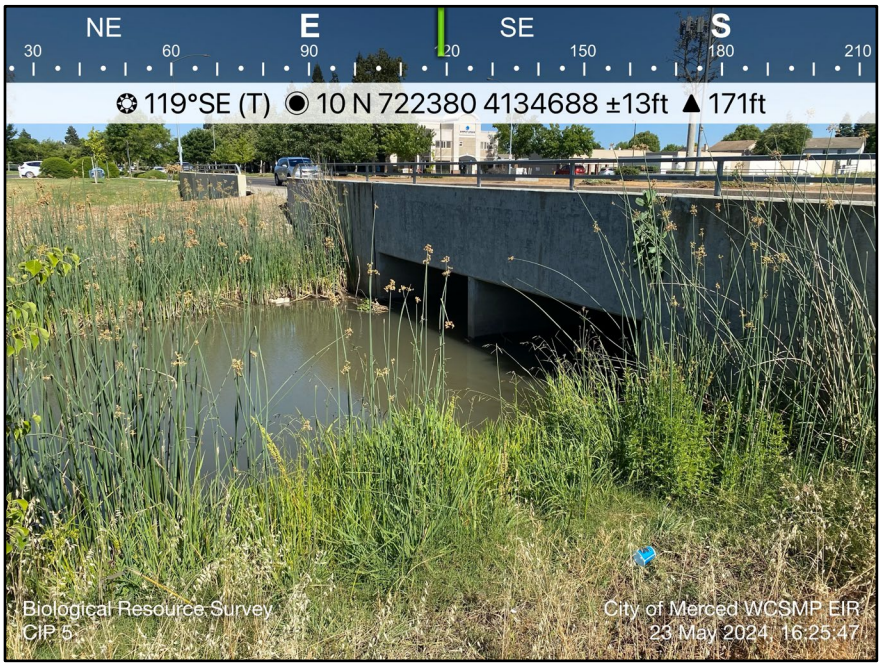
Photograph 1: Field Survey CIP 5. West Yosemite Avenue and El Redondo Drive intersection. 5/23/24.

Photograph 2: Field Survey CIP 5. West Yosemite Avenue. 5/23/24.

Photograph 3: Field Survey CIP 5. West Yosemite Avenue. 5/23/24.

Photograph 4: Field Survey CIP 5. West Yosemite Avenue and Compass Pointe Avenue. 5/23/24.

Photograph 5: Field Survey CIP 5. Fahrens Creek crossing. 5/23/24.



Photograph 6: Field Survey CIP 5. Fahrens Creek crossing. 5/23/24.

Photograph 7: Field Survey CIP 5. Pedestrian underpass beneath West Yosemite Avenue. 5/23/24.

Photograph 8: Field Survey CIP 5. Fahrens Creek crossing under West Yosemite Avenue. 5/23/24.

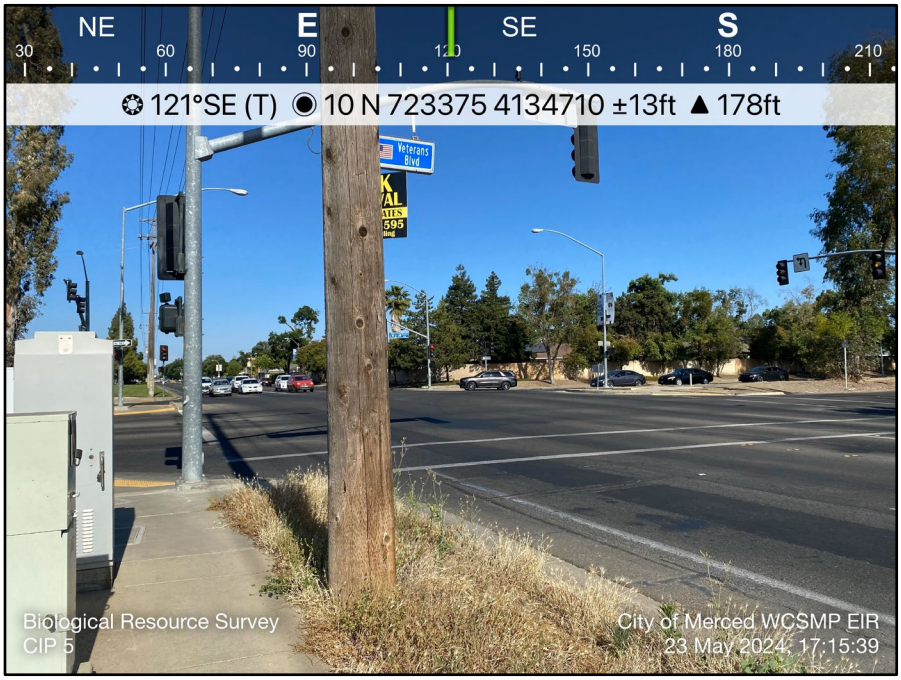
Photograph 9: Field Survey CIP 5. Fahrens Creek crossing West Yosemite Avenue. 5/23/24.

Photograph 10: Field Survey CIP 5. West Yosemite Avenue. 5/23/24.

Photograph 11: Field Survey CIP 5. West Yosemite Avenue and M Street intersection. 5/23/24.

Photograph 12: Field Survey CIP 5. West Yosemite Avenue and R Street intersection. 5/23/24.

Photograph 13: Field Survey CIP 5. West Yosemite Avenue. 5/23/24.

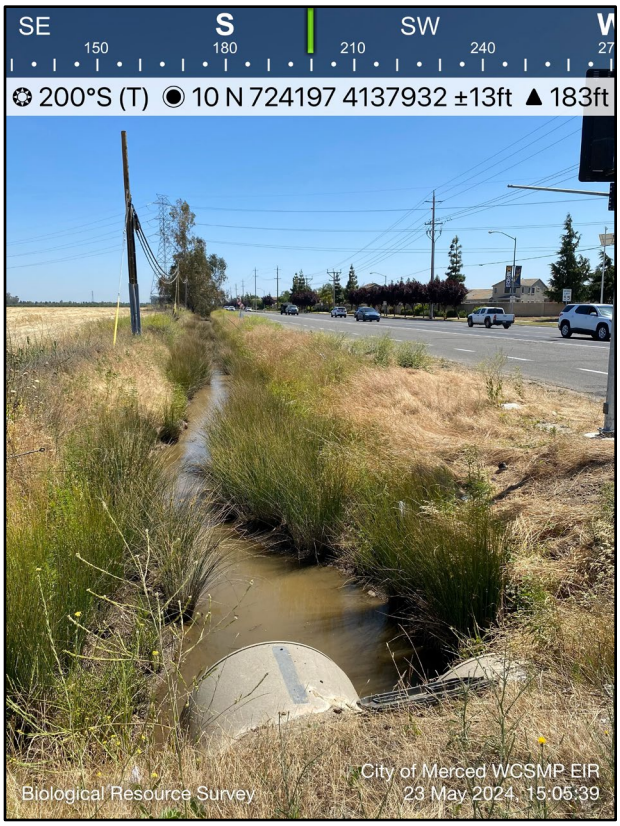


Photograph 14: Field Survey CIP 5. West Yosemite Avenue and M Street intersection. 5/23/24.

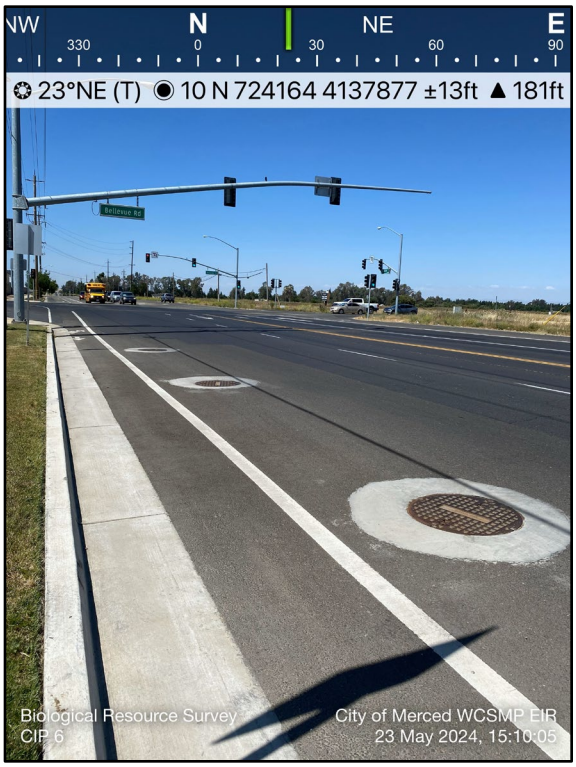
CIP 6

CIP 6 Photographic Record

Photograph 1: Field Survey CIP 6. G Street. 5/23/24.



Photograph 2: Field Survey CIP 6. Roadside ditech along G Street. 5/23/24.

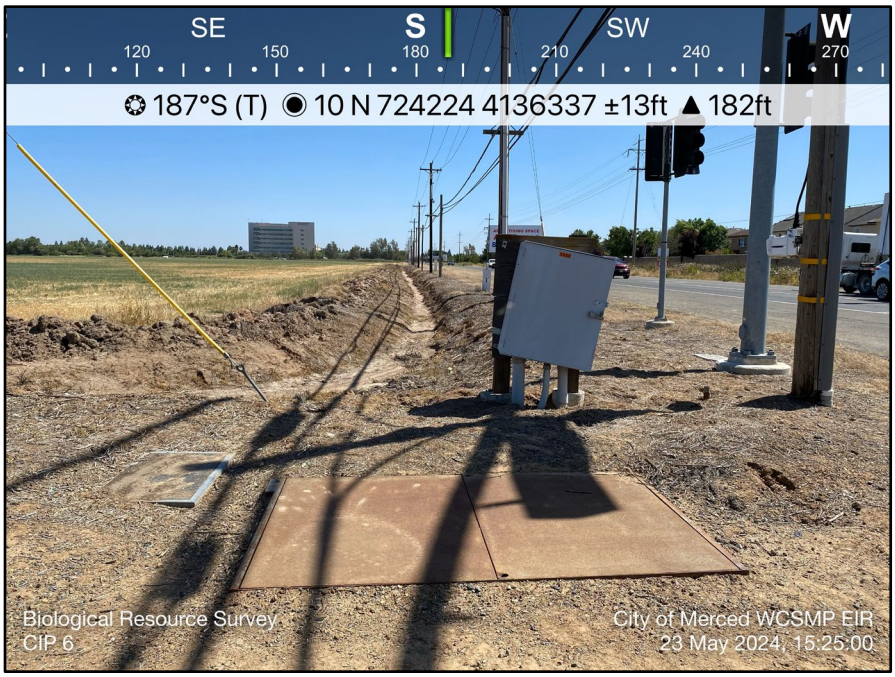


Photograph 3: Field Survey CIP 6. G Street and Bellevue Road intersection. 5/23/24.

Photograph 4: Field Survey CIP 6. G Street and Foothill Drive intersection. 5/23/24.

Photograph 5: Field Survey CIP 6. G Street and East Cardella Road intersection. 5/23/24.

Photograph 6: Field Survey CIP 6. G Street and adjacent orchard. 5/23/24.



Photograph 7: Field Survey CIP 6. G Street at East Cardella Road intersection. 5/23/24.

Photograph 8: Field Survey CIP 6. Bike path heading west from G Street south of East Cardella Road intersection. 5/23/24.

Photograph 9: Field Survey CIP 6. Cottonwood Creek crossing on east side of G Street. 5/23/24.

Photograph 10: Field Survey CIP 6. Cottonwood Creek crossing. 5/23/24.

Photograph 11: Field Survey CIP 6. Cottonwood Creek crossing on west side of G Street. 5/23/24.

Photograph 12: Field Survey CIP 6. G Street. 5/23/24.

Appendix D CULTURAL RESOURCES

This is a confidential appendix that contains sensitive information and is not available for public release or distribution, and therefore is not included here.

Appendix E ALTERNATIVE DEVELOPMENT BACKGROUND

E.1 CITY OF MERCED WASTEWATER COLLECTION SYSTEM MASTER PLAN 2022 UPDATE

City of Merced
Wastewater Collection System
Master Plan 2022 Update

February 9, 2023

Prepared for:
City of Merced

Prepared by:
Stantec Consulting Services Inc.
3875 Atherton Road
Rocklin CA 95765-3716

Stantec

Wastewater Collection System Master Plan

2022 Update

February 9, 2023

Prepared for:
City of Merced

Prepared by:
Stantec Consulting Services, Inc.

Project Number:
184030360

02/09/2023

WASTEWATER COLLECTION SYSTEM MASTER PLAN

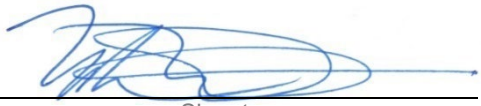
Executive Summary
February 9, 2023

Prepared by 
Signature

Breanna Webb, EIT

Prepared by 
Signature

Steven L. Beck, PE

Reviewed by 
Signature

Mike Van Doorn, PE

Executive Summary

Stantec Consulting Services Inc. (Stantec) was retained by the City of Merced (City) to prepare an update to the Wastewater Collection System Master Plan (WCSMP) using updated per capita wastewater flow design criteria.

ES-1 Revised Sewage Generation Rates

The per capita flows have been analyzed and revised based on data collected from the 2021 sewer flow monitoring program (V&A 2021) at 18 flow monitoring sites and three pump station locations, discussed in detail in Chapter 4.0. The 2021 flow monitoring investigation found that the average wastewater per capita flow in the City of Merced equates to approximately 60 gallons per capita per day (gpcd). In consultation with the City, a factor of safety of 5 gpcd was added to this value to establish a revised recommended dry weather flow (DWF) per capita rate of **65 gpcd**. This value is approximately 24 percent less than the previously established unit rate of 85 gpcd that was used in previous assessments.

Using the updated per capita value, the unit wastewater generation rate per equivalent dwelling unit (EDU) was adjusted to 208 gpd/EDU from 257 gpd/EDU used in previous planning efforts. The per EDU unit flow rate is based on residential densities identified in the City's General Plan. The recommended per capita and per EDU average dry weather flow (ADWF) rates used in this updated WCSMP are shown in **Table ES-1**.

Table ES-1. Wastewater Generation Rate Per Equivalent Dwelling Unit Summary

Parameter	Updated DWF Unit Rate Values	Previous Planning Values
Average Per Capita Flow (gpcd)	60 [1]	85
Factor of Safety (gpcd)	5	
Recommended Per Capita Flow (gpcd)	65	
EDU Density (persons per household)	3.20 [2]	3.02 [3]
EDU Wastewater Generation Rate (gpd/EDU)	208	257

Notes:
[1] Average per capita flow based on 2021 flow monitoring efforts, as shown in Table 4 3.
[2] The per capita density of single-family housing units from the City's Financing Plan and Impact Fee Update Report (December 2021) prepared by Economic and Planning Systems, Inc.
[3] The 2030 General Plan defines the average residential density within the City's Specific Urban Development Plan as 3.02 persons/unit.

Key:
DWF = dry weather flow
EDU = equivalent dwelling unit
gpcd = gallons per capita per day
gpd/EDU = gallons per day per equivalent dwelling unit

ES-2 Wastewater Master Plan Updates

Recent planning documents, including the *City of Merced Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis* (South Trunk Alternatives Analysis) and the 2017 Draft Wastewater Collection System Master Plan (Draft 2017 WCSMP) considered many alternatives, but ultimately presented two basic plans for building the wastewater collection system infrastructure needed to serve the 2030 General Plan growth projections. The two alternatives included upgrading the City's existing wastewater treatment facility to handle full build-out flow or build a new wastewater treatment facility in North Merced to serve the northern service area. As discussed in the Draft 2017 WCSMP, the City has chosen to not build a new wastewater facility in the north and will focus on alternatives that deliver wastewater to the existing wastewater treatment facility (WWTF) located southwest of Merced. This WCSMP update provides recommendations consistent with this decision.

The hydraulic model was updated using the flow monitoring data and the revised per capita flow to calculate the average dry weather flows for the existing and future development areas (based on 2030 General Plan). Infiltration and Inflow (I/I) parameters were calibrated under existing conditions and applied to the existing and interim areas to simulate PWWF conditions in the existing and interim models. The build out system model expanded the existing collection system and added flow from build out development areas to the interim system model. The PWWFs from build-out development areas are simulated using a peaking factor of 2.3 as opposed to the calibrated I/I parameters used for existing and interim development. A summary of these modeled scenarios and the associated model results are presented below.

Table ES-2. Development Scenarios

Model Scenario	Description	Cumulative Development Areas	Service Area (acres)	Simulated ADWF (MGD)	Simulated PWWF (MGD)
Existing System Model	Existing Service Area and PWWF Conditions	Existing Service Area	6,697	7.0	19.5
Interim System Model	Near-Term Development and PWWF Conditions	Planned Sewer Service Commitments	10,235	12.4	31.6
Build-out System Model	Build-out of the City's General Plan and PWWF Conditions	Remaining Parcels within City's General Plan	22,364	27.3	66.7

Key:
ADWF = average dry weather flow
MGD = million gallons per day
PWWF = peak wet weather flow

Existing System Model

The existing model of the trunk sewer system was used to evaluate the extent of hydraulic deficiencies within the system under peak flow conditions. The model simulates an ADWF of 7.02 million gallons per day (MGD) and predicts a PWWF of 19.5 MGD will occur at the WWTF under 10-year, 24-hour design storm conditions.

The existing system has sufficient capacity to convey PWWF flows and meet level of service (LOS) guidelines with no significant surcharging.

Interim System Model – Existing System Plus Committed Service Areas

The interim model simulates flow conditions in the existing sewer system with the addition of flow from the City's sewer service commitments without any improvements or new infrastructure added to the existing system. The interim system model includes flow from the committed development areas identified in Section 3.3. The flow projected to be contributed from entitled parcels will add approximately 5.3 MGD to the existing ADWF, bringing the total ADWF up to 12.4 MGD under interim conditions. The interim model was used to evaluate the extent of hydraulic deficiencies within the system under PWWF conditions. The interim model predicts a PWWF of 31.6 MGD will occur at the WWTF under 10-year, 24-hour design storm conditions without considering any improvements to the existing collection system.

The results of the interim system model predict LOS failures and capacity deficiencies in several reaches of the trunk system, including the G Street, Rascal, North Merced West Ave, and 48-inch interceptor trunk sewers. Despite surcharging and capacity limitations, no sanitary sewer overflows (SSOs) are predicted to occur within the system under interim conditions.

Six improvement projects are recommended to bring the City's existing collection system within the recommended LOS criteria under interim conditions, discussed in detail in Chapter 6. The recommended interim system improvements are shown in **Figure ES-1**.

- **Capital Improvement Project (CIP) 1 – Bellevue Ranch Pump Station Discharge:** Operational modifications to FM discharge location.
- **CIP 2 – Parallel Sewer and Bear Creek Crossing:** New 36-inch parallel sewer and creek crossing to expand the capacity of the existing system to convey flow from North Merced.
- **CIP 3s and 4 –Replace 48-inch Interceptor and West Ave Sewer:** Replacing the 48-inch interceptor and West Avenue sewers are recommended to increase capacity and address poor physical condition. It is also recommended that the remaining portion of the 42-inch North Merced West Avenue trunk be upsized along with the 48-inch interceptor to facilitate the conjunction of the new Bear Creek Crossing parallel sewer and existing North Merced West Avenue trunk.
- **CIP 5 – Yosemite Avenue Extension:** A new 27-inch extension of the Yosemite Avenue sewer from G Street to R Steet and further extending to El Redondo Drive connecting to the Highway 59 pump station sewer shed will provide additional capacity to serve the City's sewer service commitments and some of the pre-annexation areas.
- **CIP 6 – Parallel G Street Sewer:** A new parallel 27-inch sewer in G Street from Bellevue Road to Community College Drive. This sewer will be tied into the new Cardella Sewer recommended to provide additional capacity for North Merced under build-out conditions.

The Interim CIPs will give the City the capacity to serve an additional 34,628 EDUs, including 9,000 EDUs from the identified pre-annexation areas as discussed in Section 3.3 (**Table 3.7**).

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Legend

Interim Improvements

- Parallel G Street Sewer
- BRPS FM Discharge Change
- 48-inch Interceptor
- Parallel Sewer & Creek Crossing
- West Street
- Yosemite Sewer Extension
- Modeled Sewer Trunks
- Existing Service Area
- Interim Service Area
- WW — WWTF
- PS — Modeled Lift Station
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus

BELLEVUE RANCH PUMP STATION (BRPS)

Parallel G Street Sewer

BRPS FM Discharge Change

Yosemite Sewer Extension & Creek Crossing

HIGHWAY 59 PUMP STATION (H59PS)

Parallel Sewer & Creek Crossing

West Street

48-inch Interceptor

WW — WASTEWATER TREATMENT FACILITY

UC MERCED CAMPUS

MILES 0 0.5 1.0 1.5 2.0

N

Stantec

City of Merced
Wastewater Collection System
Master Plan 2022 Update

Figure ES-1
Recommended Interim Improvements

Build-Out System Model – Future Collection System with Full Development of the Specific Urban Development Plan

The build-out system model includes the existing collection system and the future trunk network that will be needed to serve the extended service area. The interim system model was used as the starting point for developing the build-out system model and included recommended near-term system improvements as noted above to provide the existing system sufficient capacity to serve interim development. After adding flow from build-out development areas, these interim improvement recommendations were resized to provide sufficient build-out capacity, as noted below in as **Table ES-3**.

Table ES-3. Interim Improvements Sized for Build-Out

CIP No	Name	Existing Pipe Size (in)	Slope (feet/feet)	Length (feet)	Interim Pipe Size (in)	Build-out Pipe Size (in)
1	BRPS FM Discharge Change [1]	NA	NA	NA	NA	NA
2	Parallel Sewer and Creek Crossing	NA	0.00067	6,491	36	48
3	West Street	42	Current: 0.0007 New: 0.0006	1,900	48	Current Slope: 60 New Slope: 60
4	48-inch Interceptor	48	Current: 0.0003 New: 0.0006	14,695	48 [2]	Current Slope: 66 New Slope: 60
5	Yosemite Sewer Extension	NA	0.00047	7,660	27	27
6	Parallel G Street Sewer	27	0.0008	8,000	27	27

Notes:
[1] CIP No. 1 includes changing the discharge of the Bellevue Ranch Pump Station to utilize its existing alternative force main which discharges flow to the gravity sewer along R Street.
[2] A new 48-inch pipe with a roughness (n) of 0.013 has capacity to convey interim flow at the existing slope. The existing 48-inch pipe is known to have a much higher roughness value and would require replacement.
[3] CIPs 3 and 4 are recommended to be constructed together at the new specified slope, dropping the invert at the influent junction box at the WWTF

Key:
BRPS FM = Bellevue Ranch Pump Station Force main
CIP = Capital Improvement Project
NA = Not Applicable
WWTF = wastewater treatment facility

The build-out system model simulates flow conditions in the City's collection system upon full development of the City's General Plan service area. The flow projected to be generated from remaining parcels within the City Specific Urban Development Plan (SUDP) will add approximately 14.9 MGD to the interim ADWF, bringing the total ADWF up to 27.3 MGD under build-out conditions. The build-out model was used to identify the best approach to expanding the system to provide service to the ultimate service area under PWWF conditions. The projected build-out flow at the WWTF equals 66.7 MGD under PWWF conditions.

Opinions of probable costs were developed for each of the recommended interim system improvements at their pipe size required for build-out. These projects and their associated opinions of probable costs are presented in **Table ES-4**.

Table ES-4. Interim Improvement Project Costs

Item	Description	Opinion of Capital Cost [1]
1	BRPS FM Discharge Change [2]	$0
2	Parallel Sewer and Creek Crossing	$4,634,000
3	West Street [2]	$1,207,000
4	48-inch Interceptor [2]	$10,869,000
5	Yosemite Sewer Extension	$1,793,000
6	Parallel G Street Sewer	$1,979,000
	Subtotal	***$20,482,000***
	5% Mobilization/Demobilization	$1,025,000
	Construction Cost Subtotal	***$21,507,000***
	30% Contingency	$6,453,000
	Estimated Construction Cost	***$27,960,000***
	20% Engineering, Environmental, and Admin	$5,592,000
	Total Project Cost	**$33,552,000**

Notes:
[1] Costs based on ENRCCI (20 Cities Index) = 13,175, October 2022.
[2] Bellevue Ranch Pump Station has two existing force mains, this project changes operations of the pump station to discharge through the larger force main conveying flow to R Street.
[3] It is recommended that the West Street sewer project and the 48-inch Interceptor project are done together. Both of the improvements should be constructed at a slope of 0.0006 feet/feet, lowering the existing invert at the downstream end of the existing 48-inch trunk at the influent junction box near the WWTF.

Key:
BRPS FM = Bellevue Ranch Pump Station Force main
ENRCCI = Engineering News Record Construction Cost Index
WWTF = wastewater treatment facility

Summary of Recommended Build-Out Improvements

A proposed future trunk network was developed to service future growth areas under build-out conditions assuming the interim improvements (i.e., sized for build-out) are completed. This WCSMP update breaks down the required improvements by region and classifies improvements as major or minor improvement needs. The two main regions of the collection system are the North and South Merced service areas. Major system improvements mirror those considered in the Draft 2017 WCSMP and generally include future trunks 18-inches in diameter or larger, while minor system improvements include budgets for smaller sewers and extensions to the existing system.

A figure showing the proposed interim, major, and minor improvements is provided as **Figure ES-2**. Opinions of probable costs were developed for the wastewater collection system infrastructure needed to provide service to North and South Merced at build-out, these costs are summarized in **Table ES-5**.

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Legend

- Major Buildout Improvements
- Minor Buildout Improvements
- Interim Improvements
- Modeled Sewer Trunks
- Existing Service Area
- Interim Service Area
- Buildout Service Area
- Pre-Annexation Area
- WW WWTF
- PS Modeled Lift Station
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus
- Campus Community

12 in
15 in
12 in
10 in
12 in
15 in
18 in
12 in
12 in
21 in
18 in
15 in
30 in
12 in
24 in
BELLEVUE RANCH PUMP STATION (BRPS)
PS
42 in
30 in
27 in
24 in
UC MERCED CAMPUS
CAMPUS COMMUNITY
12 in
48 in
12 in
HIGHWAY 59 PUMP STATION (H59PS)
PS
24" Dual FM
12 in
15 in
12 in
12 in
18 in
21 in
12 in
27 in
18 in
15 in
12 in
30 in
WW
WASTEWATER TREATMENT FACILITY

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Master Plan 2022 Update

Figure ES-2
2022 Merced Master Plan Recommended Improvements

Table ES-5. Summary of Proposed Improvement Costs

Item	Area of Improvements	Total Cost [1]
1	Interim System Improvements	$33,552,000
2	North Merced Major Improvements	$56,835,000
3	South Merced Major Improvements	***$18,182,000***
	Subtotal Major Improvements	**$108,569,000**
4	North Merced Minor Improvements	$12,536,000
5	South Merced Minor Improvements	$4,456,000
	Subtotal Minor Improvements	***$16,992,000***
	Total Improvements Cost	**$125,561,000**

Note:
[1] Costs based on Engineering News Record Construction Cost Index (20 Cities Index) = 13,175, October 2022.

ES-3 Conclusions and Recommendations

The updated hydraulic modeling and capacity analysis completed for this master plan update confirms that the existing wastewater collection system does not have the capacity to convey the projected flows from interim development projects without exceeding the City's LOS criteria in several reaches of the trunk system. Without improvements, the existing system does not have the capacity to service the build-out of the pre-annexation areas and the City's remaining SUDP. These conclusions are generally consistent with the previous Draft 2017 WCSMP findings.

Several improvements focused on increasing the capacity of the existing trunk system were discussed with the City and noted in the Draft 2017 WCSMP, but they were determined to be less cost-effective than constructing new trunk sewers around the perimeter of the City to service future growth. The previous study also contemplated reserving the limited capacity within the existing 48-inch interceptor in order to fully utilize the G Street Trunk and that no flow beyond that be added until future large trunks are constructed to convey the ultimate SUDP flows from North Merced to the existing WWTF. This meant that many projects ready for development would have to wait until the new infrastructure was completed due to the significant length and cost of these trunk extensions.

However, the condition of the existing concrete 48-inch interceptor is severely corroded and should be replaced as soon as possible given its criticality in the system. Taking this into consideration, and the desire to provide near-term capacity for interim development projects, it is recommended that the City implement the improvement projects sized for build-out capacity (presented in Table ES-3) and the proposed major and minor future trunk network as a preferred strategy versus the alternatives initially identified in the Draft 2017 WCSMP. This strategy will provide a phased approach for capacity improvements that address both near-term and build-out developments that can be constructed and funded in manageable projects to better accommodate the rate of development.

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Abbreviations

ADWF	average dry weather flow (observed during the dry season)
BRPS	Bellevue Ranch Pump Station
CHI	Computational Hydraulics International
CIP	capital improvement project
City	City of Merced
DWF	dry weather flow
EDU	equivalent dwelling unit
ENRCCI	Engineering News Record Construction Cost Index
gpd	gallons per day
gpcd	gallons per capita per day
H59PS	Highway 59 pump station
HGL	hydraulic grade line
HLR	hydraulic loading ratio
ICM	international computer management
I/I	inflow and infiltration
LOS	level of service
MGD	million gallons per day
NMWWTF	North Merced Wastewater Treatment Facility
OS	open space
PCSWMM	Personal Computer Storm Water Management Model
PF	peaking factor
PWWF	peak wet weather flow
R&R	repair and replacement
RDI	rainfall dependent infiltration
RDII	rainfall dependent inflow and infiltration
RGN	rain gauge north
RGS	rain gauge south
ROW	right-of-way
SMSAD	South Merced Sewer Assessment District
SSO	sanitary sewer overflow
Stantec	Stantec Consulting Services Inc.
SUDP	specific urban development plan
TSAM	tentative subdivision activity map
UC Merced	University of California Merced
V&A	V&A Consulting Engineers, Inc.
WCSMP	Wastewater Collection System Master Plan (Stantec 2017)
WWTF	wastewater treatment facility

1.0 Introduction

The City of Merced (City) retained Stantec Consulting Services Inc. (Stantec) to update the City's Wastewater Collection System Master Plan (WCSMP). This WCSMP update addresses existing and future wastewater collection system capacity needs, and alternative solutions based on 1) providing sewer service to planned community growth and 2) eliminating known system deficiencies. This plan recommends locations, sizes, and/or mitigation measures for trunk sewers to serve areas within the existing City limits and areas within the City's Specific Urban Development Plan (SUDP) boundary as identified in the City of Merced Vision 2030 General Plan (2030 General Plan). "Trunk sewers" are the main sewers of a wastewater collection system to which other smaller, collector and neighborhood sewers drain. In the case of the City's system, the trunk sewers have diameters ranging in size from 12 inches up to 60 inches.

This chapter is divided into the following sections:

- 1.1 Purpose
- 1.2 Study Area
- 1.3 Background

1.1 Purposes of this Document

The purposes of this WCSMP are to:

1. Update the City's wastewater design criteria by reviewing specific flow monitoring data collected for various land uses and establishing a per capita wastewater generation rate for planning purposes.

2. Update future wastewater flow projections using the updated wastewater design criteria and the latest ongoing planning information.

3. Provide the City with an updated evaluation of options for serving the wastewater collection system needs of the 2030 General Plan.

4. Update the WCSMP to include the existing system capacity evaluation results presented in the Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis (June 2020).

5. Re-assess the capacity of existing trunk sewers within the City limits and SUDP, including consideration of sewer performance under future development conditions.

6. Provide recommendations for upsizing existing trunk sewers or other means to address deficiencies identified as part of the assessment of the current and interim sewer system's capacity design conditions.

7. Revisit the assessment of major future trunk alignment alternatives originally considered as part of the draft 2017 Wastewater Collection System Master Plan.

8. Provide recommendations for sewer projects that would fulfill the City's desire to serve growth envisioned in the 2030 General Plan.

9. Prepare a list of capital improvement projects (CIPs) with planning-level cost estimates to address existing system deficiencies and projects that will be needed to serve new growth.

This master plan document is divided into the following chapters:

- Chapter 1.0: Introduction
- Chapter 2.0: Overview and Basis of Planning Wastewater Service
- Chapter 3.0: Existing Wastewater Collection System
- Chapter 4.0: Sewer Flow Estimates
- Chapter 5.0: Hydraulic Model
- Chapter 6.0: Collection System Model Results
- Chapter 7.0: Capital Improvement Program
- Chapter 8.0: Conclusions and Recommendations

1.2 Study Area

The study area for this WCSMP is as described in the 2030 General Plan, and shown in **Figure 1-1**, which covers the entire City and its planned growth areas. However, much of the sewer system for the City is in place and performing satisfactorily. The focus of this WCSMP is developing wastewater collection system alternatives to serve the SUDP area, relative to the existing City, its existing sewers, and the City's existing wastewater treatment facility (WWTF).

In planning the wastewater collection system ("sewer system") for an area like the SUDP that is largely undeveloped, the 2030 General Plan serves as the basis for projecting build-out development conditions and the level of sewer service (i.e., flow capacity) that may ultimately be needed.

In addition to the General Plan, the City provided Stantec with information for planned land uses within the University of California Merced (UC Merced) campus and adjoining campus community. Both areas are in the SUDP and were described in separate documents including:

- UC Merced and University Community Project Final EIS/EIR, (March 2009)
- 2020 UC Merced Long Range Development Plan Recirculated Draft Subsequent Environmental Impact Report, (December 2019)

To accommodate the actual rate of development, an interim or near-term level of development scenario is also considered. The sewer system capacity needs are evaluated considering build-out of the City's ongoing planning and development areas for which the City has provided specific planning information. Considering the interim needs of the collection system allows for a phased approach in planning the ultimate build-out needs. Collectively, this information forms the basis for the analyses described in this WCSMP.

Legend

Merced 2030 General Plan Land Uses

- Agricultural
- Business Park
- Business Park Reserve
- Commercial Office
- Commercial Reserve
- Community Plan
- Future Park
- Future School
- General Commercial
- High Density Residential
- High to Medium Density Residential
- Industrial Reserve
- Low Density Residential
- Low to Medium Density Residential
- Manufacturing / Industrial
- Mixed Use
- Mobile Home Park Residential
- Neighborhood Commercial
- Open Space - Park Recreation
- Public / General Use
- Regional Community Commercial
- Residential Reserve
- Rural Residential
- School
- Thoroughfare Commercial
- Village Residential
- City Limit
- SUPD Boundary
- UC Merced Campus

UC MERCED CAMPUS

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Figure 1-1
2030 General Plan

1.3 Background

This WCSMP builds off previous City sewer planning documents, including:

- City of Merced Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis (Stantec, June 2020)
- City of Merced Wastewater Collection System Draft (Stantec, December 2017)
- City of Merced Sewer Master Plan Draft (ECO:LOGIC Engineering, January 2007)
- City of Merced North Merced Sewer Master Plan Draft (ECO:LOGIC Engineering, 2002)

The most recent planning document, City of Merced Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis, and the executive summary of the 2017 City of Merced Wastewater Collection System Draft are included in Appendix A. Throughout the development of these past planning documents, several sewer service alternatives have been considered for build-out of the City's planning area. The City of Merced Sewer Master Plan Draft (ECO:LOGIC Engineering, January 2007) was prepared in the context of serving the City's Vision 2015 General Plan growth projections, and the City of Merced North Merced Sewer Master Plan Draft (ECO:LOGIC Engineering 2002) was prepared to identify sewer needs in the North Merced area.

The 2017 Draft Wastewater Collection System Master Plan (2017 WCSMP) considered many alternatives, but ultimately presented two basic plans for building the wastewater collection system infrastructure needed to serve the 2030 General Plan growth projections. The foundation of the two alternatives included upgrading the City's existing wastewater treatment facility to handle full build-out flow or build a new wastewater treatment facility in North Merced to serve the northern service area. The 2017 WCSMP also considered the effluent disposal needs of these two alternatives.

As discussed in the 2017 WCSMP, the City has chosen not to build a new wastewater facility in the north and will continue to consider alternatives presented in the City of Merced Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis (Stantec, June 2020) (Appendix A).

2.0 Overview and Basis of Planning Wastewater Service

This WCSMP is focused on developing plans for building new trunk sewers necessary to serve planned City growth. This plan also discusses known deficiencies with existing trunk sewers and recommends mitigation measures when feasible. The purpose of this chapter is to present an overview of the wastewater servicing strategy, basis of collection system planning, present alternatives previously considered, design conditions and criteria, and guiding principles.

This chapter is divided into the following sections:

- 2.1 Overview of Wastewater Service Planning
- 2.2 Basis of Collection System Planning
- 2.3 Alternatives Previously Considered
- 2.4 Design Conditions and Criteria

2.1 Overview of Wastewater Service Planning

The City retained Stantec to prepare an engineering analysis of probable wastewater collection system needs (a.k.a., “sewer needs”) to serve near-term and long-term City growth and development. Based on past evaluations of the City’s system, there is currently insufficient service capacity in the City’s existing sewer system to serve near-term or long-term growth.

Part of the analyses provided herein includes consideration of feasible alternative approaches to providing the needed sewer service, evaluation of those alternative approaches, recommendation of the best apparent plan for expanding the City’s sewer system to serve new growth based on information provided to Stantec by the City, and based on Stantec’s experience with planning and evaluating sewer systems like the City’s in the Central Valley.

A basic overview of the wastewater service planning approach is provided below:

1. **Update Design Criteria**: Update unit flow rates, design criteria, and future wastewater flow projections.

2. **Update Hydraulic Model:** Update the hydraulic model to reflect the updated design criteria and future flow projections.

3. **Update Capacity Needs Assessment:** Re-evaluate interim (near-term) and build-out (long-term) capacity needs based on updated model results.

4. **Develop Alternative Improvements:** Identify and recommend alternative system improvements which provide interim and build-out capacity required to serve future development. Three alternatives will be evaluated for interim and build-out levels of development.

5. **Alternatives Analysis and Recommendations:** Develop opinions of probable costs for each alternative and evaluate the feasibility of each alternative. Based on the results of alternatives analysis, recommend the best apparent alternative.

2.2 Basis of Collection System Planning

This WCSMP establishes an updated per capita design flow for use in projecting future wastewater flows. The basis of this master plan is to evaluate the impacts of these updated flow projections, identify solutions to serving the near-term and long-term capacity needs of the collection system, and develop alternative improvement recommendations that will provide capacity for interim development needed to serve North Merced under build-out conditions.

This WCSMP also identifies solutions for interim capacity improvements that also serve the needs of build-out development through an integrated approach that allows for phased capacity improvements. Providing a phased approach to capacity improvements needed for future development allows portions of the overall build-out system needs to be built and funded in increments corresponding to the actual rate of development.

Another important piece of updating this master plan includes incorporating the system capacity evaluation results presented in the Model Update and South Trunk Alternatives Analysis report prepared by Stantec in June 2020. These results include re-calibration of the existing system model, existing system model results, and alternatives presented for serving build-out development in South Merced.

2.3 Alternatives Previously Considered

The Model Update and South Trunk Alternatives Analysis (Stantec 2020) report updated the City's hydraulic model and evaluated alternative alignments to serve the South Merced service area at build-out, referred to as the south trunk sewer. Given the results of the existing system model, the objective of the south trunk analysis reevaluated the south trunk sewer proposed in the Draft 2017 WCSMP and evaluated alternatives that considered maximizing the available residual capacity in the existing collection system.

The updated hydraulic model was used to reevaluate the sizing of the WCSMP south trunk improvements and presented an alternative that leverages available residual capacity. Two alternatives were presented:

1. Alternative 1 refined the south trunk alignment as it was presented in the 2017 WCSMP, eliminating excess capacity by adjusting recommended pipe diameters and slopes. This alternative considered refinement of the proposed south trunk to eliminate excess capacity that exists due to the refined flow distribution within the model. The alignment is the same, but pipe sizes and slopes were adjusted to eliminate excess capacity within the proposed sewers while maintaining ground elevations along the proposed alignment.

2. Alternative 2 considered collection system improvements that the City intended on implementing in the near-term and limited the extent of new infrastructure by taking advantage of residual capacity in the existing system. The proposed South Merced trunk under Alternative 2 is reduced

to approximately 2.5 miles of 36-inch sewer and connects to the existing 48-inch interceptor sewer at the intersection of West Dickenson Ferry Road and South West Avenue. The proposed improvements provide a parallel relief trunk for the downstream end of the Gerard Avenue trunk and take advantage of additional capacity that would be provided by City planned improvements to address concerns with the condition (i.e., hydrogen sulfide damage) of the existing 48-inch and 42-inch trunks which deliver influent to the WWTF.

The 2017 WCSMP considered several alternatives for providing sewer service for build-out of the City's General Plan and several options; e.g., on-site wastewater systems, satellite wastewater treatment and reuse facilities, and flow equalization. The 2017 WCSMP eventually narrowed the alternatives down with the following parameters:

- Either all sewage flowing to the existing WWTF, or North Merced sewage flowing largely to a new North Merced WWTF (NMWWTF) with the remainder of the City being served by the existing WWTF.
- Gravity flow sewers are to be used to the maximum extent feasible. When trunk sewers become very deep, lift stations may be used to lift the sewage so that gravity flow can continue but at a shallower depth.
- Where topography or other factors are not conducive to cost effective use of gravity sewers, pump stations and force mains will be used with features, as may be necessary, to control odors and corrosion and to provide reliable operation during outages.
- New North Merced trunk sewers will flow in an overall westerly and southerly direction to follow topography and to minimize disruption of existing developments. This conceptual plan is compatible to either of the WWTF options being considered herein.

The 2017 WCSMP notes the design, financing, and construction of the new trunk sewer system will take several years. Members of the community would like new development to occur now, rather than years from now when the new permanent trunk sewer system is completed. There are many ways to facilitate these developments that involve use of the existing infrastructure before a new trunk sewer system is constructed.

The primary difference in the approach taken in this WCSMP update compared to the 2017 WCSMP is that the goal of this master plan is to provide an integrated phased approach (i.e., interim and build-out) to collection system planning that allows implementing the ultimate capacity needs of the community and minimizing the need for temporary facilities.

The 2017 WCSMP ultimately presented two alternatives:

- **Plan A:** The collection system takes all municipal wastewater to the City's existing WWTF located southwest of the City. The existing WWTF would be expanded, as needed, to handle 2030 General Plan flows. The effluent disposal and reuse facilities needed by the planned expansions largely exist; however, developers still need to buy their fair shares of all existing City facilities they use, including the land on which that infrastructure is located. The existing WWTF site is

believed to have sufficient land and disposal potential to serve "reasonable build-out" design flow estimates of 34 to 35 million gallons per day (MGD), when needed.

- **Plan B:** The collection system takes most municipal wastewater generated by growth in North Merced to a new NMWWTF located on industrially zoned land west of the intersection of West Yosemite Avenue and Highway 59 (a.k.a. Snelling Highway). The NMWWTF site would be planned for under the 2030 General Plan with build-out capacities of approximately 14 to 15 MGD. The existing WWTF would serve the remainder of the City and its growth and would have approximate planned capacities for the 2030 General Plan, and build-out conditions of 20 MGD. Both the new NMWWTF and existing WWTF would be built and expanded in stages, or phases, as needed. The NMWWTF would also need new effluent disposal and reuse facilities planned for in the 2030 General Plan and the build-out flow conditions. This is because there are no existing effluent facilities or related effluent discharge permits for the NMWWTF site; whereas, they do exist at the WWTF site.

As discussed in the 2017 WCSMP, the City selected Plan A and will not build a new NMWWTF and will continue to expand its existing WWTF as necessary to accommodate growth. This WCSMP update considers alternative new trunk alignments and existing system improvements that will ultimately convey wastewater to the City's existing WWTF.

2.4 Design Conditions and Criteria

Chapters 4 and 5 discuss the design conditions and criteria used in evaluating and sizing the sewer system. These design conditions and criteria include:

- **The design storm:** What rainfall condition is the sewer system designed to handle without exceeding sewer performance design criteria.
- **Sewer performance design criteria:** How high the hydraulic grade line (HGL) of the water in the sewer is allowed to rise under design conditions. Also, the design hydraulic friction coefficient "C" used in the sewer flow analyses.
- **Design hydraulic peaking factor (PF):** By what multiplier do typical sewer flow rates increase above typical flow conditions under design storm conditions occurring during the day when peak sewer flows naturally occur (i.e., sewage flow is not constant during the day).
- **Design wastewater flows**: flows from various types of urban development/land use zoning.

3.0 Existing Wastewater Collection System

This chapter presents a summary of the existing collection system, planning information, and the updated data that was collected, reviewed, and incorporated into the model as part of this effort. Wastewater flow data was collected in 2019 and used to redistribute flow and calibrate the model of the existing collection system along with current information related to existing sewer service accounts and service commitments. Inputs for the future system service areas were updated using recent development and land use information provided by the City to simulate future system wastewater flows.

This chapter is divided into the following sections:

- 3.1 Existing Trunk Network
- 3.2 Existing Wastewater Flow
- 3.3 Land Use Data and Service Area

3.1 Existing Trunk Network

The City owns and operates a sewer collection system serving a population of about 83,700 people. The City's customer base includes residential, commercial, industrial, and public users, including UC Merced. The wastewater is conveyed by the collection system to the City's WWTF located southwest of the current extents of the City. The collection system consists of over 400 miles of gravity flow sewers that are 6-inch diameter and larger. The system is commonly described as having two geographical regions, North Merced and South Merced, delineated by Bear Creek which runs approximately east to west through the middle of the City.

The only major pumping facilities that exist within the trunk sewer system are the Highway 59 Pump Station (H59PS) and the Bellevue Ranch Pump Station (BRPS). The H59PS is located north of Fahren's Creek near Highway 59, and the BRPS is located north of Black Rascal Creek in the Bellevue Ranch development. There are several smaller pump stations within the system that serve small portions of the service area, such as individual subdivisions. These smaller pump stations are not considered part of the trunk sewer system and are excluded from the hydraulic model.

The City's existing system contains no raw sewage equalization basins, on-site sewage systems[1], septic tank effluent pump systems, nor any "unusual" sewer systems, e.g., vacuum, grind, or pump systems.

The focus of this evaluation is on the existing large primary trunk sewers within the existing collection system which are included within the skeletonized model. Trunk sewers are the large main branches of the collection system conveying flow from smaller collector sewers to the WWTF. The existing collection system and primary trunk sewers within the northern and southern regions of the system are shown on **Figure 3-1** and listed in **Table 3-1.**

[1] On-site sewage systems include septic/leach field systems serving rural residences within the City limits, which are operated by the property owner or resident, but none that are owned or operated by the City.

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Legend

- WW — WWTF
- PS — Modeled Lift Station
- 42-inch WWTF Trunk
- 48-inch Interceptor
- Bellevue Trunk
- Black Rascal Trunk (Part 1, North)
- Black Rascal Trunk (Part 2, South)
- East Gerard Avenue Trunk
- East Olive Avenue Trunk
- G Street Trunk
- H59PS Trunk
- North Merced West Ave Trunk
- South Merced West Ave Trunk
- West Gerard Avenue Trunk
- West Olive Avenue Trunk
- Yosemite Avenue Trunk
- Other Modeled Sewers
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- Aprox. South Merced Service Area
- UC Merced Campus

BELLEVUE TRUNK

UC MERCED CAMPUS

G STREET TRUNK

BELLEVUE RANCH PUMP STATION (BRPS)

YOSEMITE AVENUE TRUNK

H59PS TRUNK

BLACK RASCAL TRUNK (PART 1, NORTH)

HIGHWAY 59 PUMP STATION (H59PS)

WEST OLIVE AVENUE TRUNK

EAST OLIVE AVENUE TRUNK

H59PS TRUNK

BLACK RASCAL TRUNK (PART 2, SOUTH)

SOUTH MERCED WEST AVENUE TRUNK

NORTH MERCED WEST AVENUE TRUNK

SOUTH MERCED WEST AVENUE TRUNK

WEST GERARD AVENUE TRUNK

EAST GERARD AVENUE TRUNK

42-INCH WWTF TRUNK

48-INCH INTERCEPTOR

WW — WASTEWATER TREATMENT FACILITY

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Wastewater Collection System
Master Plan 2022 Update

Figure 3-1
Existing Wastewater Collection System

Table 3-1. City of Merced Primary Trunk Sewers

Trunk Sewer	Diameter Range (in)	Location/Description	Vicinity
Bellevue Trunk	18 to 24	Bellevue Road from UC Merced to G Street	North Merced
G Street Trunk	27 to 30	G Street between Bellevue Road and Black Rascal Ravine/Campus Drive	North Merced
Yosemite Avenue Trunk	18	Yosemite Avenue between Parsons and G Street	North Merced
Black Rascal Trunk (Part 1, North)	30 to 43	Following Black Rascal Ravine near Campus Drive from G Street to West Olive Avenue Trunk	North Merced
East Olive Avenue Trunk	12 to 18	Olive Avenue between McKee Road and G Street	North Merced
West Olive Avenue Trunk	18 to 21	Olive Avenue G Street and Hwy 59	North Merced
Black Rascal Trunk (Part 2, South)	42	Devonwood / Stoneybrook Drive between Olive Avenue and Bear Creek	North Merced
H59PS Trunk	18 to 27	Hwy 59 from the H59PS to Bear Creek	North Merced
North Merced West Ave Trunk	36 to 42	West Avenue between Bear Creek and West Childs Avenue	North Merced
48-inch Interceptor	48	Interceptor pipeline from West Childs Ave to the WWTF	North Merced
East Gerard Avenue Trunk	18 to 36	Kibby Road from Hwy 140 to East Gerard Avenue continuing west in Gerard Avenue to Tyler Road	South Merced
West Gerard Avenue Trunk	36	Remaining portion of the Gerard Avenue trunk from Tyler Road to West Avenue	South Merced
South Merced West Ave Trunk	18 to 27	West Avenue from Hwy 59 to Gerard Avenue running parallel to the North Merced West Avenue Trunk	South Merced
42-inch WWTF Trunk Sewer	42	Trunk sewer conveying flow from the intersection of Gerard Avenue and West Avenue to the WWTF	South Merced

Key:
H59PS = Highway 95 Pump Station; UC = University of California; WWTF = wastewater treatment facility

Several creeks flow through the City and were factors in the configuration of the City's trunk sewer system. To the extent feasible, the City has constructed sewers that allow gravity flow at creek crossing locations. This minimizes the number of pump stations and associated operation and maintenance costs that would otherwise be required in the system.

In addition to the main trunks of the City's domestic sewer system, a portion of the Western Industrial Area located west of Highway 59, northeast of Highway 99, and between Bear Creek and Black Rascal Creek is also served by a dedicated 14-inch force main originally constructed for use by a single user (the City refers to this as the "Old Ragu Line"). This conveyance runs south, all the way to the City's WWTF where it previously discharged waste to existing agricultural fields. This line is not currently used and was not modeled as part of this master planning effort. A separate assessment of the dedicated industrial line was summarized in a document entitled Merced WWTF Industrial Waste Acceptance Evaluation (Stantec, May 2014). This dedicated line is reserved by the City for potential future industrial uses which may be located within the Western Industrial Area.

The current wastewater needs of the Western Industrial Area are served via a collector sewer which flows by gravity east along Cooper Avenue to a trunk sewer along Highway 59. The trunk at Highway 59 conveys flow from the Western Industrial Area, the Highway 59 pump station located north of Black Rascal Creek, and the trunk at West Olive Avenue, south to the City's 48-inch interceptor, which then conveys combined flows to the WWTF.

3.2 Existing Wastewater Flow

Wastewater sources in the City of Merced include residential customers, commercial users, industrial users, and public uses; i.e., City administrative offices and public service facilities that include libraries, parks, and schools. A majority of the wastewater generated within the service area originates from residential customers.

Infiltration and inflow (I/I) of rainwater and/or shallow groundwater into the City's wastewater collection system also contributes to the volume of water that must be conveyed by the collection system. I/I can enter the collection system through different mechanisms. Infiltration is non-wastewater that enters the collection system via subsurface means such as damaged pipes, leaky pipe joints, leaky service connections and manholes. Inflow is non-wastewater that enters the collection system via more direct routes, such as leaky manhole lids, roof gutters, or yard drains inappropriately connected to the sewer system, sewer clean-outs, etc. Peak volumes of I/I generally occur during rainy weather.

The Merced wastewater collection system is designed to provide flow capacity to meet the level of service (LOS) to accommodate a peak flow resulting from a 10-year, 24-hour design storm event. A 10-year, 24-hour design storm in the City of Merced has a total rainfall depth of 2.31 inches (NOAA Atlas 14, Volume 6, Version 2, point precipitation frequency estimates for the City of Merced). Until Water Year 2017, the lack of significant rainfall prevented accurate forecasts of peak wet weather flow (PWWF) conditions in the existing wastewater collection system. The water year 2017 wastewater collection system flow and performance data provided by the City were incorporated into the analyses presented in the 2017 WCSMP, but the hydraulic model used in the assessment had not been recalibrated from its original development in 2007.

New flow monitoring data was collected as part of the Model Update and South Trunk Alternatives Analysis (Stantec 2020). V&A Consulting Engineers (V&A) monitored flows within the wastewater collection system between November 22, 2019, and December 25, 2019. During this period, the system experienced rainfall equal to 2- to 5-year, 24-hour events and 5- to 10-year events which provided sufficient system response for model calibration.

Open channel flow monitoring was performed at ten locations to provide sanitary flow data which allowed detailed definition of sewersheds within the model during the conversion and recalibration. The specific flow monitoring locations provide a higher resolution of flow distribution within the hydraulic model than existed in the previous international computer management (ICM) model used in the analysis presented in the 2017 WCSMP. The Flow Monitoring Site Reports provided by V&A, including data, graphs and information, are included in Appendix B.

A summary of the flow monitoring locations, sewershed characteristics, and flow data provided by V&A is presented in **Table 3-2**. The measured average dry weather flow (ADWF) and PWWF are presented for each monitoring site, along with the calculated wet weather PF. The PF is defined as the ratio of PWWF to ADWF for each monitoring location. The City's trunk sewers are designed using a PF of 2.3 per City design standards. PFs that exceed this design criteria were observed at Site 1 and Site 9 during the flow monitoring study. Discussions with City staff indicate that ongoing construction in these areas may have contributed to the high wet weather response in these sewersheds.

Table 3-2. V&A Flow Monitoring Data

V&A FM ID	FM MH ID	Pipe Size (in)	Trunk Sewer	Location/ Description	Area (Acres)	ADWF (MGD)	PWWF (MGD)	PF
1	1M149	18	Yosemite	East Yosemite Ave	444	0.38	1.12	2.95
2	5M040	30	G Street	Camp Drive West of G St	590 [1]	1.03	2.34	2.27
3	6M376	21/24	Hwy 59	Hwy 59 near Olive South of RR	386	0.90	1.89	2.10
4	6M125	43	Black Rascal (North)	Meadows Ave, North of Olive	521	1.48	3.15	2.12
5	6M161	21	Olive	Olive Ave, East of Meadows	873	0.67	1.46	2.18
6	16M071	39	Black Rascal (South)	North of Hwy 99 Crossing	391	3.43	6.59	1.92
7	16M050	42	42-inch Trunk	Near Airport LS discharge	482	3.36	7.29	2.17
8	16M192	36	Gerard Trunk West	Gerard Avenue trunk at West Avenue	2,122	2.76	6.00	2.17
9	[39729]	36	Gerard Trunk East	Gerard Avenue trunk East of Tyler Rd	754	0.52	1.37	2.63
10	16M097	48	48-inch Interceptor	Interceptor Sewer along Gerard Avenue	22	3.52	6.71	1.90

Note:
[1] Only 200 acres of UC Merced campus is included in the sewershed area presented for Site 2.
Key:
FM = Flow Monitor, ID = Identification Number, LS = lift station, MGD = million gallons per day
MH = manhole, PF = Peaking Factor, V&A = V&A Consulting Engineers, Inc.

V&A noted that Site 8 and Site 10 are in proximity to each other, and both had a large amount of sediment build-up. High amounts of sediment at the monitoring location can impact the quality of the associated flow monitoring data. They also noted that generally, there was a noticeable decrease in observed flows during the Thanksgiving and Christmas holidays. This presumably may be due to UC Merced student population and holiday travel. V&A cautions that ADWF rates and wet weather flow responses may not have been at full strength and further noting that the data may not be representative of average conditions due to the timing of the study, which took place during the holiday season. The existing collection system and flow monitoring locations from this study are presented in **Figure 3-2**.

As discussed, additional flow monitoring data was collected as part of this effort. This flow data is further described in **Chapter 4.0** as part of the per capita flow analysis.

Legend

- WW — WWTF
- PS — Modeled Lift Station
- FM — Flow Monitoring Locations
- Sewer Lift Station
- Modeled Sewer Trunks
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus
- BRPS
- H59PS

FM

- Site 1
- Site 2
- Site 3
- Site 4
- Site 5
- Site 6
- Site 7
- Site 8
- Site 9
- Site 10

UC MERCED CAMPUS

FM1
FM2
FM3
FM4
FM5
FM6
FM7
FM8
FM9
FM10

WW — WASTEWATER TREATMENT FACILITY

MILES
0 0.5 1.0 1.5 2.0

N

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City of Merced
Wastewater Collection System
Master Plan 2022 Update

Figure 3-2
Flow Monitoring Locations – V&A Flow Monitoring Study (Nov-Dec 2019)

3.3 Land Use Data and Service Area

The purpose of this section is to present the City's land use data and service area divisions and how they relate to the collection system capacity analysis.

3.3.1 GENERAL PLAN LAND USE DATA

Land uses from the 2030 General Plan, supplemental specific plan, and pre-annexation information provided by the City were used in projecting wastewater flows at build-out of the City limits and the SUDP. The 2030 General Plan is shown in **Figure 1-1**. Land use planning areas applicable to this WCSMP update is described in detail in this section and presented in **Figure 3-3**. These land uses constitute the planning area for this document.

3.3.2 EXISTING SEWER SERVICE CONNECTIONS

The City provided account information for each of its existing sewer service connections, including the address, assessor's parcel number, and the number of equivalent dwelling units (EDU) associated with each service account. An EDU is a unit of measure that normalizes all land use types to the equivalent wastewater demand of one single-family residential unit. For example, if a commercial service account has five EDUs, it produces wastewater equivalent to that of five single-family residential service accounts.

The existing system model was updated as part of the City of Merced Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis (Stantec, June 2020) and is still considered to be representative of existing system conditions. This evaluation included updating the existing sewer service account parcel file for use in the existing system model. The updated file reflects parcels, based on data provided by City staff in early 2020, with connected accounts during the time of the flow monitoring study (November–December 2019).

Existing service area information is summarized in **Table 3-3**. The number of existing EDUs was approximated by the City and should not be considered an exact number, and flow for the existing system was determined based on actual recorded flows.

Table 3-3. Existing Service Area Data

Service Area	Total Area (Acres)	Total EDUs
Total Existing Service Area	6,697	33,029

Key:
EDU = equivalent dwelling unit

3.3.3 PLANNED SEWER SERVICE COMMITMENTS AND INTERIM DEVELOPMENT

Planned sewer service commitments consist of parcels that have anticipated future sewer services but are not currently connected to the system. This includes the service commitment associated with UC Merced, areas identified in the City's tentative subdivision map database, properties which have received entitlements to develop and are only partially built or have not yet been started, vacant parcels within City limits, and other parcels identified by City staff.

Wastewater flow assumed to be generated from parcels with service commitments is projected using an EDU count assigned to each parcel. The number of EDUs is converted to a flow projection using the City's standard flow per EDU unit factor. Where refined planning information is available, a specific EDU count is estimated considering the planned number of dwellings and more refined plans for non-residential areas. Where this information is not available, the number of EDUs assigned to each parcel is estimated using its associated land use and the EDU density for each land use designation listed in **Table 3-4**.

Wastewater flow projections for parcels with sewer service commitments (committed parcels) are estimated using one of the following criteria:

- **General Plan Land Use**: Land use outlined in the City's General Plan is used along with the associated land use-based wastewater generation rates, described in the following chapter.
- **City Specified Land Use**: City provided updated land use or EDU information that is used along with the associated land use-based wastewater generation rates, described in the following chapter.
- **Single Lot/1 EDU:** Single residential lots were identified and counted as one EDU by the City.
- **Specific Development Plan:** City provided specific development plans. Single lots were counted as one EDU, and specific land use information was used in conjunction with wastewater generation rates.
- **Open Space/ No Flow Areas:** These parcels are not expected to contribute wastewater to the collection system and were removed from the model.
- **UC Merced:** The committed ADWF from the University beyond their existing flow.

Table 3-4. Interim Service Area Data

Service Area	Total Area (Acres)	Total EDUs
General Plan Land Use Parcels	2,737	19,669
City Specified Land Use Parcels	82	788
Single Lot Parcels/ 1 EDU	407	2,129
Specific Development Plan Parcels	311	2,417
UC Merced (ADWF exceeding existing)	380	0.13 MGD [1]
Total Interim Commitments	**3,918**	**25,004**

Note:
[1] UC Merced estimate from the 2020 UC Merced Long Range Development Plan Recirculated Draft Subsequent Environmental Impact Report, (December 2019).
Key:
ADWF = Average Dry Weather Flow (observed during the dry season)
EDU = equivalent dwelling unit
MGD = million gallons per day

3.3.4 FUTURE BUILD-OUT MERCED SERVICE AREA

The City must also plan how to serve the remaining parcels within the SUDP. These areas do not have an existing sewer service connection and have not been identified as part of planned interim development. The full development of these future parcels represents build-out of the City's planning area and sewer service area.

The City provided planning information for its current annexation project applications. Pre-annexation applications were reviewed to determine the number of EDUs associated with each development area for purposes of this master plan. A summary of pre-annexation areas and specific EDUs is presented in **Table 3-5**. This information was used to approximate wastewater flow for these areas and build-out development phasing.

Table 3-5. Pre-annexation Areas, Application EDU Summary

Annexation	Gross Area	Single-Family Units	Multi-family Units	Commercial /BP/Hospital	Mixed Use	Total EDUs
	(Acres)	(EDU)	(EDU)	(EDU)	(EDU)	(EDU)
M and Bellevue	30.9	323	0	94	0	417
Rogina	148.5	545	270	211	0	1,026
Yosemite and Gardner–MU Area	64.3	570	0	58	0	628
Yosemite and Gardner–Church/School	17.3	0	0	67	0	67
Yosemite and Gardner–R1		4	0	0	0	4
Yosemite and Gardner–UT		8	0	0	0	8
Yosemite Lake Estates	1,022.9	2,689	0	0	0	2,689
University Vista	286.4	210	2,272	1,218	1,694	5,394
UC Village	34.2	922	0	109	60	1,091
Branford Point	45.9	347	127	1,074	1,157	2,705
Virginia Smith Trust	646.0	3,857	0	0	0	3,857
Parrish	4.3	0	0	25	0	25
Total:	**2,300**					**17,912**

Key:
BP = Business Professional
EDU = equivalent dwelling unit
MU = Mixed Use

After completing the hydraulic model of the interim system and recommended improvements, the amount of available capacity for pre-annexation areas was evaluated to identify the threshold of EDUs that could be added by implementing the proposed improvements.

The Draft 2017 WCSMP included specific wastewater flow estimates for UC Merced and the north and south campus community. As previously discussed, the estimate for UC Merced has been updated with the most recent information provided in the UC Merced Long Range Development Plan. The north campus community is included within the pre-annexation areas as the Virginia Smith Trust with updated specific planning formation.

No updated planning information has been provided for the south campus community. Therefore, the previous ADWF estimate from Table 2.0-8 of the UC Merced and University Community Project Final EIS/EIR (March 2009) has been used as the basis. The previous south campus community flow estimate,

1.04 MGD, was scaled using the ratio of the updated wastewater unit rate to the previous wastewater unit rate (208/257), resulting in an updated ADWF projection of 0.84 MGD. The updated per capita wastewater unit rate and details regarding the per capita analysis are provided in **Section 4.1**. Flow from the remaining SUDP parcels is estimated based on General Plan land use designations and wastewater generation rates presented in the following chapter.

Table 3-6. Build-out Service Area Data

Service Area	Total Area (Acres)	Total EDUs
Pre-annexation Areas	1,710 [1]	17,912
South Campus Community	1,106	0.84 MGD [2]
Remaining Parcels within SUDP (General Plan) Boundary	9,313	49,642
Total	**12,129**	**67,554**

Notes:
[1] Net area listed here excludes open spaces and non-wastewater contributing areas, which are included in the total area listed in **Table 3-5**.
[2] ADWF estimate from Table 2.0-8 of the UC Merced and University Community Project Final EIS/EIR (March 2009), scaled to reflect changes to the wastewater unit rate (208/257). See **Section 4.1** of this report.
Key:
EDU = equivalent dwelling unit
EIS/EIR = Environmental Impact Statement/Environmental Impact Report
MGD = million gallons per day
SUDP = Specific Urban Development Plan
UC = University of California

The existing, planned, and future service areas are shown in **Figure 3-3**.

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Legend

- Existing Service Area
- Interim Service Area
- Buildout Service Area
- Pre-Annexation Area
- UC Merced Campus
- Campus Community
- City Limit
- SUPD Boundary

UC MERCED CAMPUS

MILES
0 0.5 1.0 1.5 2.0

N

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Figure 3-3
Existing, Planned, and Future Sewer Service Areas

3.3.5 UPDATED STUDY AREA LAND USE DATA SUMMARY

Land use data in the form of EDU projections for entitled, pre-annexation, and future development areas is summarized below in **Table 3-7**.

Table 3-7. Summary of Planning Area Land Use Data

Service Area	Total Area (Acres)	Total EDUs
Total Existing Service Area [1]	6,497	33,029
UC Merced [2]	200	673
Total Existing	**6,697**	**33,702**
Interim Service Area		
General Plan Land Use Parcels	2,737	19,669
City Specified Land Use Parcels	82	788
Single Lot Parcels/ 1 EDU	407	2,129
Specific Development Plan Parcels	311	2,417
UC Merced (committed ADWF exceeding existing, 0.13 MGD) [2]	380	625
Pre-Annexation Areas [5]	155	9,000
Subtotal Interim	**4,072**	**34,628**
Build-out Service Area		
Pre-Annexation Areas (Remaining)	1,555	8,912
Remaining Parcels within SUDP (General Plan) Boundary [3]	9,313	49,642
Campus Community (planning ADWF estimate, 0.84 MGD) [4]	1,106	4,038
Subtotal Build-out	**11,974**	**62,592**
Total Interim Service Area	**10,769**	**68,330**
Total Build-out Service Area	**22,743**	**130,922**

Notes:
[1] The existing total EDU estimate is approximate and was provided by the City; existing system flows are based on flow monitoring data independent of actual EDUs.
[2] UC Merced future wastewater flow equates to the projection provided in the 2020 UC Merced Long Range Development Plan Recirculated Draft Subsequent Environmental Impact Report (December 2019). The existing flow is approximately 0.14 MGD with an addition of 0.13 MGD projected under future conditions resulting in a total flow of approximately 0.27 MGD.
[3] The area and EDU estimate of parcels bisected by the City's SUDP boundary are limited to the portion that exists within the City's planning area.
[4] ADWF estimate from Table 2.0-8 of the UC Merced and University Community Project Final EIS/EIR (March 2009), scaled to reflect changes to the wastewater unit rate (208/257). See **Section 4.1** of this report.
[5] After model completion, the amount of available capacity for pre-annexation areas, after implementation of proposed improvements, was considered. These available EDUs are listed here and are not reflected in model results. Additional information is provided in **Section 6.3.3.4**.
Key:
ADWF = average dry weather flow (observed during the dry season)
EDU = equivalent dwelling unit
EIS/EIR = Environmental Impact Statement/Environmental Impact Report
MGD = million gallons per day
SUDP = Specific Urban Development Plan
UC = University of California

4.0 Sewer Flow Estimates

The purposes of this chapter are to present the future wastewater flow projection methodology and design criteria and to describe the City's per capita flow investigation and analysis. To project future wastewater flows from undeveloped area land use data and demographics are correlated with wastewater flow unit rates; and from that correlation, average wastewater flows for future development are forecasted under design conditions. The information presented is used to model existing system performance, size near-term system improvements, and size system improvements needed to serve the needs at build-out of the 2030 General Plan.

Average design wastewater flows were estimated for future City development conditions by multiplying residential development acreages and population estimates, commercial or industrial acreage, and public use acreages (such as schools) by unit flow generation rates. PFs from future development areas were estimated by applying PFs to average flows, as described in more detail in this chapter.

This chapter is divided into the following sections:

- 4.1 2021 Per Capita Flow Investigation
- 4.2 Wastewater Generation Rates
- 4.3 Peak Flow Estimates and Methodology
- 4.4 Future Flow Projections Summary

4.1 2021 Per Capita Flow Investigation

V&A was retained by the City to perform sanitary sewer flow monitoring within the City. Flow monitoring was performed from September 27, 2021, to November 1, 2021, at eighteen flow monitoring sites and three pump station locations. The purposes of the study were as follows:

1. Establish the baseline sanitary sewer flows at the flow monitoring sites.
2. Measure the peak flow characteristics of the subject pipes during the flow monitoring period.
3. Establish flow rates for the various land use categories.

The flow monitoring locations and collection areas are summarized in **Table 4-1** and shown in **Figure 4-1**.

Table 4-1. Flow Monitoring Locations and Areas

FM Site ID	Site Name	Basin Area (Acres)	Land Use Designation	Sewer Accounts (EDU)			
				Single Family	Multi-Family	Non-Residential	Total
1_1	LowDen-1	849.6	Low Density Residential	2,641	0	-	2,641
1_2	LowDen-2	47.4	Low Density Residential	170	184	-	354
1_3	LowDen-3	84.5	Low Density Residential	267	142	-	409
1_4	LowDen-4	274.4	Low Density Residential	749	251	-	1,000
1_5	LowDen-5	55.9	Low Density Residential	342	0	-	342
1_6	LowDen-6	122.7	Low Density Residential	400	0	-	400
1_7	LowDen-7	76.8	Low Density Residential	254	0	-	254
1_8	LowDen-8	44.9	Low Density Residential	328	0	-	328
1_9	LowDen-9	37.7	Low Density Residential	149	0	-	149
1_10	HiMedDen-2	33.8	High to Medium Density Residential	0	296	-	296
2_1	Mobile-1	26.3	Mobile Home Park Residential	215	0	-	215
2_2	Mobile-2	26.3	Mobile Home Park Residential	155	0	-	155
2_3	HIDen-1	31.4	High Density Residential	0	315	-	315
2_4	PlanDev-1	257.3	Planned Development Residential	1,083	96	-	1,179
2_5	PlanDev-2	309.9	Planned Development Residential	1,694	0	-	1,694
2_6	Industrial-1	1,065.9	Industrial	-	-	5	5
2_7	Industrial-2	157.2	Industrial	-	-	41	41
2_8	Industrial-3	265.9	Industrial	-	-	12	12
2_9	OfficeComm-2	41.1	Commercial Office	-	-	4	4
2_10	UCMerced	#N/A	University of CA–Merced Campus	-	-	-	-
2_11	WWTF	#N/A	Wastewater Treatment Plant Influent	-	-	-	-

Key:
EDU = equivalent dwelling unit
FM = Flow Monitor
ID = Identification Number
N/A = Not Applicable
WWTF = wastewater treatment facility

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Legend

- PS — Sewer Lift Station
- FM — Flow Monitoring Locations

FM

- Industrial-1
- Industrial-2
- Industrial-3
- OfficeComm-2
- Mobile-1
- Mobile-2
- LowDen
- HiMedDen-2
- HiDen-1
- PlanDev-1
- PlanDev-2
- WW — WWTF
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus

UC MERCED (20)

PLANNED DEVELOPMENT-2 (PS)

OFFICE/COMMERCIAL-2 (10)

LOW DENSITY-2 (10)

LOW DENSITY 01 (18)

PLANNED DEVELOPMENT-1 (27)

LOW DENSITY-3 (10)

INDUSTRIAL-3 (12)

LOW DENSITY 7 (10) - TAHOE DR

HIGH-MEDIUM DENSITY-2 (10)

MOBILE-1 (8)

LOW DENSITY 8 (PS) - SYDNEY

LOW DENSITY-4 (16)

HIGH-DENSITY-1 (10.25)

LOW DENSITY-9 (7.75)-HWY 140

INDUSTRIAL-2 (PS)

LOW DENSITY 6 (12) - 21st/CEDAR

MOBILE-2 (8)

LOW DENSITY 5 (11.5)-GERARD AVE

INDUSTRIAL-1 (33)

WWTF INFLUENT (60)

WASTEWATER TREATMENT FACILITY

UC MERCED CAMPUS

MILES 0 0.5 1.0 1.5 2.0

N

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Figure 4-1
Flow Monitoring Locations – V&A Flow Monitoring Study (Sept-Nov 2021)

4.1.1 FLOW MONITORING DATA

V&A produced a flow monitoring report that summarized the ADWF, peak measured flow, PF, pipe diameter, max reported flow depth, and the depth over diameter ratio for each flow monitoring location. The data reported by V&A is summarized in **Table 4-2**. The full V&A Flow Monitoring Report can be found in **Appendix B**.

Table 4-2. 2021 Flow Monitoring Data

FM Site ID	Site Name	ADWF (MGD)	Peak Measured Flow (MGD)	Peaking Factor	Pipe Diameter (in)	Max Depth (n)	Max d/D Ratio
1_1	LowDen-1	0.43	0.84	1.9	18	7.18	0.4
1_2	LowDen-2	0.05	0.17	3.2	10	4.14	0.41
1_3	LowDen-3	0.04	0.12	2.8	10	2.78	0.28
1_4	LowDen-4	0.18	0.33	1.9	16	5.61	0.35
1_5	LowDen-5	0.09	0.21	2.5	11.5	2.99	0.26
1_6	LowDen-6	0.08	0.19	2.2	12	5.74	0.48
1_7	LowDen-7	0.05	0.15	3.1	10	4.26	0.43
1_8	LowDen-8	0.12	0.31	2.6	N/A [1]	N/A [1]	N/A [1]
1_9	LowDen-9	0.02	0.07	3.6	7.75	2.31	0.3
1_10	HiMedDen-2	0.06	0.16	2.8	10	3.22	0.32
2_1	Mobile-1	0.03	0.06	2.1	8	2.19	0.27
2_2	Mobile-2	0.02	0.08	3.8	8	6.33	0.79
2_3	HIDen-1	0.05	0.25	4.8	10.25	3.64	0.36
2_4	PlanDev-1	0.35	0.69	1.9	27	6.5	0.24
2_5	PlanDev-2	0.28	0.54	1.9	N/A [1]	N/A [1]	N/A [1]
2_6	Industrial-1	0.16	1.39	8.8	33	4.95	0.15
2_7	Industrial-2	0.03	0.16	5.3	N/A [1]	N/A [1]	N/A [1]
2_8	Industrial-3	0.35	0.89	2.6	12	7.74	0.65
2_9	OfficeComm -2	0.01	0.02	4.1	10	3.13	0.31
2_10	UC Merced	0.12	0.56	4.9	21	4.47	0.21
2_11	WWTF	6.88	9.78	1.4	60	13.64	0.23

Note:
[1] Stations 1_8, 2_5, and 2_7 were monitored using pump station loggers, therefore there is no pipe diameter or depth information associated with these monitoring locations.
Key:
ADWF = Average Dry Weather Flow (observed during the dry season)
d/D = depth over diameter ratio
FM = Flow Monitor
ID = Identification Number
MGD = million gallons per day
n = Manning's Roughness
N/A = Not Applicable
UC = University of California
WWTF = wastewater treatment facility

4.1.2 PER CAPITA ANALYSIS

The City's flow per capita was calculated using the V&A reported flow data and the number of sewer accounts contributing to each flow monitoring location as provided by the City. The results of the per capita analysis are shown in **Table 4-3**. The current per capita density of single-family and multi-family units was extracted from the City's most recent Financing Plan and Impact Fee Update Report (December 2021) prepared by Economic and Planning Systems, Inc., for use in determining population per sewershed in this analysis:

> *"Based on the U.S. Census Bureau's American Community Survey, single-family units average 3.20 persons per household and multi-family units average 2.54 units per household."*

Table 4-3. Wastewater Flow Per Capita Results

FM Site ID	Site Name	Population			ADWF	Per capita
		Single Family (3.20 persons/EDU)	Multi-Family (2.54 persons/EDU)	Total	(MGD)	(gpcd)
1_1	LowDen-1	8,452	0	8,452	0.43	51
1_2	LowDen-2	544	468	1,012	0.05	51
1_3	LowDen-3	855	361	1,216	0.04	N/A [1]
1_4	LowDen-4	2,397	638	3,035	0.18	59
1_5	LowDen-5	1,095	0	1,095	0.09	78
1_6	LowDen-6	1,280	0	1,280	0.08	66
1_7	LowDen-7	813	0	813	0.05	62
1_8	LowDen-8	1,050	0	1,050	0.12	N/A [1]
1_9	LowDen-9	477	0	477	0.02	42
1_10	HiMedDen-1	0	752	752	0.06	76
2_1	Mobile-1	688	0	688	0.03	41
2_2	Mobile-2	496	0	496	0.02	40
2_3	HIDen-1	0	801	801	0.05	65
2_4	PlanDev-1	3,466	244	3,710	0.35	95
2_5	PlanDev-2	5,421		5,421	0.28	52
					Average Per Capita Flow: [2]	**60**

Notes:
[1] Flow measured by lift station loggers was omitted from this analysis due to the level of error associated with flow measurement associated with wet-well volume. The average wastewater flow per capita in the City of Merced equates to 60 gpd. Two of the residential sewershed areas were excluded from the assessment due to inconsistencies in flow recording. Flow from these monitoring locations was calculated based on pump station loggers, which have a higher level of error associated with them due to the accuracy of the calculated wet-well volume.
[2] Please note that a 5 gpcd factor of safety is applied to this value to give the final per capita flow rate of 65 gpcd used in this master plan.
Key:
ADWF = average dry weather flow (observed during the dry season)
EDU = equivalent dwelling unit
FM = flow monitor
gpcd = gallons per capita per day
gpd = gallons per day
ID = identification number
MGD = million gallons per day

The average wastewater flow per capita in the City of Merced equates to 60 gpd, as shown in **Table 4-3**. Two of the residential sewer shed areas were excluded from the assessment due to inconsistencies in flow recording. Flows from these monitoring locations were calculated based on pump station loggers, which have a higher level of error associated with them due to the accuracy of the calculated wet-well volume.

4.1.3 RECOMMENDED PER CAPITA WASTEWATER GENERATION RATE

The recommended per capita wastewater generation rate adds 5 gallons per capita per day (gpcd) factor of safety to the average value determined in the per capita flow analysis. This updates the City's standard per capita flow to 65 gpcd from 85 gpcd used in previous master planning efforts. The EDU density (the number of persons per EDU) was also adjusted to reflect the most recent census data recorded in the City's Financing Plan and Impact Fee Update Report (December 2021).

Using these updated values, the unit wastewater generation rate is adjusted to 208 gpd/EDU from 257 gpd/EDU used in previous planning efforts. This adjustment also impacts the land-use based wastewater generation rates used to project wastewater flows from future developments within the planning area. These unit flow rates are based on residential densities discussed in the City's General Plan and discussed in more detail in section 4.2.

The recommended per capita wastewater generation rate and updated average residential density is used to update the City's standard wastewater unit rate per EDU as shown in **Table 4-4**.

Table 4-4. Unit Rate Update Summary

Parameter	Updated Unit Rate Values	Previous Planning Values
Average Per Capita Flow (gpcd)	60 [1]	85
Factor of Safety (gpcd)	5	
Recommended Per Capita Flow (gpcd)	65	
EDU Density (persons per household)	3.20 [2]	3.02 [3]
Unit Wastewater Generation Rate (gpd/EDU)	208	257

Notes:
[1] Average per capita flow based on 2021 flow monitoring efforts, as shown in **Table 4-3**.
[2] The per capita density of single-family housing units from the City's Financing Plan and Impact Fee Update Report (December 2021) prepared by Economic and Planning Systems, Inc.
[3] The 2030 General Plan defines the average residential density within the City's SUDP as 3.02 persons/unit.
Key:
EDU = equivalent dwelling unit
gpcd = gallons per capita per day
gpd = gallons per day
SUDP = Specific Urban Development Plan

4.2 Wastewater Generation Rates

Land uses within the City's planning area are established by the City's 2030 General Plan, and supplemental specific plan information provided by the City serves as the basis to estimate future wastewater flow rates for future planning scenarios evaluated in this master plan. This section presents the unit rates used to project flow from this data.

4.2.1 RESIDENTIAL UNIT DENSITIES

Average wastewater flow estimates for land uses described in the City's General Plan are derived using land use-based unit densities and wastewater generation rates. For undeveloped residential lands within the planning area, specific residential land uses were assigned by the 2030 General Plan. Dwelling unit density factors (units/acre) applied to the various types of residential land uses are unchanged from the 2017 WCSMP and summarized in **Table 4-5**.

Table 4-5. General Plan Residential Density Definitions

Residential Land Use	General Plan Residential Density (units/acre) [1]	Residential Density Used in this Master Plan (units/acre) [1]
Rural	1.0 to 3.0	2
Low Density	2.0 to 6.0	4.5
Low-Medium Density	6.1 to 12.0	8.5
High-Medium Density	12.1 to 24.0	18
High Density	24.1 to 36.0	28
Mobile Home Park	6.0 to 10.0	8
Village Core Residential	7.0 to 30.0	12
Residential Reserve	2.0 to 6.0	4.5
Community Plan	-	4.5 [2]

Notes:
[1] For purposes of this report a "unit" is defined as one housing unit with an average of 3.20 persons (See Note 2 in Table 4-4).
[2] City staff indicated that for Community Plan land use, this WCSMP was to assume 4.5 units/acre, which is consistent with the density assumption utilized for the Residential Reserve land use.
[3] These dwelling unit densities were multiplied by the 2030 General Plan acreage allocated to each specific land use to estimate the total number of residential units needing sewer service. The number of residential units in a trunk sewer's service area multiplied by the unit wastewater generation rate and represents an estimate of the average residential wastewater flow that needs to be handled by the serving trunk sewer.
[4] Specific estimates are provided for UC Merced and other specific planning areas were provided by the City. Specific developments, identified by City staff as either currently under construction or expected to develop in the near future, were evaluated based on development-specific information provided by the City.
Key:
UC = University of California
WCSMP = Wastewater Collection System Master Plan

These dwelling unit densities were multiplied by the 2030 General Plan acreage allocated to each specific land use to estimate the total number of residential units needing sewer service.

4.2.2 LAND USE DESIGNATIONS

The total estimation of average wastewater flows for planning purposes is based on the unit factors presented in **Table 4-6**. The wastewater generation rates were equated to their equivalent number of EDUs and scaled appropriately by the per capita flow analysis. These wastewater generation rates were cross checked using the wastewater flow data collected by V&A.

Table 4-6. Wastewater Generation Rates

Land Use Code	Description	Density (EDU/acre)	Updated Generation Rate (gpd/acre)
CG	General Commercial	5.8	1,214
BP	Business Park	5.8	1,214
BP-R	Business Park Reserve	5.8	1,214
CO	Commercial Office	5.8	1,214
CT	Thoroughfare Commercial	5.8	1,214
RC	Regional Community Commercial	5.8	1,214
COM-R	Commercial Reserve	5.8	1,214
CN	Neighborhood Commercial	5.8	1,214
IND	Manufacturing/Industrial	7.8	1,619
IND-R	Industrial Reserve	7.8	1,619
FSCH	Future School	14.6	3,047
SCH	School	14.6	3,047
P/G	Public General Use	5.8	1,214
AG	Agricultural	0.0	0
OS-PK	Open Space–Park Recreation	0.0	0
FPK	Future Park	0.0	0
RR	Rural Residential	2.0	415
LD	Low Density Residential	4.5	935
LMD	Low To Medium Density Residential	8.5	1,766
HMD	High To Medium Residential	18.0	3,740
HD	High Density Residential	28.0	5,818
RMH	Mobile Home Park Residential	8.0	1,662
VR	Village Residential	12.0	2,493
RES-R	Residential Reserve	4.5	935
CP	Community Plan	4.5	935
MU	Mixed Use	11.9	2,474

Key:
EDU = equivalent dwelling unit
gpd = gallons per day

4.3 Peak Flow Estimates and Methodology

PWWFs simulated in the hydraulic model are used to evaluate the LOS of the collection system and provide recommendations for future servicing and improvement strategies.

Two methods were used to determine peak flows within the hydraulic model:

1. **Existing and Interim Flows:** Use simulated design storms to predict PWWFs in the existing system.

2. **Build-out Flows:** Use City design criteria and PF method, to predict PWWFs that may result from build-out development.

Each method of estimating PWWF in the system is further described below.

4.3.1 DESIGN STORM

PWWFs are determined by computational models by simulating design rainfall events representing a reasonable worst-case condition. During rainfall conditions considered more severe than the input design storm, exceedances of LOS criteria would be expected to occur, which may result in sanitary sewer overflow (SSO). The design storm selected for many Central Valley collection systems has a statistical 10-year return frequency and a 24-hour duration. PWWFs in the collection system, originating from the existing sewer sheds, were evaluated using a 10-year, 24-hour design storm with a Huff Distribution (distributing rainfall by the hour). The 10-year, 24-hour design storm in the City of Merced has a total rainfall depth of 2.31 inches.

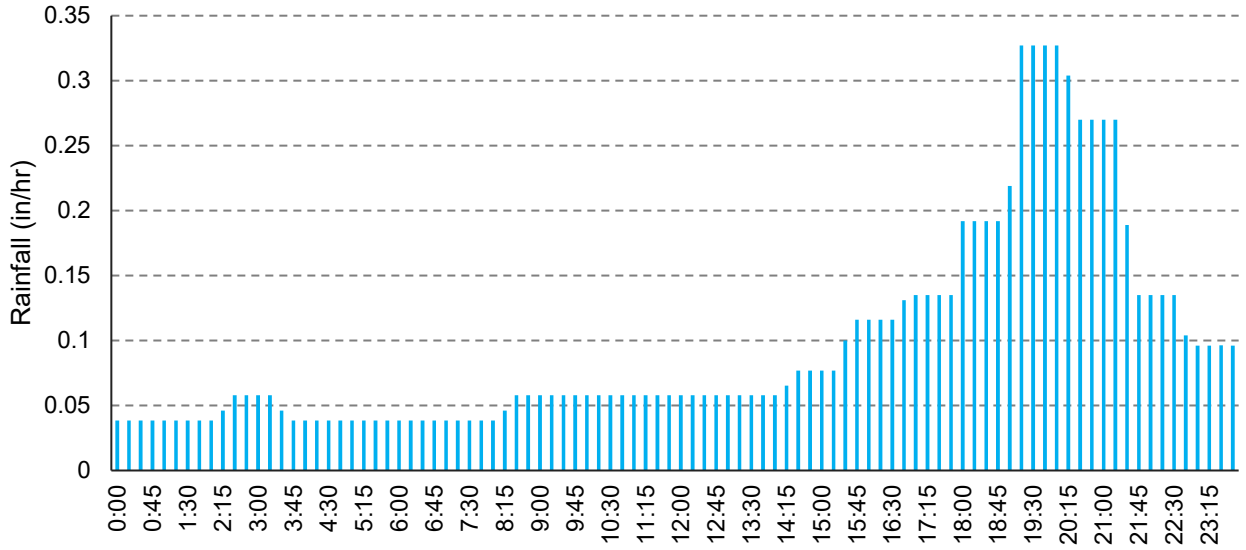

Figure 4-2. City of Merced 10-year, 24-hour Design Storm

4.3.2 PEAKING FACTOR METHOD

A PF of 2.3 is used to estimate peak flows from future build-out development areas. PWWFs contributing to proposed build-out infrastructure are calculated using the City's design standard, which applies a PF of 2.3 to the projected ADWF.

4.4 Future Flow Projections Summary

The land use data presented in **Table 4-7** was correlated with the updated wastewater generation rates.

Table 4-7. Future Wastewater Flow Projections Summary

Service Area	Total Area (acres)	Total EDUs	ADWF (MGD)
Existing Service Area [1]	6,497	33,029	6.88
UC Merced [2]	200	673	0.14
Total Existing	***6,697***	***33,702***	***7.02***
Interim Service Area			
General Plan Land Use Parcels	2,737	19,669	4.09
City Specified Land Use Parcels	82	788	0.16
Single Lot Parcels/ 1 EDU	407	2,129	0.44
Specific Development Plan Parcels	311	2,417	0.5
UC Merced (committed ADWF exceeding existing, 0.13 MGD) [2]	380	625	0.13
Pre-Annexation Areas [5]	155	9,000	1.87
Subtotal Interim	***4,072***	***34,628***	***7.19***
Build-out Service Area			
Pre-Annexation Areas (Remaining)	1,555	8,912	1.86
Remaining Parcels within SUDP (General Plan) Boundary [3]	9,313	49,642	10.33
Campus Community (planning ADWF estimate, 0.84 MGD) [4]	1,106	4,038	0.84
Subtotal Build-out	***11,974***	***62,592***	***13.03***
Total Interim Service Area	**10,769**	**68,330**	**14.21**
Total Build-out Service Area	**22,743**	**130,922**	**27.24**

Notes:
[1] The existing total EDU estimate is approximate and was provided by the City; existing system flows are based on flow monitoring data independent of actual EDUs.
[2] UC Merced wastewater flow equates to the projections provided in the 2020 UC Merced Long Range Development Plan Recirculated Draft Subsequent Environmental Impact Report, (December 2019). The existing flow is approximately 0.14 MGD with an addition of 0.13 MGD projected under future conditions resulting in a total flow of approximately 0.27 MGD.
[3] The area and EDU estimate of parcels bisected by the City's SUDP boundary are limited to the portion that exists within the City's planning area.
[4] ADWF estimate from Table 2.0-8 of the UC Merced and University Community Project Final EIS/EIR (March 2009), scaled to reflect changes to the wastewater unit rate (208/257). See Section 4.1 of this report.
[5] After model completion, the amount of available capacity for pre-annexation areas, after implementation of proposed improvements, was considered. These available EDUs and flow capacity are listed here.

Key:
ADWF = Average Dry Weather Flow (observed during the dry season)
EDU = equivalent dwelling unit
gpd = gallons per day
MGD = million gallons per day
SUDP = Specific Urban Development Plan
UC = University of California

5.0 Hydraulic Model

The purpose of this chapter is to outline details of the sewer collection system model background, use, and approach. The most recent version of the City's existing system model was updated and calibrated as part of the Model Update and South Trunk Alternatives Analysis (Stantec 2020). This existing system model is used as the foundation of this master plan update and analysis.

This chapter is divided into the following sections:

- 5.1 Modeling Software
- 5.2 Model Background
- 5.3 Model Calibration
- 5.4 Model Scenarios

5.1 Modeling Software

The City's wastewater collection system model uses the latest version of Personal Computer Storm Water Management Model (PCSWMM) software (version 7.4.3240) developed by Computational Hydraulics International (CHI).

5.2 Model Background

A fully dynamic hydraulic model of the City of Merced's (City) wastewater collection system was initially developed using InfoWorks ICM software (version 6.5.5.13016) for use in preparing the WCSMP (Stantec 2017). This model was updated and converted from ICM to PCSWMM software as part of the most recent update performed as part of the Model Update and South Trunk Alternatives Analysis (Stantec 2020) report.

As part of the 2020 effort, the model was updated using flow monitoring data collected within the sewer system and the most recent information on existing sewer accounts, sewer service commitments, and land use planning information provided by the City. After completing the hydraulic model update, the new model was used to perform an alternatives assessment which considered servicing options for the future southeast portion of the City, originally proposed to be served by the future south trunk in the City's 2017 WCSMP. The proposed alternatives include sizing and alignment variations of what had been previously proposed and considered the potential of utilizing residual capacity within the existing system.

5.3 Model Calibration

As previously discussed, the model was most recently updated and calibrated as part of the City of Merced Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis (Stantec, June 2020) report. Wastewater flow was monitored at ten strategic locations within the collection system for a four-week period from November 22, 2019, to December 25, 2019. The flow monitoring data was used to redistribute flow and calibrate the existing system model after the physical

system data was reconstructed in PCSWMM. This calibration was validated using the flow data collected by V&A as part of the per capita analysis discussed in **Section 4.1**. The validation process included running the existing system model under the conditions experienced during the 2021 flow monitoring study and comparing the overall system flow results with the recorded data. The validation results showed that the error between monitored and simulated flows was less than 10 percent for the maximum, minimum, mean, and total system flow. All recorded versus observed flow values fell within the 30 percent envelope.

5.4 Model Scenarios

The following model scenarios were included as part of this WCSMP update to evaluate the collection system under existing, near-term, and future build-out development conditions. Simulated scenarios are summarized below.

5.4.1 EXISTING SYSTEM MODEL

This modeled scenario simulates flow in the existing collection system during a 10-year, 24-hour design storm event. This model was constructed using the calibrated wet weather flow model and applying a 10-year, 24-hour rainfall event. The results of this simulation evaluate the existing collection system under PWWF conditions.

5.4.2 INTERIM SYSTEM MODEL

This modeled scenario is the existing wet weather flow model evaluated in previous scenario with the addition of flow from planned sewer service commitments described in **Section 3.3.3**. Sanitary flow from these parcels was approximated using methods described in **Section 3.3.5**. Sewershed unit hydrographs corresponding to the location of the infill have been applied to estimate PWWFs under design storm conditions. The results of this simulation represent PWWF in the collection system if all committed parcels were to be developed. It should be noted that these results do not reflect the addition of flow from pre-annexation areas, which was considered after identifying the recommended system improvements.

5.4.3 BUILD-OUT SYSTEM MODEL

This modeled scenario represents build-out of the entire City planning area. PWWF from these build-out areas was approximated using a PF of 2.3. The results of this simulation represent the maximum build-out flow through the existing collection system and the trunk extensions required to accommodate the added flow. The results of this simulation represent the approximate PWWF from all planning areas and the new trunk sewers needed to accommodate this flow.

A summary of the modeled scenarios is provided in **Table 5-1**.

Table 5-1. Summary of Modeled Scenarios

Model Scenario	Description	Cumulative Development Areas	Service Area (Acres)	Simulated ADWF (MGD)	Simulated PWWF (MGD)
Existing System Model	Existing Service Area and PWWF Conditions	Existing Service Area	6,697	7.02	19.47
Interim System Model	Near-Term Development and PWWF Conditions	Planned Sewer Service Commitments	10,235	12.36	31.56
Build-out System Model	Build-out of the City's General Plan and PWWF Conditions	Remaining Parcels within City's General Plan	22,364	27.25	66.70

Key:
ADWF = Average Dry Weather Flow (observed during the dry season)
MGD = million gallons per day
PWWF = peak wet weather flow

6.0 Collection System Model Results

The purpose of this chapter is to summarize and present the results of the model simulations described in **Chapter 5.0**.

This chapter is divided into the following sections:

- 6.1 Recommended Level of Service Evaluation Criteria
- 6.2 Existing System Results
- 6.3 Interim System Results
- 6.4 Build-Out System Results

6.1 Recommended Level of Service Evaluation Criteria

The LOS criteria used to assess capacity of sewers include the extent of surcharging in manholes, minimum and maximum velocity predicted in pipelines, and pipe capacity metrics.

6.1.1 SURCHARGING CRITERIA

The primary criteria used to evaluate the collection system is level of surcharge. Surcharging in a manhole is defined in terms of the distance between the top of the sewer pipe leaving the manhole (i.e., the pipe crown elevation) and the HGL of water flowing through the manhole. A manhole is surcharged when the HGL exceeds the exit pipe's crown elevation.

Two surcharging design criteria are applied to capacity assessments of the existing trunk sewer system:

- Manhole rim elevation is less than 8-feet above the exit pipe crown elevation: no surcharging allowed.
- Manhole rim elevation is greater than or equal to 8-feet above the exit pipe crown elevation: 1-foot of surcharging is acceptable.

Proposed sewer improvements and new sewers are designed to have no surcharging allowed under peak design flow conditions.

6.1.2 VELOCITY

Velocities within the collection system will be rendered in plan view. Typical LOS criteria define an acceptable velocity range of 2–7 feet per second.

6.1.3 PIPE CAPACITY

The following metrics for evaluating pipe capacity will be used to describe model results in the following sections along with the parameters described above.

6.1.3.1 Depth to Diameter (d/D) Ratio

New gravity flow trunk sewers will conform to the following capacity criteria under design peak flow conditions (where d = depth of flow in pipe, and D = pipe diameter):

- d/D will be a maximum of 0.70 for gravity flow trunk sewers with diameters up to 24 inches.
- d/D will be a maximum of 1.00 for gravity flow trunk sewers with diameters greater than 24 inches.

6.1.3.2 Hydraulic Loading Ratio and Residual Capacity

The hydraulic loading ratio (HLR) is mathematically defined as the peak modeled flow divided by the full pipe capacity derived from Manning's equation. The residual capacity is the remaining capacity within a sewer when subjected to PWWF conditions. The residual capacity is mathematically defined as Manning's full pipe flow capacity minus the peak modeled flow. This performance indicator is useful for illustrating the relative remaining capacity throughout the collection system for use in evaluating future servicing strategies.

6.2 Existing System Results

The existing model of the trunk sewer system was used to evaluate the extent of hydraulic deficiencies within system under peak flow conditions. The model simulates an ADWF of 7.02 MGD and predicts a PWWF of 19.5 MGD will occur at the WWTF under 10-year, 24-hour design storm conditions. This is within the range of peak observed flows recorded during significant historical storm events.

This model scenario is essentially the same as what had been evaluated as part of the Model Update and South Trunk Alternatives Analysis (Stantec 2020). The only change to the existing system model as part of this WCSMP update is the existing wastewater flow associated with UC Merced. The flow estimate was adjusted to reflect the updated flow estimates presented in the 2020 UC Merced Long Range Development Plan Recirculated Draft Subsequent Environmental Impact Report (December 2019). A factor of safety had previously been included in the flow recorded from UC Merced in the existing system model simulation. The resulting changes to the UC Merced flow estimate are presented in **Table 6-1**.

Table 6-1. UC Merced Model Existing System Model Changes

Parameter	Existing System Model Assumptions UC Merced Contribution		Units
	2020	2022	
ADWF	0.35	0.14	MGD
Area	200	200	Acres
PWWF	0.76	0.49	MGD

Key:
ADWF = Average Dry Weather Flow (observed during the dry season)
MGD = million gallons per day
PWWF = peak wet weather flow
UC = University of California

No significant system deficiencies were identified in the existing system model. No significant surcharging is predicted to occur under existing PWWF conditions. The existing system model results, showing residual system capacity are depicted in **Figure 6-1**.

6.3 Interim System Results

The interim model simulates flow conditions in the existing sewer system with the addition of flow from the City's sewer service commitments without any improvements or new infrastructure added to the existing system. The interim system model includes flow from the committed development areas identified in **Section 3.3**. The flow projected to be contributed from entitled parcels will add approximately 5.3 MGD to the existing ADWF, bringing the total ADWF up to 12.4 MGD under interim conditions. It should be noted that these results do not reflect the addition of flow from pre-annexation areas, which was considered after identifying the recommended system improvements.

The interim model was used to evaluate the extent of hydraulic deficiencies within the system under PWWF conditions. The interim model predicts a PWWF of 31.6 MGD will occur at the WWTF under 10-year, 24-hour design storm conditions without considering any improvements to the existing collection system.

6.3.1 HYDRAULIC CONSTRAINTS

The results of the interim system model predict capacity deficiencies in several reaches of the trunk system, including the G Street, Rascal, North Merced West Ave, and 48-inch interceptor trunk sewers. Despite surcharging and capacity limitations, no SSOs are predicted to occur within the system under interim conditions.

6.3.1.1 G Street/Rascal Trunk (Part 1, North)

The most concerning hydraulic restriction predicted in the interim system model exists along the Rascal Trunk (Part 1, North) between G Street and M Street, where it parallels Black Rascal Creek and Campus Drive. The sewer is predicted to flow at approximately 150 percent where it crosses M Street and has a limiting capacity of approximately 5.1 MGD. The average slope of this 30-inch sewer is approximately 0.0006 feet/feet with a minimum of 0.0003 feet/feet in some segments. The limited capacity in this stretch of sewer causes surcharging to occur along G Street and Yosemite.

6.3.1.2 Bear Creek Crossing/North Merced West Ave Trunk

The main hydraulic constraint that limits flow from the North Merced service area from reaching the WWTF is at the Bear Creek sewer crossing near N. Bear Creek Court and W. 16th Street. The 36-inch sewer crossing has a limiting capacity of approximately 13.6 MGD and is predicted to flow at an HLR of 111 percent under interim conditions.

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Legend

Existing Model Results

Residual Capacity

- Over Capacity
- ≤ 2.5 MGD
- 2.5 - 5.0 MGD
- 5.0 - 10 MGD
- > 10 MGD
- Existing Service Area
- WW WWTF
- PS Modeled Lift Station
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus

UC MERCED CAMPUS

BELLEVUE RANCH PUMP STATION (BRPS)

HIGHWAY 59 PUMP STATION (H59PS)

WASTEWATER TREATMENT FACILITY

MILES 0 0.5 1.0 1.5 2.0

N

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City of Merced
Wastewater Collection System
Master Plan 2022 Update

Figure 6-1
Existing Collection System Model Results and Residual Capacity

6.3.1.3 48-Inch Interceptor

The existing condition of the 48-inch interceptor is poor, and the concrete sewer is showing signs of hydrogen sulfide accumulation and pipeline deterioration due to its extremely shallow slope (0.0003 feet/feet). The condition of this sewer corresponds to a high roughness value, which reduces the available flow capacity of the pipe. Large amounts of sediment were noted during installation of flow monitoring equipment, which indicates sewers are likely to flow less than full, have shallow slopes, and/or high roughness. The pipe condition and roughness coefficients were validated upon review of pipe condition photos provided by V&A, pipe material data, and discussions with City staff. The shallowest segments of the 48-inch interceptor are predicted to flow at an HLR of 100–150 percent under interim conditions. The 48-inch sewer needs to convey approximately 15.0 MGD in this scenario.

6.3.1.4 42-inch WWTF Trunk

The 42-inch WWTF Trunk is also predicted to exceed its available capacity, flowing at an HLR of approximately 162 percent in its shallowest segment. Although this trunk has a more variable slope when compared to the parallel 48-inch interceptor, minor surcharging is predicted at the upstream junction with the Gerard Avenue sewer due to mismatched crown elevations. The Gerard Avenue trunk has sufficient capacity to convey the predicted flows under interim conditions.

6.3.2 SURCHARGING AND LEVEL OF SERVICE

The LOS criterion used for identification of recommended improvements is level of surcharge as described in **Section 6.1**. Under interim conditions, the City's system fails this recommended LOS along G Street and Yosemite Avenue, where surcharging is predicted to exceed 1 foot above the pipe crown. Surcharge depth is predicted to reach approximately 1.4 feet where Yosemite Avenue meets the G Street trunk. Mismatched crown elevations at this junction causes surcharging along Yosemite Avenue to exceed 2.2 feet.

Surcharging of just under a foot is predicted to occur along the North Merced West Avenue trunk. Despite having sufficient depth, the addition of any additional flow upstream will cause surcharging to exceed this threshold and fail to meet the recommended LOS.

There is not enough available freeboard to allow any surcharging to occur where the 42-inch WWTF trunk meets the Gerard Avenue trunk. Under interim conditions less than 2-inches of surcharging is predicted at this location and as discussed, this surcharge is due to mismatched pipe crown elevations and would not warrant improvements, as additional improvements are recommended at build-out.

To help identify the extent of the predicted surcharging, HGL profiles have been included in Appendix C for these areas of concern. The interim system model results, showing residual capacity are depicted in **Figure 6-2**.

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Legend

Interim Model Results

Residual Capacity

- Over Capacity
- ≤ 2.5 MGD
- 2.5 - 5.0 MGD
- 5.0 - 10 MGD
- > 10 MGD

Surcharged Manholes

- < 1'
- > 1'

- Existing Service Area
- Interim Service Area
- WW WWTF
- PS Modeled Lift Station
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus

BELLEVUE RANCH PUMP STATION (BRPS)

HIGHWAY 59 PUMP STATION (H59PS)

WASTEWATER TREATMENT FACILITY

UC MERCED CAMPUS

MILES 0 0.5 1.0 1.5 2.0

N

Stantec

City of Merced
Wastewater Collection System
Master Plan 2022 Update

Figure 6-2
Interim Collection System Model Results and Residual Capacity

6.3.3 RECOMMENDED INTERIM IMPROVEMENTS

Five primary improvement projects are recommended to bring the City's existing collection system within the recommended LOS criteria under interim conditions.

6.3.3.1 Capital Improvement Project 1 – Bellevue Ranch Pump Station Discharge

The BRPS currently uses an interim 14-inch force main which has been designed to pump a peak flow of 1.95 MGD to the G Street trunk. The BRPS also includes a permanent 16-inch force main (already installed) to convey all flow from Bellevue Ranch to the R Street trunk. The force main to the G Street trunk from the BRPS is planned to be abandoned when the force main capacity is reached.

It is recommended that the City switch the discharge of the BRPS prior to reaching this capacity threshold to bypass flow around predicted hydraulic constraints downstream. This includes switching the discharge from the existing 14-inch connection to G Street to its alternative 16-inch connection to R Street. This will route flow around the capacity constraint identified in the G Street trunk and where it turns west following the Rascal Bike Path. Bypassing flow around this capacity constraint eliminates surcharging in G Street but due to mismatched conduit crowns, minor surcharging is still predicted in the downstream end of the Yosemite Avenue trunk.

6.3.3.2 Capital Improvement Project 2 – Parallel Sewer and Bear Creek Crossing

This project addresses capacity constraints identified in the Bear Creek sewer crossing and North Merced West Avenue trunk. A new parallel sewer and creek crossing is proposed to expand the capacity of the existing system to convey flow from North Merced. Under interim conditions, a 36-inch diameter sewer would be required, but a 48-inch diameter sewer is required for build-out capacity as discussed in **Section 6.4.1**. The parallel sewer is proposed to be routed along W 16th Steet and V Street before meeting back up with the North Merced West Avenue trunk to avoid conflicts with existing utilities.

6.3.3.3 Capital Improvement Projects 3 and 4 – Replace 48-inch Interceptor and West Avenue Sewer

Replacing and expanding the 48-inch Interceptor and West Avenue sewer are recommended on the basis of their current physical condition and the need for additional capacity to serve future development. The 2007 City of Merced Sewer Master Plan Draft described the age and condition of portions of the West Avenue trunk as essentially poor and the 48-inch interceptor sewer is also known to be in poor condition. These are critical trunks in the existing collection system and will only allow for servicing of a limited number of entitled or future connections without significant upgrades.

As previously discussed, the shallow slope and roughness coefficient of these existing sewers limits the available capacity. Therefore, replacing the 48-inch interceptor with a new sewer pipeline is recommended to provide sufficient capacity under interim and build-out conditions, as opposed to simply lining the sewer which reduces the pipe's inner diameter and does not address the risk of pipe collapse due to corrosion. It is also recommended that the remaining portion of the 42-inch North Merced West

Avenue trunk be upsized along with the 48-inch interceptor to facilitate the conjunction of the new Bear Creek crossing parallel sewer and existing North Merced West Avenue trunk.

6.3.3.4 Capital Improvement Project 5 – Yosemite Avenue Extension

Extending the Yosemite Avenue sewer west, connecting G Street and R Street, will provide added capacity under interim conditions. A 27-inch sewer is recommended to allow interim flows and expand this portion of the system. Extending this improvement beyond R street to the H59PS service area allows additional flow capacity to be added to the upstream system. The proposed 27-inch sewer along Yosemite Avenue should be extended to connect to the existing manhole at El Redondo Drive. This improvement extension will allow the addition of 5,480 pre-annexation EDUs along Yosemite Avenue and Bellevue Drive, expanding available capacity by 1.15 MGD ADWF. This extension, which includes a new Fahren's Creek sewer crossing, should include a weir or flow-limiting device added to the H59PS, to help ensure that it does not exceed its reliable pumping capacity of 3.17 MGD.

6.3.3.5 Capital Improvement Project 6 – Parallel G Street Sewer

Adding a parallel 27-inch sewer in G Street between Bellevue Road and Community College Drive, will provide added capacity under interim conditions. A 27-inch sewer is recommended to allow interim flows and expand this portion of the system. This sewer will connect to the future sewer in Cardella Road under build-out conditions. This will allow the addition of 9,000 pre-annexation EDUs, updating the total from those allowed under CIP 5.

6.3.4 STRATEGY FOR FUTURE SERVICING

These interim improvement recommendations primarily serve the North Merced service area. CIPs 1, 2, 3, and 4 are congruent and extend from the WWTF to a new Bear Creek sewer crossing near W. 16th Street. This effectively provides an improved pathway for flow from the North Merced service area. Sizing these improvements to accommodate ultimate build-out development flows provides a favorable phasing approach to other alternatives investigated for the build-out system. This approach addresses the immediate interim need for sewer capacity to serve committed areas and provides the backbone of the build-out system. Prioritizing and implementing these improvements facilitates ongoing development in North Merced and the construction of other major system improvements that will be needed at build-out. As discussed, extending CIP 5 across Fahren's Creek to the H59PS sewer shed will allow additional capacity for a portion of the pre-annexation areas.

These improvements are summarized in the following section of this master plan, where they are also alternatively sized to accommodate build-out development flows. The recommended interim improvement projects have been shown in **Figure 6-3**.

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Legend

Interim Improvements

- Parallel G Street Sewer
- BRPS FM Discharge Change
- 48-inch Interceptor
- Parallel Sewer & Creek Crossing
- West Street
- Yosemite Sewer Extension
- Modeled Sewer Trunks
- Existing Service Area
- Interim Service Area
- WW — WWTF
- PS — Modeled Lift Station
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus

BELLEVUE RANCH PUMP STATION (BRPS)

Parallel G Street Sewer

BRPS FM Discharge Change

Yosemite Sewer Extension & Creek Crossing

HIGHWAY 59 PUMP STATION (H59PS)

Parallel Sewer & Creek Crossing

West Street

48-inch Interceptor

WW — WASTEWATER TREATMENT FACILITY

UC MERCED CAMPUS

MILES 0 0.5 1.0 1.5 2.0

N

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Wastewater Collection System
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Figure 6-3
Recommended Interim Improvements

6.4 Build-out System Results

The build-out system model simulates flow conditions in the City's collection system upon full development of the City's General Plan service area. The flow projected to be generated from remaining parcels within the City SUDP will add approximately 14.9 MGD to the interim ADWF, bringing the total ADWF up to 27.3 MGD under build-out conditions.

The build-out model was used to identify the best approach to expanding the system to provide service to the ultimate service area under PWWF conditions. PWWF contributions from build-out development (minus existing and interim development) is determined within the model using the City's standard wastewater PF of 2.3, as opposed to using model calibrated parameters to simulate future flow conditions as are used for existing and interim development. The build-out model predicts a flow of 66.7 MGD to occur at the WWTF under PWWF conditions.

As described in **Chapter 2.0**, several alternatives have been developed to consider how to best serve the far reaches of the City's build-out service area. Previous planning efforts have been primarily focused on routing all future flow through new interceptor to the City's WWTF to avoid the need for capacity improvements to the existing system. This approach resulted in the need to construct new infrastructure outside of the existing SUDP to serve these remote areas. After identifying that the City's existing sewer condition issues and interim capacity needs require significant improvements to the existing collection system, a build-out service area approach considering improvements to the existing system was reconsidered.

This WCSMP update develops a future service area layout that uses any available capacity within the existing collection system and allows a phased build-out approach while considering interim system improvement needs. Large new sewer infrastructure and improvements will still be needed to accommodate build-out development within the SUDP, but previously recommended infrastructure can be downsized and rerouted to consolidate improvements recommended under interim and build-out conditions.

6.4.1 INTERIM IMPROVEMENTS SIZED FOR BUILD-OUT

The build-out system model includes the existing collection system and the future trunk network that will be needed to serve the extended service area. The interim system model was used as the starting point for developing the build-out system model and included recommended near-term system improvements to provide the existing system sufficient capacity to serve interim development. These near-term improvements are further described in Section 6.3 of this WCSMP. After adding flow from build-out development areas, these interim improvement recommendations were resized to provide sufficient build-out capacity. A table summarizing the recommended improvements at each level of development is provided as **Table 6-2**.

To accommodate build-out flows, CIPs 3 and 4 are recommended to be installed at a steeper slope to limit the required pipe size to 60 inches. The existing influent junction structure at the WWTF should be modified to facilitate the change in slope, dropping the existing invert approximately 4.5 feet.

Table 6-2. Interim Improvements Sized for Build-out

CIP No	Name	Existing Pipe Size (inches)	Slope (feet/feet)	Length (feet)	Interim Pipe Size (in)	Build-out Pipe Size (in)
1	BRPS FM Discharge Change[1]	NA	NA	NA	NA	NA
2	Parallel Sewer and Creek Crossing	NA	0.00067	6,491	36	48
3 [3]	West Street	42	Current: 0.0007 New: 0.0006	1,900	48	Current Slope: 60 New Slope: 60
4 [3]	48-inch Interceptor	48	Current: 0.0003 New: 0.0006	14,695	48 [2]	Current Slope: 66 New Slope: 60
5	Yosemite Sewer Extension	NA	0.00047	7,660	27	27
6	Parallel G Street Sewer	27	0.0008	8,000	27	27

Notes:
[1] CIP No. 1 includes changing the discharge of the Bellevue Ranch Pump Station to utilize its existing alternative force main which discharges flow to the gravity sewer along R Street.
[2] A new 48-inch pipe with a roughness (n) of 0.013 has capacity to convey interim flow at the existing slope; the existing 48-inch pipe is known to have a much higher roughness value and would require replacement.
[3] CIPs 3 and 4 are recommended to be constructed together at the new specified slope, dropping the invert at the influent junction box at the WWTF
Key:
BRPS = Bellevue Ranch Pump Station
CIP = capital improvement project
FM = force main
NA = not applicable
WWTF = wastewater treatment facility

6.4.2 BUILD-OUT SERVICE AREA INFRASTRUCTURE

The layout of future infrastructure presented in this master plan was developed using high resolution surface elevation data to minimize the need for pump stations and maximize the extents of the gravity collection system needed to serve the SUDP. Surface elevation data consists of LiDAR data from the National Elevation Dataset, which is a primary elevation data product that has been produced and distributed by the U.S. Geological Survey.

6.4.2.1 North Merced

The main constraint limiting development in North Merced is the West Avenue Trunk and the 48-inch interceptor. Resizing the recommended interim improvements expanding these trunks to accommodate build-out flows allows for a new approach to serving build-out of North Merced through the H59PS, the lowest point in the existing North Merced collection system.

The backbone of the future North Merced collection system will consist of a new west-flowing trunk in Cardella Road and south flowing trunk in Highway 59 connecting to the H59PS. The interim CIP 6 recommending a parallel sewer along G Street will ultimately connect the existing Bellevue trunk to the new Cardella trunk to provide sufficient capacity and divert flow from the northeast SUDP. The new Highway 59 and G Street trunks will need to be extended north to the northern boundary of the SUDP, with new west-flowing sewer extending from each.

The current capacity of the H59PS is 3.17 MGD, with the option to expand capacity to 6.34 MGD. However, to realize full capacity, a second parallel force main is needed in addition to new pumps, and the existing downstream gravity sewer along Highway 59 will also need to be expanded.

The H59PS will ultimately need to be expanded or replaced to accommodate build-out flow of 27.5 MGD, and two new 24-inch force mains will be required from the lift station to either a new trunk south of Fahren's Creek or to connect with the proposed new Bear Creek Crossing at W. 16th Street.

A summary of the recommended North Merced build-out infrastructure is presented in **Table 6-3** and shown in **Figure 6-4**.

Table 6-3. North Merced Recommended Build-out Improvements

CIP No	Name	Current Size (inches)	Slope (feet/feet)	Length (feet)	Build-out (in)
7	H59PS Expansion	3.2 MGD			27.5 MGD
8	H59PS Force main	10	NA	4,641	2x24
9	South Hwy 59 Trunk (pump station to Cardella)	NA	0.001	8,688	48
10	West Cardella Trunk (Hwy 59 to G St)	NA	0.0012	10,257	42
11	East Cardella Trunk (G St to VST)	NA	0.0015	10,448	30 to 24
12	G Street Extension 1 (Bellevue to Farmland)	NA	0.0009	2,627	30 to 21
13	G Street Extension 2 (Farmland to Old Lake)	NA	0.00151	2,657	18
14	G Street Extension 3 (Old Lake to SUDP)	NA	0.0015	2,647	15
15	Old Lake Road Sewer (G St to Golf Rd)	NA	follow grade	5,267	12
16	N. SUDP Sewer (G St to Golf Course)	NA	0.0015	3,222	12
17	Farmland Avenue Sewer (G St to Golf Rd)	NA	0.0019/ follow grade	5,257	12 to 8
18	Hwy 59 North Trunk 1 (Bellevue to Cardella)	NA	0.0012	5,307	24
19	Hwy 59 North Trunk 2 (Breeze to Bellevue)	NA	0.0015	2,691	18
20	Hwy 59 North Trunk 3 (Nevada to Breeze)	NA	0.002	2,575	15
21	West Bellevue (Hwy 59 to Fahren's Creek)	NA	0.0012	6,064	18 to 12
22	West Bellevue Collector (ROW)	NA	0.002	2,674	12
23	Breeze Rd West (Hwy 59 to Utah St)	NA	0.002	1,404	12
24	Nevada St West (Hwy 59 to Creek)	NA	0.002	7,009	15 to 10
25	Future Yosemite (El Capitan Canal to Hwy 59)	NA	0.002	3,510	12
26	Future ROW (Santa Fe to Hwy 59)	NA	0.0022	2,618	12

Key:
MGD = million gallons per day
NA = Not Applicable
ROW = right-of-way
SUDP = Specific Urban Development Plan
VST = Virginia Smith Trust

N

0 .50 1.0 1.5 MILES

BELLEVUE RANCH PUMP STATION (BRPS)

HIGHWAY 59 PUMP STATION (H59PS)

UC MERCED CAMPUS

CAMPUS COMMUNITY

APPROXIMATE SOUTH MERCED SERVICE AREA BOUNDARY (REMAINING SUPD CONSIDERED NORTH MERCED)

Legend

Buildout Improvements

- Breeze Rd West
- East Cardella Trunk
- Farmland Ave. Sewer
- Future ROW
- Future Yosemite
- G Street Extension 1
- G Street Extension 2
- G Street Extension 3
- Hwy 59 North Trunk 1
- Hwy 59 North Trunk 2
- Hwy 59 North Trunk 3
- N SOI Sewer
- Nevada St West
- Old Lake Rd Sewer
- Olive McKee Extension/LS
- South Hwy 59 Trunk
- West Bellevue Collector
- West Bellvue
- West Cardella Trunk
- FM
- Interim Improvements
- Modeled Sewer Trunks
- Existing Service Area
- Interim Service Area
- Buildout Service Area
- Pre-Annexation Area
- PS Modeled Lift Station
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- Aprox. South Merced Service Area

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Figure 6-4
North Merced Recommended Buildout Improvements

6.4.2.2 South Merced

The recommended South Merced build-out service area improvements from the Draft 2017 WCSMP were reevaluated as part of the 2020 Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis report. The conclusions of this alternatives analysis report are carried through here as the best apparent alternative for serving the South Merced service area.

The primary elements of this service layout include a new Mission Avenue trunk, referred to as the south trunk, and relief sewer along Tyler Avenue connecting the existing Gerard Avenue trunk to the Mission Avenue Trunk. Other improvements needed in South Merced include a new main trunkline along Gove Road and Thornton Road. This trunk sewer may require a lift station due to the relatively low elevation of this area.

The Olive McKee extension, Stretch Road, and Cone Avenue sewers are extensions of the existing system. The Olive McKee extension may also require a small lift station to facilitate service to this low-lying area. Upsizing the exiting 12-inch sewer along Santa Fe Drive is required to facilitate the addition of flow from the Stretch Road sewer. This is the only recommended improvement to the existing system in South Merced.

The south trunk extension would extend the south trunk sewer east, parallel to Gerard Avenue. The 2020 Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis Report identified that this area could alternatively be served through the existing Gerard Avenue trunk, but elevation data indicates that a lift station would likely be required to facilitate this alternative.

A summary of the recommended South Merced build-out infrastructure is presented in **Table 6-4** and shown in **Figure 6-5**.

Table 6-4. South Merced Recommended Build-out Improvements

CIP No	Name	Current Size (inches)	Slope (feet/feet)	Length (feet)	Build-out (in)
27	Olive McKee Extension/LS [1]	NA	follow grade	5,480	12
28	South Mission Trunk Connection	NA	0.0008-0.0005	2,749	48 to 30
29	South Mission Trunk	NA	0.0011	7,788	27
30	Gerard Relief Sewer	NA	0.00114	2,675	24
31	South Trunk Extension/LS to Gerard [1]	NA	follow grade	7,230	18 to 12
32	Upsize Santa Fe Dr Sewer	12	0.001	1,302	15
33	Stretch Rd Sewer	NA	0.00104 (min)	6,126	12
34	Cone Avenue Sewer	NA	follow grade, 0.00078, 0.00177	5,326	12
35	Gove Rd Sewer [1]	NA	0.0006	9,347	30
36	Thornton Rd Sewer 1 (Dickenson Ferry to Wardrobe) [1]	NA	0.0009	8,112	21 to 18
37	Thornton Rd Sewer 2 (Wardrobe to McSwain) [1]	NA	0.00137	2,648	12

Note:
[1] Elevation data indicates that a lift station may be required to provide service to this area.
Key:
CIP = Capital Improvement Project; LS = lift station; min = minimum; NA = not applicable

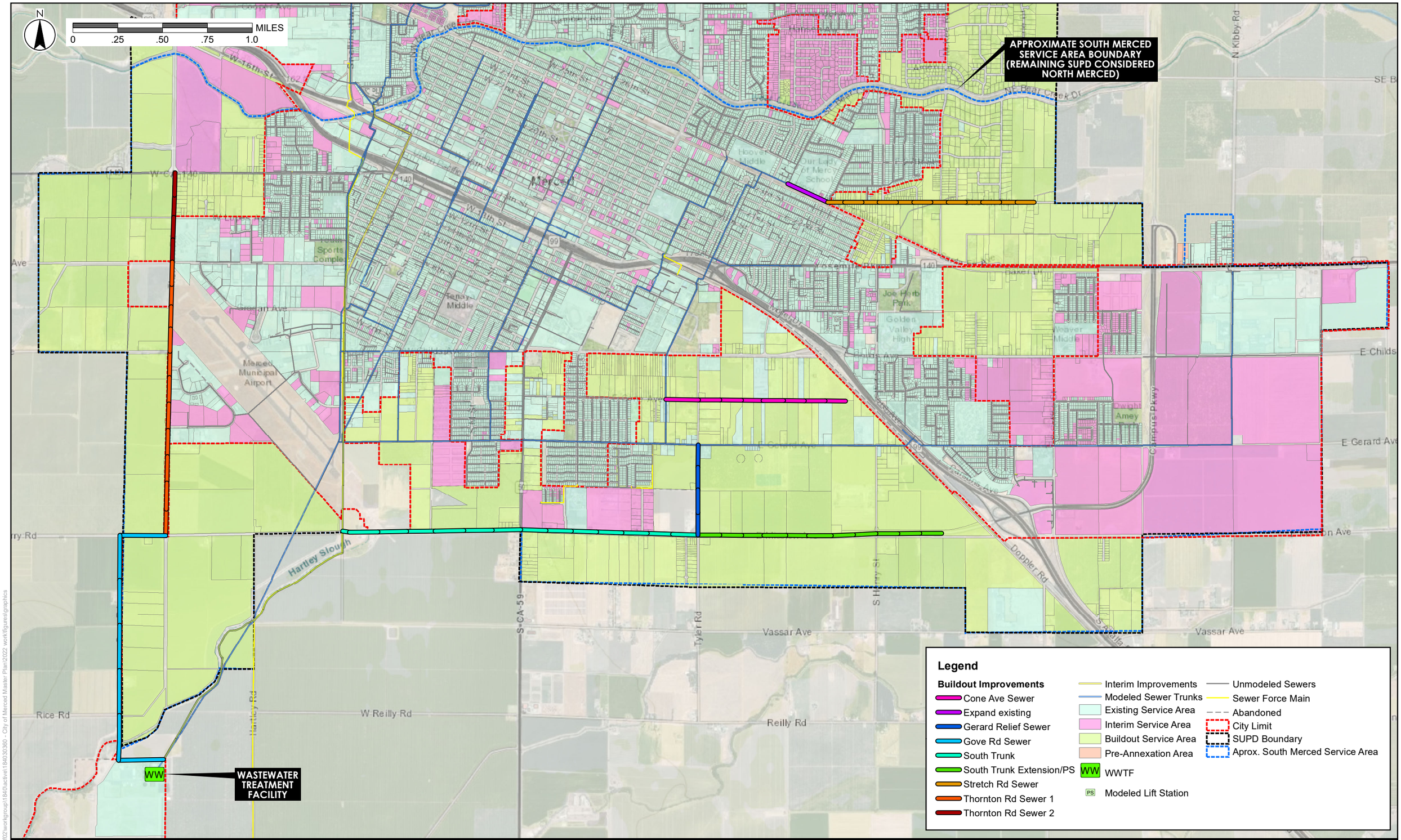

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Figure 6-5
South Merced Recommended Buildout Improvements

7.0 Capital Improvement Program

The purpose of this chapter is to provide recommendations for capital improvements to the City's collection system that eliminate capacity constraints and provide sufficient capacity to accommodate the predicted PWWFs described in Chapter 6.0. Planning level opinions of probable costs have been developed for the proposed CIPs and future trunk network needed to serve SUDP.

These planning level estimates include a 30 percent contingency for unforeseen conditions, and a 20 percent allowance for engineering and environmental documentation. These costs have been estimated using the current 20 Cities Engineering News Record Construction Cost Index (ENRCCI) of 13,175 (October 2022). Unit costs used in the 2017 WCSMP were inflated using this ENRCCI value and validated using recent sewer project bid results provided by the City.

This chapter is divided into the following sections:

- 7.1 Existing System Capital Improvement Project Costs
- 7.2 Interim System Capital Improvement Project Costs
- 7.3 Recommended New Trunk Sewers to Serve City Growth
- 7.4 Summary of Improvement Costs

7.1 Existing System Capital Improvement Project Costs

No system restrictions or constraints were predicted by hydraulic model of the City's collection system for existing development conditions. No deficiencies were identified in the existing system under PWWF conditions, and no capacity improvements are recommended to address deficiencies under current flow conditions. Despite there being no current capacity related improvement needs, it has been noted by City staff that the condition of the City's sewer system is deteriorating in older areas of the collection system. The City's geographic information system database has limited pipeline age information but does indicate some sewers are approaching 100 years old (e.g., Radsdale's Subdivision). It is recommended that the City perform a condition assessment to evaluate the system for condition-based deficiencies that may exist within the existing system to develop a prioritized, ongoing repair and replacement program. An ongoing I/I improvement program is also recommended. Existing system constraints identified in the 2017 WCSMP were not a concern in the updated model. Additional detail is provided in the 2020 Collection System Model Update report in Appendix A.

7.1.1 REPAIR AND REPLACEMENT PROGRAM

A robust repair and replacement (R&R) program is a key element of any properly managed public infrastructure system. The City's R&R program for the sewer utility includes an annual expenditure for the replacement of older, aging infrastructure. To replace all the facilities in the City's sewer enterprise would require a significant sum of money. The annual R&R allocation is intended to reduce the impact of repairing and replacing critical portions of the City's sewer collection system by stretching them out over time.

As a result, to help ensure the elements of these systems which are in place today remain in service for perpetuity, the City has elected to fund their R&R program sufficiently to allow replacement of all collection system mechanical components (i.e., valves, pumps, appurtenances) on a schedule which is consistent with industry standard expectations for service life. The City is budgeting for replacement of all pipelines by assuming an 80-year service life. Pump stations are assumed to have 20-year service life for mechanical components (i.e., pumps and emergency power generation), with wet wells and control buildings assumed to have 80-year service lives. At this time, the City is planning to budget $300,000 annually for repair and replacement of system assets. Prioritization of R&R projects will be done within the typical five-year CIP timeframe, updated accordingly, but the City also recognizes that unforeseen incidents may require adjustments in the specific projects identified in any particular year.

7.2 Interim System Capital Improvement Project Costs

As discussed in preceding chapters, a new trunk network that ultimately depends on improvements to the existing system is needed to provide service to the future SUDP and to relieve system constraints identified under interim development conditions. Five primary improvement projects have been recommended; these interim improvements are sized for build-out of the SUDP. These projects and their associated opinions of probable costs are presented in **Table 7-1**.

Table 7-1. Interim Improvement Project Costs

Item	Description	Opinion of Capital Cost [1]
1	BRPS FM Discharge Change [2]	$0
2	Parallel Sewer and Creek Crossing	$4,634,333
3	West Street [3]	$1,207,000
4	48-inch Interceptor [3]	$10,868,667
5	Yosemite Sewer Extension	$1,793,000
6	Parallel G Street Sewer	$1,979,000
	Subtotal	***$20,482,000***
	5% Mobilization/Demobilization	$1,025,000
	Construction Cost Subtotal	***$21,507,000***
	30% Contingency	$6,453,000
	Estimated Construction Cost	***$27,960,000***
	20% Engineering, Environmental, and Admin	$5,592,000
	Total Project Cost	**$33,552,000**

Notes:
[1] Costs based on ENRCCI (20 Cities Index) = 13,175, October 2022.
[2] Bellevue Ranch Pump Station has two existing force mains, this project changes operations of the pump station to discharge through the larger force main conveying flow to R Street.
[3] It is recommended that the West Street sewer project and the 48-inch interceptor project are done together. Both improvements should be constructed at a slope of 0.0006 feet/feet, lowering the existing invert at the downstream end of the existing 48-inch trunk at the influent junction box near the WWTF.
Key:
BRPS FM = Bellevue Ranch Pump Station Force main
WWTF = wastewater treatment facility

A breakdown of the construction costs of each trunk sewer is provided in Appendix D. The recommended interim improvement projects have been shown in **Figure 6-3**.

7.3 Recommended New Trunk Sewers to Serve City Growth

As previously discussed, several trunk sewer alternatives to serve City growth have been considered. The future infrastructure proposed in this WCSMP update is based on implementation of the improvements identified to relieve interim hydraulic constraints presented in **Table 7-1**.

This WCSMP update considers sewers needed to serve future development at a more refined level than previously considered, including trunks 12 inches and greater in diameter. The 2017 WCSMP considered trunk sewers needed a minimum size of 18 inches, but it did not consider infrastructure that may be needed north of Bellevue Road or extensions to the existing system required for infill development. Therefore, this WCSMP update breaks projects down into major and minor system improvements. Major system improvements mirror those considered in the 2017 Master Plan and generally include future trunks 18 inches in diameter or larger, while minor system improvements include budgets for smaller sewers and extensions to the existing system.

7.3.1 NORTH MERCED BUILD-OUT IMPROVEMENTS

7.3.1.1 Major Improvements

The opinions of probable cost for the major improvements needed to serve the North Merced service area at build-out are summarized in **Table 7-2**.

Table 7-2. North Merced Major Improvement Project Costs

Item	Description	Opinion of Capital Cost [1]
1	H59PS Upgrades and Force main	$14,703,000
2	South Hwy 59 Trunk (pump station to Cardella)	$5,724,000
3	West Cardella Trunk (Hwy 59 to G St)	$5,872,667
4	East Cardella Trunk (G St to VST)	$4,243,333
5	G Street Extension 1 (Bellevue to Farmland)	$482,000
6	G Street Extension 2 (Farmland to Old Lake)	$383,000
7	Hwy 59 North Trunk 1 (Bellevue to Cardella)	$1,576,000
8	Hwy 59 North Trunk 2 (Breese to Bellevue)	$599,000
9	West Bellevue (Hwy 59 to Fahren's Creek)	$1,114,000
	Subtotal	***$34,697,000***
	5% Mobilization/Demobilization	$1,735,000
	Construction Cost Subtotal	***$36,432,000***
	30% Contingency	$10,930,000
	Estimated Construction Cost	***$47,362,000***
	20% Engineering, Environmental, and Admin	$9,473,000
	Total Project Cost	**$56,835,000**

Note:
[1] Costs based on ENRCCI (20 Cities Index) = 13,175, October 2022.

Key:
VST = Virginia Smith Trust

7.3.1.2 Minor Improvements

The opinions of probable cost for the minor improvements needed to serve the North Merced service area at build-out are summarized in **Table 7-3**.

Table 7-3. North Merced Minor Improvement Project Costs

Item	Description	Opinion of Capital Cost [1]
1	G Street Extension 3 (Old Lake to SUDP)	$933,500
2	Old Lake Road Sewer (G St to Golf Rd)	$692,000
3	N. SUDP Sewer (G St to Golf Course)	$448,000
4	Farmland Avenue Sewer (G St to Golf Rd)	$669,000
5	Hwy 59 North Trunk 3 (Nevada to Breese)	$476,000
6	West Bellevue Collector (ROW)	$958,500
7	Breeze Rd West (Hwy 59 to Utah St)	$221,000
8	Nevada St West (Hwy 59 to Creek)	$1,048,000
9	Future Yosemite (El Capitan Canal to Hwy 59)	$1,163,000
10	Future ROW (Santa Fe to Hwy 59)	$416,000
11	Olive McKee Extension/LS	$627,000
	Subtotal	***$7,652,000***
	5% Mobilization/Demobilization	$383,000
	Construction Cost Subtotal	***$8,035,000***
	30% Contingency	$2,411,000
	Estimated Construction Cost	***$10,446,000***
	20% Engineering, Environmental, and Admin	$2,090,000
	Total Project Cost	**$12,536,000**

Note:
[1] Costs based on ENRCCI (20 Cities Index) = 13,175, October 2022.

Key:
ROW = right-of-way
SUDP = Specific Urban Development Plan

7.3.2 SOUTH MERCED BUILD-OUT IMPROVEMENTS

7.3.2.1 Major Improvements

The opinions of probable cost for the major improvements needed to serve the South Merced service area at build-out are summarized in **Table 7-4**.

Table 7-4. South Merced Major Improvement Project Costs

Item	Description	Opinion of Capital Cost [1]
1	South Mission Trunk	$4,050,000
2	Gerard Relief Sewer	$1,171,000
3	Gove Rd Sewer	$4,577,000
4	Thornton Rd Sewer 1 (Dickenson Ferry to Wardrobe)	$1,301,000
	Subtotal	***$11,099,000***
	5% Mobilization/Demobilization	$555,000
	Construction Cost Subtotal	***$11,654,000***
	30% Contingency	$3,497,000
	Estimated Construction Cost	***$15,151,000***
	20% Engineering, Environmental, and Admin	$3,031,000
	Total Project Cost	**$18,182,000**

Note: [1] Costs based on ENRCCI (20 Cities Index) = 13,175, October 2022.

7.3.2.2 Minor Improvements

The opinions of probable cost for the minor improvements needed to serve the South Merced service area at build-out are summarized in **Table 7-5**.

Table 7-5. South Merced Minor Improvement Project Costs

Item	Description	Opinion of Capital Cost [1]
1	South Trunk Extension/pump station to Gerard	$931,000
2	Upsize Santa Fe Dr Sewer	$175,000
3	Stretch Rd Sewer	$701,000
4	Cone Avenue Sewer	$610,000
5	Thornton Rd Sewer 2 (Wardrobe to McSwain)	$303,000
	Subtotal	***$2,720,000***
	5% Mobilization/Demobilization	$136,000
	Construction Cost Subtotal	***$2,856,000***
	30% Contingency	$857,000
	Estimated Construction Cost	***$3,713,000***
	20% Engineering, Environmental, and Admin	$743,000
	Total Project Cost	**$4,456,000**

Note:
[1] Costs based on ENRCCI (20 Cities Index) = 13,175, October 2022.

7.4 Summary of Improvement Costs

A summary of the opinions of probable cost developed for new trunk sewers and pump station improvements needed to serve build-out of the SUDP is presented in **Table 7-6**. As discussed, the recommended interim improvements are sized to facilitate build-out development. Major improvements generally include those 18 inches and larger in diameter, are considered backbone infrastructure, and are

generally comparable to those presented in the 2017 WCSMP. Minor improvements are further extensions of the system that will ultimately be required to serve the furthest extents of the SUDP.

Table 7-6. Summary of Proposed Improvement Costs

Item	Area of Improvements	Total Cost
1	Interim System Improvements	$33,552,000
2	North Merced Major Improvements	$56,835,000
3	South Merced Major Improvements	$18,182,000
	Subtotal Major Improvements	***$108,569,000***
4	North Merced Minor Improvements	$12,536,000
5	South Merced Minor Improvements	$4,456,000
	Subtotal Minor Improvements	***$16,992,000***
	Total Improvements Cost	**$125,561,000**

Note:
[1] Costs based on ENRCCI (20 Cities Index) = 13,175, October 2022.

A figure showing the proposed interim, major, and minor improvements is provided as **Figure 7-1**.

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Legend

- Major Buildout Improvements
- Minor Buildout Improvements
- Interim Improvements
- Modeled Sewer Trunks
- Existing Service Area
- Interim Service Area
- Buildout Service Area
- Pre-Annexation Area
- WW WWTF
- PS Modeled Lift Station
- Unmodeled Sewers
- Sewer Force Main
- Abandoned
- City Limit
- SUPD Boundary
- UC Merced Campus
- Campus Community

12 in
15 in
12 in
10 in
12 in
15 in
18 in
12 in
12 in
21 in
18 in
15 in
30 in
12 in
24 in
BELLEVUE RANCH PUMP STATION (BRPS)
PS
42 in
30 in
27 in
24 in
UC MERCED CAMPUS
CAMPUS COMMUNITY
12 in
48 in
12 in
HIGHWAY 59 PUMP STATION (H59PS)
PS
24" Dual FM
12 in
15 in
12 in
12 in
18 in
12 in
21 in
12 in
24 in
27 in
18 in
15 in
12 in
30 in
WW
WASTEWATER TREATMENT FACILITY

MILES
0 0.5 1.0 1.5 2.0

N

Stantec

City of Merced
Wastewater Collection System
Master Plan 2022 Update

Figure 7-1
2022 Merced Master Plan Recommended Improvements

8.0 Conclusions and Recommendations

The updated hydraulic modeling and capacity analysis completed for this master plan update confirms that the existing wastewater collection system does not have the capacity to convey the projected flows from interim development projects without exceeding the City's LOS criteria in several reaches of the trunk system. Without improvements, the existing system does not have the capacity to service the build-out of the pre-annexation areas and the City's remaining SUDP. These conclusions are generally consistent with the previous 2017 WCSMP findings.

Several improvements focused on increasing the capacity of the existing trunk system were discussed with the City and noted in the 2017 WCSMP but were determined to be less cost-effective than constructing new trunk sewers around the perimeter of the City to service future growth. The previous study also contemplated reserving the limited capacity within the existing 48-inch interceptor to fully utilize the G Street trunk and that no flow beyond that would be added until future large trunks are constructed to convey the ultimate SUDP flows from North Merced to the existing WWTF. This meant that many projects ready for development would have to wait until the new infrastructure was completed due to the significant length and cost of these trunk extensions.

However, the condition of the existing concrete 48-inch interceptor is severely corroded and should be replaced as soon as possible given its criticality in the system. Taking this into consideration, and the desire to provide near-term capacity for interim development projects, it is recommended that the City implement the improvement projects presented in **Table 7-1** (sized for build-out capacity) and choose the proposed major and minor future trunk network as a preferred strategy versus the alternatives initially identified in the 2017 WCSMP. This strategy will provide a phased approach for capacity improvements that address both near-term and build-out developments that can be constructed and funded in manageable projects to better accommodate the rate of development.

APPENDIX A

Previous System Planning Reports

- A.1 City of Merced Collection System Hydraulic Model Conversion and South Trunk Sewer Service Alternatives Analysis (Stantec, June 2020)
- A.2 Executive Summary of City of Merced Wastewater Collection System Draft (Stantec, December 2017)

APPENDIX B

V&A Flow Monitoring Reports

- B.1 V&A Flow Monitoring Site Reports: Data, Graphs, Information (Appendix A) November 22 – December 26, 2019
- B.2 V&A City of Merced – Sanitary Sewer Flow Monitoring Study Report (February 2022)

APPENDIX C

Hydraulic Grade Line Profiles

- C.1 Figure C-1 Profile Key Map
- C.2 Figure C-2 G Street/Rascal Trunk (Part 1, North)
- C.3 Figure C-3 Bear Creek Crossing/North Merced West Avenue Trunk
- C.4 Figure C-4 48-inch Interceptor
- C.5 Figure C-5 42-inch WWTF Trunk

APPENDIX D

Detailed Cost Estimates

- D.1 Unit Costs
- D.2 Pipeline Projects
- D.3 Interim Improvement Projects
- D.4 North Merced Major Improvement Projects
- D.5 North Merced Minor Improvement Projects
- D.6 South Merced Major Improvement Projects
- D.7 South Merced Minor Improvement Projects