CITY OF REDDING
Development Services Planning Division
777 Cypress Avenue, Redding, CA 96001
P.O. Box 496071, Redding, CA 96049-6071
Phone: 530-225-4022
cityofredding.gov

MITIGATED NEGATIVE DECLARATION

Permit No. PD-2025-00230
State Clearinghouse No.

SUBJECT

California Heritage YouthBuild Academy Planned Development

PROJECT DESCRIPTION

The project applicant, California Heritage YouthBuild Academy (CHYBA), is requesting approval of Planned Development Plan Application PD-2025-00230 to construct a new public charter high school campus for CHYBA on a 10.15-acre site located at 1400 Industrial Street. The campus would include a 36,600 square foot building consisting of classrooms, administrative offices, a dining area, and an indoor gymnasium with bleachers. Site amenities would include pedestrian walkways, parking areas, drop-off zones, a soccer field, and an outdoor basketball court. Construction of the facility would necessitate frontage improvements and right of way dedication to the City as well as the offsite construction of an Industrial Street crossing over Little Churn Creek. Although the Industrial Street crossing would be required with this project, it was previously studied with and incorporated into the adopted Mitigated Negative Declaration (State Clearing House Number 2023060613) of another project nearby.

The site is moderately sloped with an elevation of 590 feet in the northeast corner transitioning smoothly down to an elevation of 554 feet in the southwest corner. Grading would largely consist of creating a "super pad" that would act as a large flat step in the middle of the site, creating a more ideal topography for the development of the campus. All necessary public utilities such as sewer, water, and electricity are in close proximity to the site and available for connection to the project.

ENVIRONMENTAL SETTING

The project aims to develop a 10.15-acre vacant lot located in the southeast quadrant of the City within an existing developed residential and commercial neighborhood. The site is adjoined to the north and east by the Penn Acres and Enterprise Properties subdivisions; to the south by Center of Hope Apartments and a cemetery; and to the west by a plumbing supply store. The site is undeveloped land primarily characterized by oak/pine woodlands with ruderal understory vegetation and no permanent structures, roads, or improvements, other than a dirt access road.

FINDINGS AND DETERMINATION

The City of Redding conducted an Initial Study (attached), which determined that the proposed Project could have significant environmental effects. Subsequent revisions to the Project proposal create the specific mitigation measures identified below. The Project, as revised and as agreed to by the applicant, avoids or mitigates the potentially significant environmental effects identified, and the preparation of an environmental impact report will not be required. There is no substantial evidence, in light of the whole record before the City, that the Project as revised may have a significant effect on the environment. If there are substantial changes that alter the character or impacts of the proposed Project, another environmental impact determination will be necessary.

The Project includes measures to mitigate potentially significant impacts of development on biological resources.

Prior to approval of the project, the lead agency may conclude, at a public hearing, that certain mitigation measures identified in the Mitigated Negative Declaration are infeasible or undesirable. In accordance with CEQA Section 15074.1, the lead agency may delete those mitigation measures and substitute other measures which it determines are equivalent or more effective. The lead agency would adopt written findings that the new measure is equivalent or more effective in mitigating or avoiding potential significant effects and that it, in itself, would not cause any potentially significant effect on the environment.

1. **Based on the whole record (including the Initial Study and any supporting documentation) and the mitigation measures incorporated into the Project, the City of Redding has determined that a Mitigated Negative Declaration is appropriate. All potentially significant impacts would be reduced to less than significant.**

2. **The Mitigated Negative Declaration, with its supporting documentation, fully incorporated herein, reflects the independent judgment and analysis of the lead agency, which is the City of Redding.**

DOCUMENTATION

The attached Initial Study documents the reasons to support the above determination.

MITIGATION MEASURES

Bio-1: Migratory Birds/Raptors: If feasible, vegetation removal and/or construction shall be conducted between September 1 and January 31. If vegetation removal and/or construction activities are to occur during the nesting season (February 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active nest is found, a non-disturbance buffer shall be established by a qualified biologist in coordination with CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If construction activities cease for a period greater than seven (7) days, additional preconstruction surveys will be required.

Bio-2: Bats: If vegetation removal and/or construction activities are to occur during the roosting season (March 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active roost is found, a non-disturbance buffer shall be established for a distance of five hundred feet (500') around the nest unless a smaller buffer zone is approved by CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If a lapse in construction activities of fourteen (14) days or more occurs during the roosting season, an additional roost survey is required to ensure no roosts were established in the area while construction was on hold. Minimum qualifications for a Qualified Biologist include a bachelor's degree in biological or environmental science, natural resources management, or related discipline; field experience in the habitat types that may occur at the project site; familiarity with the Covered Species (or closely related species) that may occur at the Project site; and prior preconstruction survey, construction monitoring, or construction oversight experience (if and as relevant to the activity to be conducted).

PUBLIC REVIEW DISTRIBUTION

Draft copies or notice of this Mitigated Negative Declaration were distributed to:

- State Clearinghouse
- Shasta County Clerk
- U.S. Army Corp of Engineers, Redding
- California Department of Fish and Wildlife, Redding
- Central Valley Regional Water Quality Control Board, Redding
- California Native Plant Society, Shasta County
- Shasta Environmental Alliance
- Redding Rancheria
- Wintu Tribe of Northern California
- Paskenta Band of Nomlaki Indians
- All property owners within 300 feet of the property boundary
- Applicant
- Property Owner, if not applicant
- Representative

PUBLIC REVIEW

(X) Draft document referred for comments September 11, 2025.

( ) No comments were received during the public review period.

( ) Comments were received but did not address the draft Mitigated Negative Declaration findings or the accuracy/completeness of the Initial Study. No response is necessary. The letters are attached.

( ) Comments addressing the findings of the draft Mitigated Negative Declaration and/or accuracy or completeness of the Initial Study were received during the public review period. The letters and responses follow (see Response to Comments, attached).

The draft Mitigated Negative Declaration, Initial Study, Mitigated Negative Declaration, and other information concerning the project are available for public review Monday through Friday from 8:00 a.m. to 3:00 p.m., at the Planning Division of the Development Services Department, City of Redding, 777 Cypress Avenue, Redding, CA 96001, and online on the Development Services' City Planning Projects page of the City's website at http://www.cityofredding.gov. If you have any questions or wish to submit comments, please contact Danny Castro, Associate Planner, at dcastro@cityofredding.org, or by telephone at (530) 225-4471.



Lily Toy, Planning Manager

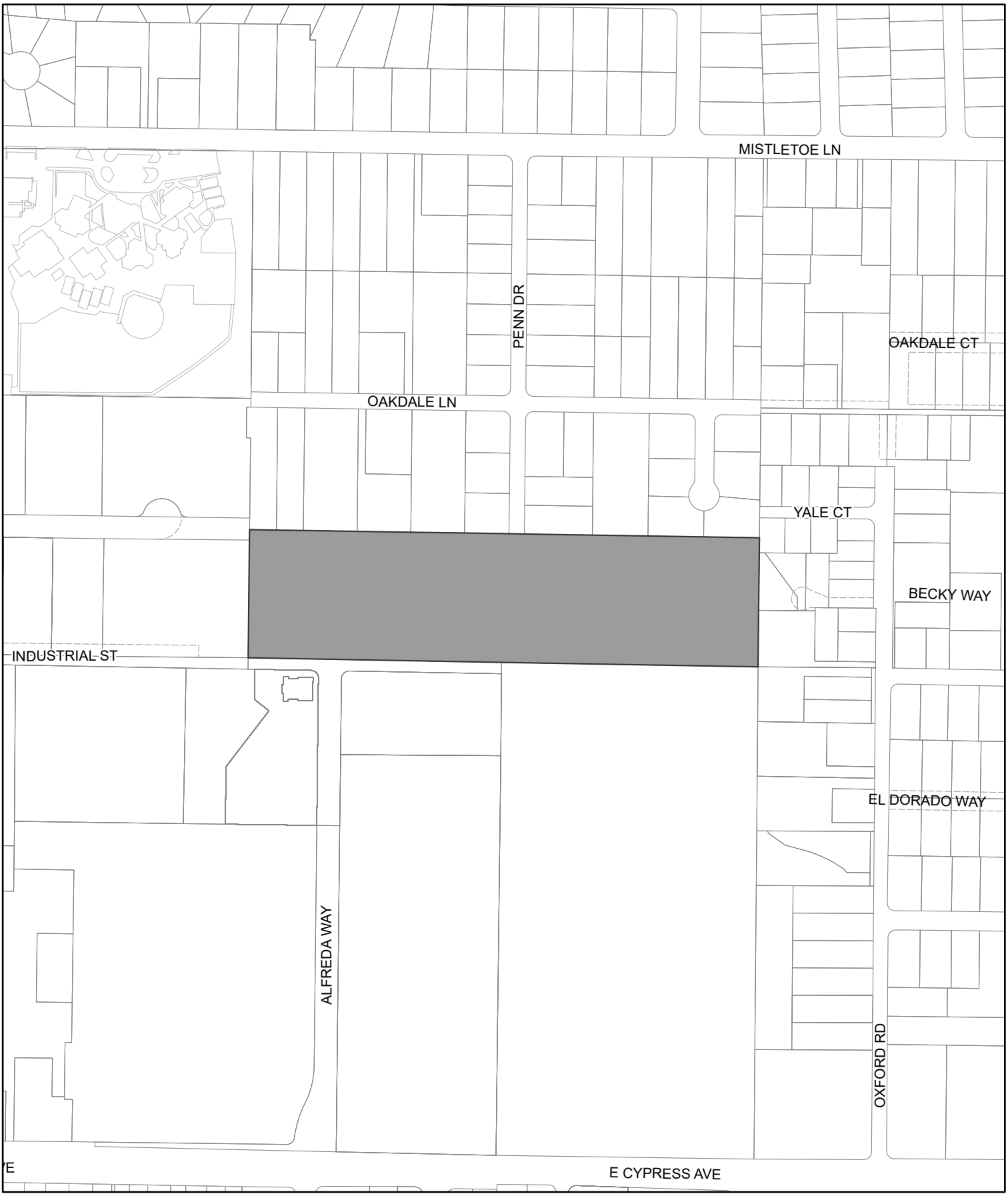
September 11, 2025

Date

Date of Final Report

Attachments:

A. Location map
B. Initial Study
C. Mitigation Monitoring Program



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GIS DIVISION
INFORMATION TECHNOLOGY DEPARTMENT

DATE PRODUCED:
FEBRUARY 18, 2025

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LOCATION MAP

PD-2025-00230
CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
1400 INDUSTRIAL ST
AP# 067-110-041

MTG. DATE:

ITEM:

ATTACHMENT:

ENVIRONMENTAL INITIAL STUDY

INITIAL STUDY CHECKLIST
References and Documentation

California Heritage YouthBuild Academy High School Campus
Planned Development Plan PD-2025-00230

Prepared by:
CITY OF REDDING
Development Services Department
Planning Division
777 Cypress Avenue
Redding, California 96001

September 10, 2025

CITY OF REDDING
ENVIRONMENTAL CHECKLIST FORM

1. Project Title: California Heritage YouthBuild Academy High School Campus

2. Lead agency name and address:

CITY OF REDDING
Development Services Department
Planning Division
777 Cypress Avenue
Redding, CA 96001

3. Contact Person and Phone Number:

Danny Castro, Associate Planner
(530) 225-4471

4. Project Location:

1400 Industrial Street, Redding, CA

5. Applicant's Name and Address:

Cathy Taylor, Executive Director
California Heritage YouthBuild Academy
8544 Airport Road
Redding, CA 96002

Representative's Name and Address:

Deven Carter, Principal Architect
Nichols, Melburg, and Rossetto Architect and Engineers
300 Knollcrest Drive
Redding, CA 96002

6. General Plan Designation:

Residential 6 to 10 Units per Acre

7. Zoning:

"RM-9-PD" Residential Multiple-Family Planned Development Plan Overlay District

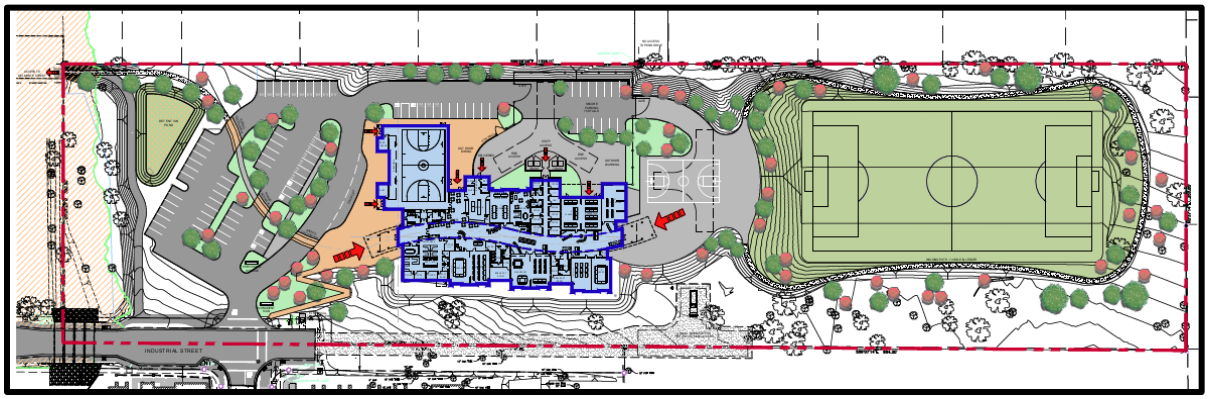
8. Description of Project:

The Project applicant, California Heritage YouthBuild Academy (CHYBA), is requesting approval of Planned Development Plan Application PD-2025-00230 to construct a new public charter high school campus for CHYBA on a 10.15-acre site located at 1400 Industrial Street. The campus would include a 36,600 square foot building consisting of classrooms, administrative offices, a dining area, and an indoor gymnasium with bleachers. Site amenities would include pedestrian walkways, parking areas, drop-off zones, a soccer field, and an outdoor basketball court. Construction of the facility would necessitate frontage improvements and right-of-way dedication to the City as well as the off-site construction of the Industrial Street crossing over Little Churn Creek. Although the Industrial Street crossing is required with this Project, it was previously studied with and

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The site is moderately sloped with an elevation of 590 feet in the northeast corner transitioning smoothly down to an elevation of 554 feet in the southwest corner. Grading would largely consist of creating a "super pad" that would act as a large flat step in the middle of the site, creating a more ideal topography for the development of the campus. All necessary public utilities such as sewer, water, and electricity are in close proximity to the site and available for connection to the Project. The preliminary layout of the campus is shown below.

CHYBA Overall Site Plan



9. Surrounding Land Uses and Setting:

The Project aims to develop a 10.15-acre vacant lot located in the southeast quadrant of the City within an existing developed residential and commercial neighborhood. The site is adjoined to the north and east by the Penn Acres and Enterprise Properties subdivisions; to the south by Center of Hope Apartments and a cemetery; and to the west by a plumbing supply store. The site is undeveloped land primarily characterized by oak/pine woodlands with ruderal understory vegetation and no permanent structures, roads, or improvements, other than a dirt access road.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):

NA

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

The Redding Rancheria, the Paskenta Band of Nomlaki Indians, and the Wintu Tribe of Northern California were noticed about this Project and the preparation of its associated initial study. The Paskenta Band of Nomlaki Indians requested consultation pursuant to Public Resources Code section 21080.3.1. The City responded in order to schedule a meeting for consultation and is still awaiting a response. Consultation is ongoing.

Note: *Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21080.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.*

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact or Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

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

DETERMINATION: (To be completed by the Lead Agency)

On the basis of the initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR of NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Copies of the Initial Study and related materials and documentation may be obtained at the Planning Division of the Development Services Department, 777 Cypress Avenue, Redding, CA 96001. Contact Danny Castro at (530) 225-4471.



Danny Castro
Development Services Department

September 10, 2025
Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

This section analyzes the potential environmental impacts associated with the proposed project. The issue areas evaluated in this Initial Study include:

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

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the State *CEQA Guidelines* and used by the City of Redding in its environmental review process. For the preliminary environmental assessment undertaken as part of this Initial Study's preparation, a determination that there is a potential for significant effects indicates the need to more fully analyze the development's impacts and to identify mitigation.

For the evaluation of potential impacts, the questions in the Initial Study Checklist are stated and an answer is provided according to the analysis undertaken as part of the Initial Study. The analysis considers the long-term, direct, indirect, and cumulative impacts of the development. To each question, there are four possible responses:

- **No Impact.** The development will not have any measurable environmental impact on the environment.

- **Less Than Significant Impact.** The development will have the potential for impacting the environment, although this impact will be below established thresholds that are considered to be significant.

- **Potentially Significant Impact Unless Mitigation Incorporated.** The development will have the potential to generate impacts which may be considered as a significant effect on the environment, although mitigation measures or changes to the development's physical or operational characteristics can reduce these impacts to levels that are less than significant.

- **Potentially Significant Impact**. The development will have impacts which are considered significant, and additional analysis is required to identify mitigation measures that could reduce these impacts to less than significant levels.

Where potential impacts are anticipated to be significant, mitigation measures will be required, so that impacts may be avoided or reduced to insignificant levels.

Prior environmental evaluations applicable to all or part of the Project site:

- *City of Redding General Plan* 2045
- *City of Redding General Plan Update Final Environmental Impact Report*, 2024, SCH #2022050300
- CEQA Findings of Fact and Statement of Overriding Considerations for the *City of Redding General Plan Update Final Environmental Impact Report*, as adopted by the Redding City Council on March 13, 2024, by Resolution 2024-027

List of attachments/references:

Attachment A – Figure 1 – Location Map
Figure 2 – Site Plan Package (Site Plan, Grading & Drainage Plans, Utility Plan, Tree Preservation Plan)
Figure 3 – Planned Development Plan (on file with the Development Services Department, Planning Division.

Attachment B – *Biological Assessment and Wetland Determination for Shasta County APN* (sic) *A Portion of Shasta County APN 067-110-041, Located in Section 5, Township 31 North, Range 4 West, 1400 Industrial Street, Redding, Shasta County, CA 96002. BA File 0620-2024-2430*, Bole and Associates, September 20, 2024

Attachment C – *Tree Inventory for CHYBA Campus (APN 067-110-041)*, Gallaway Enterprises, September 16, 2024

Attachment D – *Cultural Resources Inventory Survey*, Genesis Society, September 19, 2024 (on file in the Development Services Department, Planning Division)

Attachment E – *Geologic and Environmental Hazards Report California Heritage YouthBuild Academy*, Mid Pacific Engineering, Inc. (MPE), September 30, 2024

Attachment F – *CHYBA Entitlement Storm Drainage Analysis*, Sharrah Dunlap Sawyer, Inc., January 7, 2025

Attachment G – *Transportation Impact Study for the California Heritage YouthBuild Academy*, W-Trans, January 10, 2025

I. AESTHETICS: *Except as provided in Public Resources Code Section 21099, would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?				X
c) In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? *(Public views are those that area experienced from publicly accessible vantage point).* If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?				X
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				X

Discussion:

a) Scenic resources identified in the *General Plan Environmental Impact Report* include the Sacramento River and its tributaries; mountains and foothill; and open hillsides. Development of the Project would not obstruct a scenic vista identified in the *City of Redding General Plan 2045* and would be consistent with development pattern established on nearby properties. Although new development would alter the appearance of the existing conditions, it would not create a substantial adverse impact on scenic vistas or degrade the City's visual character or quality due to the existing urbanized character of the City. The Project will comply with the City's development ordinances, including the Zoning Ordinance. The proposed Project would not represent a significant change to the overall scenic quality of the area.

b) The Project site is not located adjacent to a state-designated scenic highway. In addition, the Project would be consistent with the surrounding land uses and the Project would not substantially obstruct, interrupt, or detract from identified scenic resources. There are not prominent rock outcroppings, visually-significant tree stands, or historic buildings in the vicinity of the Project.

c) The Project will be compatible with the existing developed visual character of the adjacent/nearby development. The Project is consistent with the *General Plan* density allowed on site and the Project site is located within the area which is developed with similar uses. The location, size, and design of the proposed use would be compatible with uses in the immediate area.

d) The Project would generate light that is customary for development and comply with the Zoning Ordinance light standards. There would not be an adverse effect on day or nighttime views in the area.

Documentation:
City of Redding General Plan 2045, Community Development and Design Element 2045
City of Redding General Plan 2045, Natural Resources Element 2045
City of Redding Zoning Ordinance, Chapter 18.40.090

Mitigation:
None necessary.

II. AGRICULTURE RESOURCES: *In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural, Land Evaluation and Site Assessment Mode (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided bin Forest Protocols adopted by the California Air Resources Board. Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or 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?			**X**	
b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?				**X**
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 5110(g))?				**X**
d Result in the loss of forest land or conversion of forest land to non-forest use?				**X**
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest land?				**X**

Discussion:
a-e) While the soils onsite are considered *prime farmland if irrigated* and *farmland of statewide importance*, they are shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency as *urban and built-up land*. This means that the Project would not convert any farmland recognized by the California Department of Conservation to a non-agricultural use. According to the *General Plan Natural Resources Element*, prime agricultural soils in the city Planning Area are limited to Churn Creek Bottom and pockets of land along Stillwater Creek in the vicinity of Shasta College. The Project site is not located within one of these areas of Prime Farmland as identified by the California Department of Conservation's Important Farmland Series Mapping and Monitoring Program and is not under Williamson Act contract. The Project would not convert or rezone any farmland to non-agricultural use or any forest land to non-forest use.

Documentation:
City of Redding General Plan 2045, Natural Resources Element 2045
California Department of Conservation's Farmland Mapping and Monitoring Program
United States Department of Agriculture, Soil Conservation Service and Forest Service, Soil Survey of Shasta County Area
DLRP Important Farmland Finder, https://maps.conservation.ca.gov/DLRP/CIFF/, accessed on March 17, 2025

Mitigation:
None necessary.

III. AIR QUALITY: *Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?			**X**	
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard			**X**	
c) Expose sensitive receptors to substantial pollutant concentrations?			**X**	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?				**X**

Discussion:

a) Shasta County, including the far northern Sacramento Valley, currently exceeds the state's ambient standards for ozone (smog) and particulates (fine, airborne particles). Consequently, these pollutants are the focus of local air quality policy, especially when related to land use and transportation planning. Even with application of measures to reduce emissions for individual projects, cumulative impacts are unavoidable when ozone and/or particulate emissions are involved. For example, the primary source of emissions contributing to ozone is from vehicles. Any project that generates vehicle trips has the potential of contributing incrementally to the problem.

The City of Redding General Plan (GP) Environmental Impact Report (EIR) concluded that cumulative impacts would be significant and unavoidable *on a City-wide basis* and those impacts are addressed in the adopted CEQA Findings of Fact and Statement of Overriding Considerations. The GP EIR estimated areawide and mobile source emissions under the General Plan 2045 and compared the estimates to the estimated area and mobile source emissions projected in the 2021 Air Quality Attainment Plan (AQAP) for year 2025, which is the time horizon of the AQAP. The analysis concluded that the *cumulative* ROG and NOX emissions that would be generated by activity under the GP in 2045 would exceed the projections in the AQAP for year 2025 resulting in a very conservative determination. The GP EIR mirrors GP policies by requiring Mitigation Measures AQ-1 and AQ-2. AQ-1 requires that "Standard Mitigation Measures" (SMMs) be applied to all discretionary projects. AQ-2 requires the use of Best Available Mitigation Measures (BAMMs) recommended by SCAQMD which has the ability to provide recommendations for each discretionary project. The requirement of SMMs are also required by the City's Standard Conditions of Approval (SCOA) for discretionary project. Because the Project would generate the type of construction and traffic emissions projected for the land use types and density set forth for the Project site by the GP EIR, the Project would not conflict with the SCAQMD plans and impacts would be less than significant.

b) The GP EIR concluded that cumulative impacts would be significant and unavoidable on a City-wide basis and those impacts are addressed in the adopted CEQA Findings of Fact and Statement of Overriding Considerations. The GP EIR concluded that implementation of the GP would cumulatively generate construction-related emissions of criteria air pollutants and precursors, including ROG, NOX, PM10, and PM2.5 from site preparation (e.g., excavation, clearing), off-road equipment, material delivery, worker commute trips, and other activities (e.g., building construction, asphalt paving, application of architectural coatings). Implementation of the construction-related SMMs as required by the City's SCOA for discretionary projects would reduce construction-generated emissions of criteria air pollutants and precursors. However, due to Shasta County's nonattainment-transitional status for ozone, construction activities associated with the Project would add to the cumulative impacts, and the GP EIR acknowledges that implementation of the GP may result in adverse air quality impacts to surrounding land uses and may contribute to the existing air quality condition in the City. There are no components of the proposed Project that would result in increased construction-related air quality emissions beyond what was previously evaluated and disclosed by the GP EIR for the Project site. Nonetheless, and consistent with the findings of the GP EIR, Project-related air quality emissions during construction activities would contribute to the significant and unavoidable construction-related air quality impact identified by the GP EIR (Impact AQ-2), However, the Project would not result in increased impacts or increased cumulatively-considerable impacts due to construction-related emissions beyond what was evaluated and disclosed by the GP EIR and would not exceed the thresholds established by the GP.

The *City of Redding General Plan 2045*, Natural Resources Element 2045 establishes emission thresholds that have been adopted by regional agencies when determining air quality impacts of discretionary projects for the important regional/local pollutants,

including: Reactive Organic Gases (ROG) and Oxides of Nitrogen (NOx), which are ozone precursors, and Inhalable Particulate Matter, 10 Micron (PM_{10}) and 2.5 Micron ($PM_{2.5}$) as follows:

Level "A"	**Level "B"**
25 pounds per day of NOx	137 pounds per day of NOx
25 pounds per day of ROG	137 pounds per day of ROG
80 pounds per day of PM_{10}	137 pounds per day of PM_{10}
80 pounds per day of $PM_{2.5}$	

The process of applying SMM and BAMM is to apply appropriate SMM to all projects based on potential air quality impacts and to help contribute to reducing cumulative impacts. If the Project exceeds Level "A" threshold, then BAMM will be applied based on the unique characteristics of the project selected from a list of measures provided by AQMD. If a project exceeds Level "B" thresholds, SMM, BAMM, and appropriate special BAMM would be applied and the City will seek recommendations of the AQMD regarding the efficiency of proposed emissions measures beyond BAMM. If a project's emission cannot be reduced to below Level "B" thresholds, emission offsets will be required. If, after applying emission offsets, the project still exceeds the Level "B" threshold, then an Environmental Impact Report is required.

The current Project has the potential to impact air quality primarily in two ways: (1) the Project would generate vehicle trip emissions (with NOx, ROG, and PM_{10}) that contribute cumulatively to local and regional air quality conditions; and (2) fugitive dust (particulate/$PM_{10\text{ and }}PM_{2.5}$) emissions are possible during construction activities. As a school, the Project does not have the potential to generate significant emission concentrations of other pollutants subject to state and federal ambient air quality standards and no recommendation for BAMM were made by the SCAQMD.

Application of the SMMs outlined below would reduce the Project's potential air quality impacts to a level less than significant.

1. Apply nontoxic soil stabilizers according to manufacturer's specification to all inactive construction areas (previously-graded areas inactive for ten (10) days or more).
2. Reestablish ground cover on the construction site through seeding and watering prior to final occupancy.
3. All grading operations shall be suspended by the City Engineer when winds (as instantaneous gusts) exceed 20 miles per hour as directed by the AQMD.
4. Provide temporary traffic control as appropriate during all phases of construction to improve traffic flow (e.g. flag person) as approved by the City Engineer.
5. Schedule construction activities that affect traffic flow to off-peak hours as determined by the City Engineer.
6. Water active construction sites at least twice daily or as directed by the Public Works Department.
7. All truck hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least two feet (2') of freeboard (i.e., minimum vertical distance between top of the load and the trailer) in accordance with the requirements of CVC Section 23114. This provision is enforced by local law enforcement agencies.
8. Sweep streets at the end of the day if visible soil materials are carried onto adjacent public paved roads (recommend water sweeper with reclaimed water).
9. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.

In addition to the requirements of the California Building Code, the following operational SMMs will be applied as appropriate to as recommended by the Shasta County Air Quality Management District:

1. Provide energy-efficient process systems, such as water heaters, furnaces, and boiler units.
2. All new wood burning devices shall be EPA Phase II certified.
3. Large residential, commercial, and industrial projects should include bus shelters at transit access points.
4. Contribute to traffic-flow improvements that reduce emissions and are not growth-inducing (e.g., right-of-way, capital improvements, etc.)
5. Install an electrical outlet at the front and back of all residential units for electrical yard equipment.
6. Streets should be designed to maximize pedestrian access to transit stops.

c-d) The GP EIR concluded that cumulative impacts would be significant and unavoidable on a City-wide basis and those are addressed in the adopted CEQA Findings of Fact and Statement of Overriding Considerations. However, the document notes that the SCAQMD identified the following types of land use conflicts that could result in the exposure of sensitive receptors to excessive pollutant concentrations in their CEQA Land Use Protocol Guidelines:

- Development projects with sensitive receptors in close proximity to a congested intersection or roadway with high levels of emissions from motor vehicles. High concentrations of carbon monoxide, fine particulate matter, or toxic air contaminants are the most common concerns.
- Development projects with sensitive receptors close to an industrial source of toxic air contaminants.
- Development projects with sensitive receptors close to a source of odorous emissions. Although odors generally do not pose a health risk, they can be quite unpleasant and often lead to citizen complaints to the District and to local governments.

The Project does not meet any of these criteria. Further, the Project is not located in proximity to any of the land uses types noted.

Documentation:
City of Redding General Plan 2045, Natural Resources Element 2045
City of Redding General Plan Update Final Environmental Impact Report, 2024, SCH #2022050300
CEQA Findings of Fact and Statement of Overriding Considerations for the *City of Redding General Plan Update Final Environmental Impact Report*, as adopted by the Redding City Council on March 13, 2024, by Resolution 2024-027

Mitigation:
None necessary.

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

Discussion:

a) The information below is based on the survey results documented in a biological resource assessment and wetland determination for the Project site prepared by Bole & Associates.

Plants

The Project area consists of an oak-foothill pine natural community. Foothill pines and interior live oak dominate these communities.

The understory consists primarily of annual grasses and forbs.

Based on field survey results, a review of the California Natural Diversity Database (CNDDB), the United States Fish & Wildlife Service's IPaC species list, and California Native Plant Society (CNPS) literature, the only special status species plant with the potential to occur in the action area of the Project site is slender orcutt grass. As there are no vernal pools necessary for this species onsite, no impacts to special status plant species are anticipated with the CHYBA Project outside the area already considered with the previously adopted MND for the Industrial Street Crossing.

Animals

Based on the sources listed above, the majority of special status animal species with the potential to occur onsite were dependent on rivers, streams, or vernal pools. Little Churn Creek was not cited as being able to support these species and is outside the scope of this MND.

The trees, shrubs, and other features in the BSA and vicinity provide potential nesting and foraging habitat for various bird species. Special-status bird species that could use these habitats include loggerhead shrike, although the potential is low due to nearby residences and other disturbances. Loggerhead shrike is designated as a species of special concern by the CDFW. It is generally found in open grasslands, relatively open woodlands, and ruderal agricultural settings throughout the Central Valley. Loggerhead shrikes nest in trees or shrubs and generally require barbed-wire fences, thorn bushes, or similar barbed structures for impaling and storing prey items. While there are no nearby CNDDB-reported occurrences of loggerhead shrike, the species occurs in the region and the Project site provides suitable habitat. Other protected migratory birds documented in the area include a variety of songbird and raptor species. Mitigation Measure Bio-1 would ensure that impacts to nesting and migratory birds, including the loggerhead shrike, are less than significant.

The Townsend's big-eared bat and the pallid bat are designated as species of special concern by CDFW. Both bat species have the potential to occur onsite. The blue oak woodland and grassland habitats within the BSA provide potential foraging habitat for bats. Trees with cavities and snags may also provide roosting and maternity colony habitat. The pallid bat and Townsend's big-eared bat may roost individually or in small groups in tree cavities or other woody vegetation in the BSA. Due to the ability of individual bats to move away from disturbances, direct impacts on bats are not expected when the bats are not in a maternity colony. If a tree is removed that contains a maternity colony, the removal could result in mortality or injury of individual bats and their young. Mitigation Measure Bio-2 would bring impacts to pallid and Townsend's big-eared bats to a level of less than significant.

b) Sensitive habitats include those of special concern to resource agencies, Section 1600 of the California Fish and Game Code, or Section 404 of the Clean Water Act. A biologist from Bole & Associates conducted over ten hours of field survey of the study area during August and September 2024. The Project area was systematically surveyed to ensure total search coverage, with particular attention given to identifying those portions of the study area with the potential for supporting special-status species and sensitive habitats. No sensitive habitats were found within the footprint of the proposed development. The CHYBA Project would have no significant impact on any riparian areas outside of those already included in the adopted MND for the Industrial Street crossing. Impacts to riparian areas or sensitive natural communities are expected to be less than significant.

c) Aside from Little Churn Creek which runs off site and was already considered with the adopted MND for the required Industrial Street crossing, no other wetlands or channels were identified within the Project site.

d) The Project site is surrounded by existing development on all sides. The Project would leave Little Churn Creek intact, thus preserving any functioning of the drainage channel as a wildlife corridor intact. (Any work in Little Churn Creek would be a part of the Industrial Street Crossing and part of a previously adopted MND.) The remainder of the site does not serve as a wildlife movement corridor as it does not link together areas of suitable habitat that are otherwise separated by rugged terrain, changes in vegetation, or human development. While the site contains trees that could be used for nesting migratory birds, it is not anticipated to substantially interfere with the migration of birds. Impacts with regard to the functioning of the site for the movement of wildlife are considered to be less than significant.

e) The City has adopted a Tree Management Ordinance (Chapter 18.45 of the RMC) that promotes the conservation of mature, healthy trees in the design of new development. This ordinance also requires a tree removal permit of any tree exceeding 6 inches in DBH. The ordinance also recognizes that the preservation of trees will sometimes conflict with necessary land-development requirements. The *City's General Plan EIR* further acknowledges that preservation of native trees will sometimes conflict with normal land development and that implementation of the *General Plan* will ultimately set aside over 7,000 acres of open space, much of which contains oak habitat. But efforts must still be made to retain existing trees if reasonably possible, and to sufficiently plant new trees in the context of the new development. A tree survey is required to identify natural trees and tree groups most suitable for

preservation or "candidate trees/groups." Where all identified candidate trees/groups cannot be preserved, the set-aside of a natural area or areas within a project site that is particularly suitable for the planting, retention, and/or natural regeneration of trees is considered to be a desirable means of accomplishing the goals of the ordinance.

An arborist report was prepared for the Project by Gallaway Enterprises on September 16, 2024. The study identified a total of 294 trees that measured six inches or greater in diameter at breast height (DBH). The average health of the trees was rated at a 2.3 out of 5, meaning below average health. Tree species identified on site included blue oaks, gray pine, interior live oak, black oaks, and catalpa. Eighty-one of these trees are proposed to be preserved, with 213 to be removed. The trees to be removed are directly in the areas proposed for development with little to no opportunity to integrate them into the design of the Project: The site's topography dictates the area that needs to be "padded-out" and the grading is largely responsible for which trees are able to be saved.

City staff have not identified any candidate trees with the potential to be preserved, and the removal of trees is permitted with an approved grading or building permit. However, the Project will be replanting approximately 100 trees as shown on the preliminary site plan. In conclusion, the removal of trees would be considered a less than significant impact as it would not conflict with the City's Tree Management Ordinance.

f) No habitat conservation plans or other similar plans have been adopted for the Project site or Project area. No impact would occur in this regard.

Documentation:

City of Redding General Plan 2045, Natural Resources Element 2045
City of Redding General Plan Update Final Environmental Impact Report, 2024, SCH #2022050300
City of Redding Municipal Code, Chapter 18.45, Tree Management Ordinance
California Department of Fish and Wildlife: Natural Diversity Data Base
Biological Assessment and Wetland Determination for Shasta County APN (sic) *A Portion of Shasta County APN 067-110-041, Located in Section 5, Township 31 North, Range 4 West, 1400 Industrial Street, Redding, Shasta County, CA 96002. BA File 0620-2024-2430*, Bole and Associates, September 20, 2024
Tree Inventory for CHYBA Campus (APN 067-110-041), Gallaway Enterprises, September 16, 2024

Mitigation:

Bio-1 Migratory Birds/Raptors: If feasible, vegetation removal and/or construction shall be conducted between September 1 and January 31. If vegetation removal and/or construction activities are to occur during the nesting season (February 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active nest is found, a non-disturbance buffer shall be established by a qualified biologist in coordination with CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If construction activities cease for a period greater than seven (7) days, additional preconstruction surveys will be required.

Bio-2 Bats: If vegetation removal and/or construction activities are to occur during the roosting season (March 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active roost is found, a non-disturbance buffer shall be established for a distance of five hundred feet (500') around the nest unless a smaller buffer zone is approved by CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If a lapse in construction activities of fourteen (14) days or more occurs during the roosting season, an additional roost survey is required to ensure no roosts were established in the area while construction was on hold. Minimum qualifications for a Qualified Biologist include a bachelor's degree in biological or environmental science, natural resources management, or related discipline; field experience in the habitat types that may occur at the Project site; familiarity with the Covered Species (or closely related species) that may occur at the Project site; and prior preconstruction survey, construction monitoring, or construction oversight experience (if and as relevant to the activity to be conducted).

V. CULTURAL RESOURCES: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?				**X**
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?			**X**	
c) Disturb any human remains, including those interred outsides of dedicated cemeteries?			**X**	

Discussion

a-c) A cultural resources inventory survey for the Project site was conducted by Genesis Society with the results documented in a report dated September 19, 2024. Resources consulted include the Northeast Information Center, the Native American Heritage Commission, the National Register of Historic Places, the California Register of Historical Resources, and the California Inventory of Historic Resources among others. No cultural resources were reported in the Project area through the Northeast Information Center and the Native American Heritage Commission indicated that no sacred places are reported on the Project site. An intensive pedestrian survey was also undertaken by a professional archeologist that resulted in a negative finding: No artifacts or potentially significant cultural features were observed. Based on the absences of significant historical resources or unique archaeological resources on the site, cultural resources clearance was recommended for the Project.

Documentation:
City of Redding General Plan 2045, Natural Resources Element 2045
Cultural Resources Inventory Survey, Genesis Society, September 19, 2024

Mitigation:
None

VI. Energy: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			**X**	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?				**X**

Discussion

a) The Project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation. Direct energy use would involve the short-term use of energy for construction activities. Project construction would primarily consume diesel and gasoline through operation of construction equipment, material deliveries, and debris hauling. Construction is estimated to result in a short-term consumption of energy, representing a small demand on local and regional fuel supplies that would be easily accommodated and would be temporary. Long-term use of electricity for operations within the school such as lighting, heating, and cooling in the office portions of the building is expected to be less than significant due to the nominal scale of the Project and will conform to standard practices, including typical municipal utility connections that comply with energy efficiency and building codes.

b) The Project will not conflict with any State or local plans for renewable energy or energy efficiency.

Documentation:
City of Redding General Plan 2045, Natural Resources Element 2045

Mitigation:
None necessary.

VII. GEOLOGY AND SOILS: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake, fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publications 42. ii) Strong seismic ground shaking? iii) Seismic-related ground failure, including liquefaction? iv) Landslides?			**X**	
b) Result in substantial soil erosion or the loss of topsoil?			**X**	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?			**X**	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				**X**
e) 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 waste water?				**X**
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				**X**

Discussion:

a, c) In review of the site specific Geologic and Environmental Hazards Report prepared by MPE, no Alquist-Priolo earthquake faults designated in the Redding area of Shasta County cross the site. There are no other documented earthquake faults in the immediate vicinity that pose a significant risk, and the site is located in an area designated in the Health and Safety Element of the *General Plan* as having a low to moderate ground-shaking potential. The Project is not located on or near any documented landslide hazard areas, and there is no evidence of ground slippage or subsidence occurring naturally on the site. The type of soils and underlying geology is identified as having low potential for liquefaction. The very western end of the site does fall within the 100-year floodplain of the Sacramento River or nearby creeks; however, this small portion of the site (0.38 acres) is not slated for any buildings.

b, d) The Project site contains two primary soil classifications: Churn gravelly loam and Red Bluff loam. These classifications are generally characterized by 0-3percent slopes; the Red Bluff loam is in some cases characterized by 3-8percent slopes. These are well-drained and moderately permeable soils, with a zero to slight erosion potential and slow runoff. Loam is not considered to be

an expansive soil. No substantial direct or indirect risks to life or property due to the presence of expansive soils are expected. Proposed grading consists of leveling some portions of the site.
The Project is subject to certain erosion-control requirements mandated by existing City and State regulations. These requirements include:

- *City of Redding Grading Ordinance.* This ordinance requires the application of "Best Management Practices" (BMPs) in accordance with the City Erosion and Sediment Control Standards Design Manual (Redding Municipal Code Section 16.12.060, Subsections C, D, E). In practice, specific erosion-control measures are determined upon review of the final Project improvement plans and are tailored to project-specific grading impacts.
- *California Regional Water Quality Board "Construction Activity Storm Water Permit.*" This permit somewhat overlaps the City's Grading Ordinance provision by applying state standards for erosion-control measures during construction of the Project.
- *California Regional Water Quality Control Board "Project Storm Water Pollution Prevention Plan (SWPPP).*" This plan emphasizes stormwater best management practices and is required as part of the Construction Activity Storm Water Permit. The objectives of the SWPPP are to identify the sources of sediment and other pollutants that affect the quality of stormwater discharges and to describe and ensure the implementation of practices to reduce sediment and other pollutants in stormwater discharges.
- *California Department of Fish and Wildlife "1600 Agreement."* This notification is only required for any work within a defined streambed. The proposed Project is not within a defined streambed.

Actions for compliance with these regulations are addressed under standard conditions of approval, which are uniformly applied to all land development projects. Since the Project is subject to uniformly applied ordinances and policies and the overall risk of erosion is low, potential impacts related to soil erosion and sedimentation are less than significant.

e) The proposed Project does not involve the use of septic tanks or alternative wastewater disposal. No impact has been identified.

f) No unique geologic features, fossil-bearing strata, or paleontological sites are known to exist on the Project site.

Documentation:
City of Redding General Plan 2045, Public Safety Element 2045, figures PS-1 (Ground Shaking Potential) and PS-2 (Liquefaction Potential)
City of Redding General Plan Update Final Environmental Impact Report, 2024, SCH #2022050300
City of Redding Grading Ordinance, RMC Chapter 16.12
City of Redding Standard Specifications, Grading Practices
City of Redding Standard Development Conditions for Discretionary Approvals
Soil Survey of Shasta County Area, United States Department of Agriculture, Soil Conservation Service and Forest Service, August 1974
Division of Mines and Geology Special Publication 42
State Regional Water Quality Control Board, Central Valley Region, *Regulations Related to Construction Activity Storm Water Permits and Storm Water Pollution Prevention Plans*
Biological Assessment and Wetland Determination for Shasta County APN (sic) *A Portion of Shasta County APN 067-110-041, Located in Section 5, Township 31 North, Range 4 West, 1400 Industrial Street, Redding, Shasta County, CA 96002. BA File 0620-2024-2430*, Bole and Associates, September 20, 2024 *Geologic and Environmental Hazards Report, California Heritage YouthBuild Academy*, Mid Pacific Engineering, Inc. (MPE), September 20 2024
Geologic and Environmental Hazards Report California Heritage YouthBuild Academy, Mid Pacific Engineering, Inc. (MPE), September 30, 2024

Mitigation:
None necessary.

VIII. GREENHOUSE GAS EMISSIONS: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			**X**	

VIII. GREENHOUSE GAS EMISSIONS: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			**X**	

Discussion:

a, b) The City of Redding General Plan (GP) and Environmental Impact Report (EIR) concluded this impact is cumulatively significant and unavoidable as pertains to buildout of the GP and is addressed in the GP EIR's CEQA Findings of Fact and Statement of Overriding Considerations. The EIR indicates that greenhouse gas (GHG) emissions are projected to result in a slight decrease in emissions from the CEQA baseline established by the GP EIR but not result in the 85 percent reduction from existing conditions necessary to ensure the City is on a trajectory to achieve the long-term reductions goals of AB 1279 and substantial progress toward the State's carbon neutrality goals for year 2045.

The City has not adopted a numerical significance threshold for assessing impacts related to GHG emissions. Similarly, neither the South Coast Air Quality Management District (SCAQMD), California Air Resources Board (CARB), nor any other state or regional agency has yet adopted a numerical significance threshold for assessing GHG emissions that applies to the Project. Since there is no applicable adopted or accepted numerical threshold of significance for GHG emissions, the methodology for evaluating the Project's impacts related to GHG emissions focuses on its consistency with statewide, regional, and local plans adopted for the purpose of reducing and/or mitigating GHG emissions. This consistency with such plans is the sole basis for determining the significance of the project's GHG-related impacts on the environment.

The Project is consistent with numerous policies of the GP that address lowering Vehicle Miles Traveled (VMT) through infill development, including but not limited to the following:

- Prioritizing infill development.
- Working to complete the City's "Complete Streets" system to provide multimodal transportation opportunities.
- Strategically locating parks, trails, and similar facilities throughout the community to result in such facilities being located within ¼ mile of residents.

The Project is also consistent with the applicable Shasta Regional Transportation Agency's Regional Transportation Plan's goals, including:

- Encouraging transportation-efficient growth and development where it is supported by current or planned mobility options.

With regard to consistency with the California Air Resources Board's 2017 Scoping Plan, the Scoping Plan addresses a broad range of actions and strategies intended to reduce greenhouse gases such as increasing stringency of carbon fuel standards, adding additional zero-emission vehicles on the state's roadways, and similar broad-based programs which are not applicable to the Project.

As demonstrated by the above and the analysis provided in the GP EIR, the Project complies with or exceeds the plans, policies, regulations and GHG reduction actions/strategies outlined in the GP, the Shasta Regional Transportation Agency Regional Transportation Plan, and CARB's 2017 Scoping Plan. Therefore, the Project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing emissions of GHGs.

Documentation:
City of Redding General Plan 2045, Natural Resources Element 2045

Mitigation:
None necessary.

IX. HAZARDS AND HAZARDOUS MATERIALS: *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				**X**
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				**X**
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			**X**	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				**X**
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				**X**
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				**X**
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?			**X**	

Discussion:

a-d) The nature of the Project as a high school does not present a significant risk related to hazardous materials or emissions. There are no documented hazardous material sites located on or near the Project site.

e) The Project site is about 5 miles northwest of Redding Regional Airport and about 3 miles east of Benton Airpark. The Project is not located within an airport land use plan or within two miles of a public airport or public use airport and would not result in a safety hazard for people residing or working in the Project area. There would be no impact on public safety.

f) The Project does not involve a use or activity that could interfere with emergency-response or emergency-evacuation plans for the area. The site is not located on a flood or wildfire evacuation route.

g) The Project site does not have a wildland fire-hazard potential. The site is an infill site outside of the high fire severity zone and is substantially surrounded by other urban uses.

Documentation:
City of Redding General Plan 2045, Public Safety Element, 2045, *including figures PS-4 (Very High Fire Severity Zone) and PS-6 (Wildfire Evacuation Routes)*

Mitigation:
None necessary.

X. HYDROLOGY AND WATER QUALITY: *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			**X**	

X. HYDROLOGY AND WATER QUALITY: *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
b) Substantially decease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?				X
c) 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:			X	
i) Result in substantial erosion or siltation on- or off-site;			X	
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;			X	
iii) 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			X	
iv) Impede or redirect flood flows?			X	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				X
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				X

Discussion:

a) Since the Project would be served by City sanitary sewer service, the Project would not involve any permitted discharges of waste material into ground or surface waters. Construction and operation of the Project would not violate any water quality standards established by the Central Valley Regional Water Quality Control Board (RWQCB) in its Basin Plan for the Sacramento River and San Joaquin River Basins. Water pollution best management practices are required and will be incorporated into the improvement plans for the Project. The City's construction standards require that all projects prepare an erosion and sediment control plan (ESCP) prior to construction to address water pollution control. The ESCP will ensure that water quality standards are not substantially affected by the Project during construction.

b) The Project would utilize City water service for domestic uses and fire protection. The proposed Project would have no significant impact on groundwater supplies or groundwater recharge.

c) The Project is subject to standard requirements defined under Section VII., *Geology and Soils*, that minimize the potential for erosion or siltation on- or off-site. The final improvement plans for the Project must also incorporate specific design measures intended to limit pollutant discharges in stormwater from urban improvements as established under the State's National Pollutant Elimination System (NPDES) general permit, which the City is now obligated to follow in accordance with State Water Quality Control Order No. 2003-0005-DWQ. Feasible Best Management Practices (BMPs) would be incorporated in the final design of the Project's storm-drain system, as approved by the City Engineer, based on the BMPs listed in the latest edition of the California Storm Water Quality Association Storm Water Best Management Practices Handbook.

The majority of stormwater runoff from the site would be directed to a storm water detention basin before being discharged into Little Churn Creek. City of Redding Policy 1806 requires that all development include stormwater detention facilities designed to maintain existing predevelopment rates of runoff during a 10-, 25-, and 100-year storm event with a six-hour duration. The Project application includes a stormwater hydrology analysis prepared by Sharrah Dunlap Sawyer that concludes that the Project can manage storm water runoff in a way that maintains or reduces pre-project runoff volumes in the post-project condition as required by the City of Redding.

d) The Project site is not located in a tsunami or seiche zone. While some of the western portion of the Project site is within the

100-year floodplain, no building construction is proposed in this area. Construction of the Industrial Street Crossing is within the 100-year floodplain and is already a part of a previously adopted MND.

e) The Project would not conflict with a water quality control plan or groundwater management plan

Documentation:
City of Redding General Plan 2045, Natural Resources Element 2045
City of Redding General Plan 2045, Public Safety Element 2045
CHYBA Entitlement Storm Drainage Analysis, Sharrah Dunlap Sawyer, Inc., January 7, 2025
Federal Emergency Management Agency Floodplain regulations, FIRM map **06089C1553G**, dated March 17, 2011
City of Redding Storm Drain Master Plan, Montgomery-Watson Engineers, 1993

Mitigation:
None necessary.

XI. LAND USE AND PLANNING: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Physically divide an established community?				**X**
b) Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				**X**

Discussion:

a) The Project does not have the potential to physically divide an established community. It is on an undeveloped parcel flanked by private developments on three sides without legal access through the site.

b) The Project is compatible with the applicable policies and regulations of the City General Plan and Zoning Ordinance and is not in conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Documentation:
City of Redding General Plan 2045, Community Development and Design Element, 2045
City of Redding General Plan 2045, Natural Resources Element, 2045

Mitigation:
None necessary.

XII. MINERAL RESOURCES: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?				**X**
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local General Plan, specific plan or other land use plan?				**X**

Discussion:

a, b)The Project site is not identified in the General Plan as having any known mineral-resource value or as being located within any "Critical Mineral Resource Overlay" area.

Documentation:
City of Redding General Plan 2045, Natural Resources Element, 2045
City of Redding General Plan Land Use 2045 Diagram

Mitigation:
None necessary.

XIII. NOISE: *Would the project result in:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			**X**	
b) Generation of excessive ground-borne vibration or ground-borne noise levels?			**X**	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				**X**

Discussion:

a, b) Due to the nature of the Project as a school, it would not result in a permanent increase in ambient noise levels and would not result in generation of excessive ground-borne vibration or ground-borne noise levels.

During the construction of the Project there may be a temporary increase in noise in the Project's vicinity above existing ambient noise levels. The most noticeable construction noise will be related to grading, utility excavation, and land-clearing activity. The City's Grading Ordinance (RMC Chapter 16.12.120.H) limits grading-permit-authorized activities to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. No operations are allowed on Sunday. Since heavy construction work associated with the Project is limited in scope and by existing regulation, the anticipated noise impact to neighboring residents is considered less than significant.

c) The proposed Project site is not located within any of the noise contours of Redding Municipal Airport and is located approximately three miles away from the closest airport. There are no private airstrips in the vicinity of the Project site.

Documentation:
City of Redding General Plan 2045, Noise Element, 2045
City of Redding General Plan 2045, Transportation Element, 2045
City of Redding Zoning Ordinance Redding Municipal Code, Section 18.40.100
City of Redding Grading Ordinance Redding Municipal Code, Section 16.12.120

Mitigation:
None necessary.

XIV. POPULATION AND HOUSING: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) 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)*?			**X**	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				**X**

Discussion:

a, b)The nature of the Project as a high school would not involve the construction of new homes. The Industrial Street crossing would connect traffic through the area but the residential properties along this right-of-way are largely built out. The crossing would not induce substantial housing growth. As the Project site is vacant, there would be no displacement of existing people or housing. The Project is expected to have a less than significant impact on population and housing in the area.

Documentation:
City of Redding General Plan 2045, Housing Element, 2020-2028

Mitigation:
None necessary.

XV. PUBLIC SERVICES: *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
Fire Protection?			**X**	
Police Protection?			**X**	
Schools?			**X**	
Parks?			**X**	
Other public facilities?			**X**	

Discussion:

Fire and Police Protection:

The City would provide police and fire protection to the Project from existing facilities and under existing service levels. The size of the Project would not mandate the need for additional police or fire facilities.

The Project is subject to Chapter 16.20 of the Redding Municipal Code, which requires new development to pay a citywide fire facilities-impact fee calculated to mitigate a project's fair share of cumulative impacts to the City's fire-protection infrastructure based upon improvements necessary to accommodate new development under the City's *General Plan*.

Schools:

The Project is located in the Enterprise Elementary School District and Shasta Union High School District. The Project itself is a California public charter school, which may contribute to the total student enrollment in these districts. The CHYBA high school is a small charter school aimed at youth between 16 and 24 years of age in need of a second chance at obtaining a high school diploma and essential job skills and training. The school currently enrolls 120 students, and enrollment in the school is expected to increase to 290 students over the next 5-10 years. However, the Project is more likely to lead to a redistribution of students within the district than any significant increase in enrollment overall.

Parks:

The Project will not cause a physical deterioration of an existing park facility or cause an adverse physical impact associated with a new park facility. Because the Project is a California public charter high school owned by a public agency or district, the Project is not subject to the requirement in Chapter 16.20 of the Redding Municipal Code that requires new developments to pay a citywide park and recreation-facilities impact fee.

Other public facilities:

See discussion under Item XIX (Utilities and Service Systems) below.

Documentation:
City of Redding General Plan 2045, Public Facilities and Services Element 2045

Mitigation:
None necessary.

XVI. RECREATION:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	

Discussion:

a) The Project will not cause a physical deterioration of an existing recreation facility or cause an adverse physical impact associated with a new recreation facility.

b) The Project includes the construction of a soccer field and both outdoor and indoor basketball courts, which will serve as recreational facilities for enrolled students at the school and may serve as recreational facilities for members of the local community during special events. The construction and use of such facilities are expected to have a less than significant impact on the environment (see Biological Resources above). There would not be any potentially significant adverse effect associated with recreation due to the Project.

Documentation:
City of Redding General Plan 2045, Natural Resources Element, 2045
City of Redding General Plan, Parks, Trails, and Recreation Element, 2045
City of Redding General Plan 2045, Public Facilities and Services Element, 2045

Mitigation:
None necessary.

XVII. TRANSPORTATION: *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?			X	
b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b)?			X	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
d) Result in inadequate emergency access?			X	

Discussion:

a) The General Plan (GP) Environmental Impact Report (EIR) concluded this impact to be less than significant. Local programs, plans, ordinances, and policies are consistent with the Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS)

for the Shasta Region, the Redding Active Transportation Plan (ATP), the Redding Area Bus Authority (RABA) Short Range Transit Plan, Title 11, Vehicles and Traffic of the Redding Municipal Code, and the Redding Complete Streets Policy. The GP focuses on increasing options for alternative transportation (public transit, walking, and bicycling); ensuring that pedestrian and bicycle systems connect residential neighborhoods to public facilities and services, schools, parks, and shopping areas; and other means to develop a multi-modal transportation system that meets the needs of all members of the community. Additionally, the planned Safe Routes to School pathway between Cypress Avenue/Alfreda Way and Del Monte Street will benefit both the Project and Mistletoe Elementary School. The Project would not conflict with any plans or policies for transportation facilities with implementation of all required on-site bicycle parking and sidewalks. Project impacts to any circulation system related plans or policies would be less than significant.

b) The potential for the Project to conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b) was evaluated based the Project's anticipated Vehicle Miles Traveled (VMT). Senate Bill (SB) 743 established VMT as the metric to be applied for determining transportation impacts associated with development projects. Like many other jurisdictions in California, the City of Redding has not yet adopted a policy or thresholds of significance regarding VMT so the Project-related VMT impacts were assessed based on guidance provided by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018, as well as how other agencies have chosen to assess schools.

   As a public charter school, the Project is a local-serving public facility intended to serve the existing population within the Redding area. Local-serving use cases typically redistribute trips within a region rather than generate new trips. The Project is not expected to increase the overall number of students in the region but will instead redistribute students to a different school location. Such redistribution is expected to have minimal effect on VMT at the regional level.
   Most students are expected to walk, bike, use the school van service, or rely on public transit to travel to and from the site. Approximately 20 percent of students (58 out of 290) will be part of an independent study program, reducing the number of students traveling to the campus on a regular basis. Only 20 students are expected to drive themselves, and up to 30 students will be dropped off/picked up by private vehicles. This results in a lower dependency on personal vehicles compared to a traditional high school. Moreover, several students are expected to live in the affordable housing development across Industrial Street, within walking distance of the site. This will further reduce VMT. Based on these characteristics, the traffic study concluded that the Project meets VMT screening criteria applied to local-serving public facilities and is thus presumed to have less-than-significant transportation-related impacts.

c) The Project site will be accessed via Industrial Street at an acceptable distance from the Industrial Street and Alfreda Way knuckle. These two collector streets are not expected to have high volumes or high speed traffic. Adequate sight distances and vision triangles are required by the City for every project. Furthermore, the site's use as a school is compatible with the neighborhood and residential zoning district. The Project would not introduce any sharp turns or dangerous intersections and would not substantially increase hazards due to a geometric design feature or incompatible use.

d) Access to the site would be provided via Industrial Street (with the new crossing conditioned with this Project) and Alfreda Way. Driveway widths and turning radii will be incorporated into the site layout in compliance with design requirements for emergency response vehicles. While the Project will slightly increase traffic delays at nearby intersections, emergency response vehicles can claim right-of-way using lights and sirens, ensuring minimal impact on response times. Nearby intersections would have adequate capacity for queuing to avoid blocking emergency access routes, even with the addition of Project traffic. Emergency access and circulation are anticipated to function acceptably with incorporation of applicable design standards into the site layout, and traffic from the proposed development would be expected to have a less-than-significant impact on emergency response times.

Documentation:
City of Redding General Plan 2045, Transportation Element, 2045
City of Redding Active Transportation Plan, 2018
Redding Area Bus Authority Short Range Transit Plan, January 2024
Transportation Impacts (SB 743), CEQA Guidelines Update and Technical Advisory, 2018
Transportation Impact Study for the California Heritage YouthBuild Academy, W-Trans, January 10, 2025

Mitigation:
None necessary.

XVIII. TRIBAL CULTURAL RESOURCES: *Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code 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:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or			**X**	
b) 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.			**X**	

Discussion:

a, b)A cultural resources inventory survey was prepared by the firm Genesis Society, dated September 19, 2024. As discussed under Item V (Cultural Resources), this report concludes that based on the absence of significant historical resources and/or unique archaeological resources within the site area, archaeological/cultural resources clearance is recommended or the Project as presently proposed.

This report consulted records at the Northeast Information Center (NEIC), which document that the area of the Project site had not been subjected to previous archaeological investigation and that no prehistoric or historic-era sites had been documented within the site location, nor within a 0.25-mile radius of the site. The field survey conducted by Genesis Society did not reveal any prehistoric or historic-era cultural resources at the site. Based upon archaeological reports, records searches, and information pertinent to the vicinity of the subject property, the report concluded that the Project site is not known to be in an area of archaeological or cultural resources.

Consultation was undertaken with the Native American Heritage Commission (NAHC) concerning sacred land listings for the property. An information request letter was delivered to the NAHC on August 18, 2024. The NAHC responded on August 22, 2024, indicating that a search of the Sacred Lands File had resulted in negative findings.

The Redding Rancheria, the Paskenta Band of Nomlaki Indians, and the Wintu Tribe of Northern California were noticed about this Project and the preparation of its associated initial study. The Paskenta Band of Nomlaki Indians requested consultation pursuant to Public Resources Code section 21080.3.1. The City responded in order to schedule a meeting for consultation and is still awaiting a response. Consultation is considered to be ongoing.

Documentation:
Cultural Resources Inventory Survey, Genesis Society, September 19, 2024.

Mitigation:
None necessary.

XIX. UTILITIES AND SERVICE SYSTEMS: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Require or result in the relocation or construction of new or expanded water or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?				**X**

XIX. UTILITIES AND SERVICE SYSTEMS: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?				**X**
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				**X**
d) Generate solid waste in excess of State or local standards, or infrastructure, or otherwise impair the attainment of solid waste reduction goals?				**X**
e) Comply with Federal, State, and local management and reduction statutes and regulations related to solid waste?				**X**

Discussion:

a) The proposed development does not generate the need for relocation or construction of new or expanded water or wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities.

b) Potable water is available from the City to serve the Project with adequate pressure and flows for fire suppression. The demands of the Project can be accommodated within the City's existing water resources. Sufficient water supplies are available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years.

c) The Project will utilize the City's sanitary sewer system to dispose of wastewater. Adequate sewer capacity and wastewater treatment are available in the City's existing system.

d) The Project would not generate solid waste in excess of State or local standards, or infrastructure, or otherwise impair the attainment of solid waste reduction goals. The City provides solid waste disposal (curbside pick-up) service, which the school would utilize. Adequate capacity is available to serve the needs of the Project without need of special accommodation.

e) The Project will comply with Federal, State, and local management and reduction statutes and regulations related to solid waste. The City regulates and operates programs that promote the proper disposal of toxic and hazardous materials from households, including those created by the Project.

Documentation:
City of Redding General Plan 2045, Public Facilities and Services Element, 2045
City of Redding Water and Sewer Atlas

Mitigation:
None necessary.

XX. WILDFIRE: *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Substantially impair an adopted emergency response plan or emergency evacuation Plan?				**X**

XX. WILDFIRE: *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:*	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose projects occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of wildfire?			**X**	
c) Require installation or maintenance of associated infrastructure (such as roads, fuel sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?			**X**	
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result, post-fire slope instability, or drainage changes?			**X**	

Discussion:

a) The Project is not located within a mapped very high fire severity zone nor within any fire hazard severity zone, according to the *General Plan Public Safety Element 2045*. It would not impair an emergency response plan or emergency evacuation plan. Construction of the Industrial Street crossing would aid in facilitating the emergency response to and evacuation of the area.

b) The Project is located on relatively flat terrain, outside of any fire hazard severity zone, and is surrounded by existing development. The Project would not exacerbate wildfire risks or expose Project occupants to pollutant concentrations from a wildfire.

c) The Project would not require the installation or maintenance of associated infrastructure that could exacerbate wildfire risks. The construction of the Industrial Street Crossing and Project frontage improvements represent a low fire risk as they are located in an urbanized area and would make use of existing power lines and utilities. The site is located in an area that is already adequately served by utilities and improvements. It does not require the installation of any additional off-site utilities or access roads though vegetated land or wildlands.

d) The Project is not in an area with 20 percent slopes and would not result in post-fire slope instability. Proper site drainage to storm drain infrastructure is proposed and required with development. Therefore, the Project would not expose people or structures to downstream flooding or landslides.

Documentation:
City of Redding General Plan 2045, Public Safety Element 2045

Mitigation:
None necessary.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE:	**Potentially Significant Impact**	**Less-Than-Significant with Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below the self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		**X**		

XXI. MANDATORY FINDINGS OF SIGNIFICANCE:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	
c) Does the project have potential environmental effects which may cause substantial adverse effects on human beings, either directly or indirectly?				X

Discussion:

Based on the analysis undertaken as part of this Initial Study, the following findings can be made:

a) If unmitigated, the Project has the potential to impact special-status species (Loggerhead shrike, Townsend's big-eared bat, pallid bat) as well as species of migratory birds and raptors. Mitigation Measures Bio-1 and Bio-2 are established to reduce potential impacts to less than significant. The Project has the potential to degrade wildlife habitat in general due to erosion and sedimentation resulting from grading and construction of Project infrastructure. However, the Project conditions as identified under *Hydrology/Water Quality* have been established to reduce potential impacts to a level less than significant.

b) As discussed in Item III, the Project will contribute to regionwide cumulative air quality impacts. However, under policy of the *General Plan*, application of Standard Mitigation Measures (SMMs) and Best Available Mitigation Measures (BAMMS) will reduce potential impacts from this Project to a level less than significant.

c) As discussed herein, the Project does not have characteristics which could cause substantial adverse effects on human beings, either directly or indirectly.

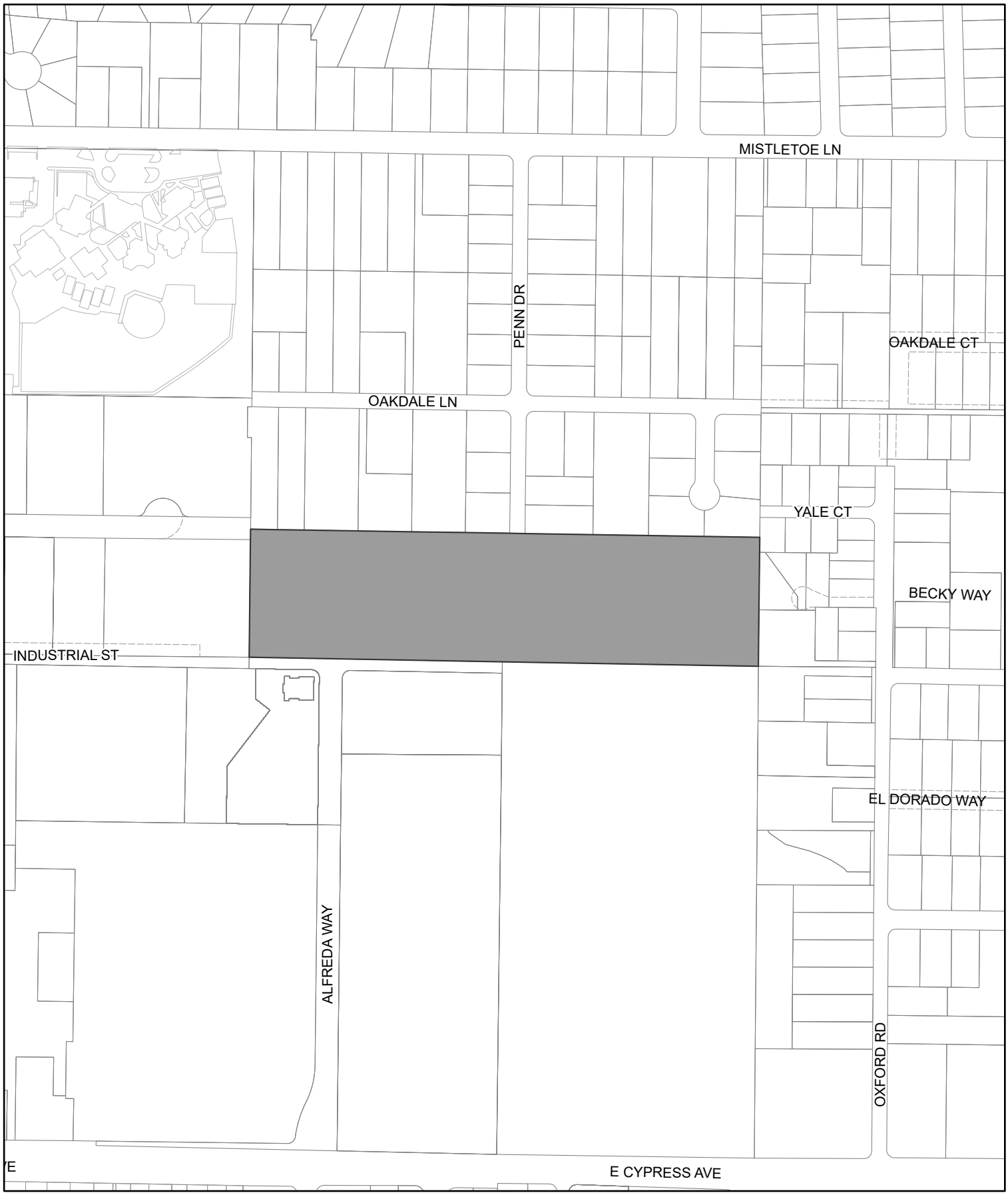
Mitigation:

Bio-1 Migratory Birds/Raptors: If feasible, vegetation removal and/or construction shall be conducted between September 1 and January 31. If vegetation removal and/or construction activities are to occur during the nesting season (February 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active nest is found, a non-disturbance buffer shall be established by a qualified biologist in coordination with CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If construction activities cease for a period greater than seven (7) days, additional preconstruction surveys will be required.

Bio-2 Bats: If vegetation removal and/or construction activities are to occur during the roosting season (March 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active roost is found, a non-disturbance buffer shall be established for a distance of five hundred feet (500') around the nest unless a smaller buffer zone is approved by CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If a lapse in construction activities of fourteen (14) days or more occurs during the roosting season, an additional roost survey is required to ensure no roosts were established in the area while construction was on hold. Minimum qualifications for a Qualified Biologist include a bachelor's degree in biological or environmental science, natural resources management, or related discipline; field experience in the habitat types that may occur at the project site; familiarity with the Covered Species (or closely related species) that may occur at the Project site; and prior preconstruction survey, construction monitoring, or construction oversight experience (if and as relevant to the activity to be conducted).

Attachment A

Figure 1 – Location Map
Figure 2 – Site Plan Package
Figure 3 – Planned Development Plan Booklet
(on file in the Development Services Department, Planning Division)



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GIS DIVISION
INFORMATION TECHNOLOGY DEPARTMENT

DATE PRODUCED:
FEBRUARY 18, 2025

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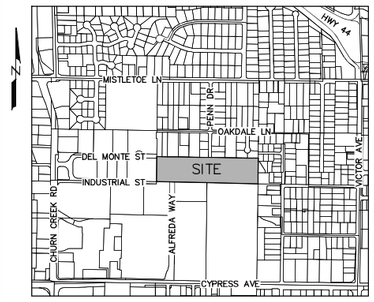
LOCATION MAP

PD-2025-00230
CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
1400 INDUSTRIAL ST
AP# 067-110-041

MTG. DATE:

ITEM:

ATTACHMENT:



SITE MAP
SCALE: NTS

OAKDALE LANE

DEL MONTE STREET

PENN DRIVE

KIMBER COURT

YALE COURT

BECKY WAY

DERBY LANE

INDUSTRIAL STREET

ALFREDA WAY

DETENTION

(E)CREEK

PROPOSED SCHOOL BUILDING
36,600± SF

ADJACENT LAND OWNERS

1. APN 067-120-040
ENTERPRISE ELEMENTARY SCHOOL DISTRICT
1220 DEL MONTE ST
REDDING CA 96002

2. APN 067-100-039
POPE ROARKE LEE
1261 OAKDALE LN
REDDING CA 96002

3. APN 067-100-002
RAY COREY & ALLYSON LIVING TRUST
1271 OAKDALE LN
REDDING CA 96002

4. APN 067-100-003
RAY COREY & ALLYSON LIV TRUST
1281 OAKDALE LN
REDDING CA 96002-0724

5. APN 067-100-004
OAKES REBEKAH J & AUBRY W
1321 OAKDALE LN
REDDING CA 96002

6. APN 067-100-005
SALIBA ERIC A
1309 OAKDALE LN
REDDING CA 96002

7. APN 067-100-006
OAKES AUBRY & REBEKAH
1345 OAKDALE LN
REDDING CA 96002

8. APN 067-100-007
PATE GREG M
1367 OAKDALE LN
REDDING CA 96002

9. APN 067-100-008
STEWARD FAMILY TRUST
2164 PENN DR
REDDING CA 96002

10. APN 067-100-009
BOSHELL JOHN
2182 PENN DR
REDDING CA 96002

11. APN 067-100-018
VALENCIA RAMON & GUADALUPE REV TRUST
2131 PENN DR
REDDING CA 96002

12. APN 067-100-019
GREGORY ROBERT G & MARGARET F FAM TRUST
2169 PENN DR
REDDING CA 96002

13. APN 067-100-015
ZOPOLOS ANDY & GINNY 2023 TRUST
2191 PENN DR
REDDING CA 96002

14. APN 067-100-017
PRIETO SALVADOR & PRIETO DERRICK
1399 OAKDALE LN
REDDING CA 96002

15. APN 067-100-011
MONK CHRISTINA MARIE HAMILTON
1431 OAKDALE LN
REDDING CA 96002

16. APN 067-100-041
JOHNSON ROCKY NOEL
1461 OAKDALE LN
REDDING CA 96002

17. APN 067-100-038
RUBIO MARISELA L & JOSE C
2144 KIMBER CT
REDDING CA 96002

18. APN 067-100-036
KOEHLER KENDRA
2188 KIMBER CT
REDDING CA 96002

19. APN 067-100-033
NEW HOPE HOUSING VENTURES LLC
2165 KIMBER CT
REDDING CA 96002

20. APN 067-100-040
LUKENS SPENCER W & CATALAN CRISTINA C
2139 KIMBER CT
REDDING CA 96002

21. APN 067-100-030
VUE GENE
1487 OAKDALE LN
REDDING CA 96002

22. APN 067-440-001
BICKETT DAROLD & DOROTHY 2000 TRUST
1511 OAKDALE LN
REDDING CA 96002

23. APN 067-440-002
VENABLE LOIS I
1531 OAKDALE LN
REDDING CA 96002

24. APN 067-440-003
LE ROUX TRUST 2017
1559 OAKDALE LN
REDDING CA 96002

25. APN 067-440-004
GOULD & GIOVANNI TRUST 2021
1573 OAKDALE LN
REDDING CA 96002

26. APN 067-440-012
SMITH CHERYL K
2122 OXFORD RD
REDDING CA 96002

27. APN 067-440-013
HOWARD DOROTHY & JERRY FAM TRUST
2148 OXFORD RD
REDDING CA 96002

28. APN 067-440-011
RODRIGUEZ JULIO
1572 YALE CT
REDDING CA 96002

29. APN 067-440-010
WARD ADAM F
1548 YALE CT
REDDING CA 96002

30. APN 067-440-009
LATEINER FAMILY TRUST 2021
1516 YALE CT
REDDING CA 96002

31. APN 067-440-017
NAKAO FAMILY TRUST
1511 YALE CT
REDDING CA 96002

32. APN 067-440-018
DAVIS BRADLEY JAMES
1545 YALE CT
REDDING CA 96002

33. APN 067-440-019
HARRIS KEITH C & ROBERTA E
1577 YALE CT
REDDING CA 96002

34. APN 067-440-020
GONZALEZ DEBRA
1583 YALE CT
REDDING CA 96002

35. APN 067-440-021
FERKEY MACKENZIE L
2154 OXFORD RD
REDDING CA 96002

36. APN 067-440-027
BOOTHE FAMILY TRUST
2176 OXFORD RD
REDDING CA 96002

37. APN 067-440-028
SCOTT AMBER N
1570 BECKY WAY
REDDING CA 96002

38. APN 067-440-026
ENGLUND TAMRA MARIE & SEAN ERIK ALBIN
1560 BECKY WAY
REDDING CA 96002

39. APN 067-440-025
ARCHULETA MARTIN J & MONIQUE N
1544 BECKY WAY
REDDING CA 96002

40. APN 067-440-024
BARD ANDRA
1530 BECKY WAY
REDDING CA 96002

41. APN 067-440-029
SWEENEY NATHAN & CATHRYN NATINA
2218 OXFORD RD
REDDING CA 96002

42. APN 067-440-030
ARATA DENNIS & LOUISE ANGELINA REV TRUST
1565 BECKY WAY
REDDING CA 96002-0404

43. APN 067-440-031
AMDAHL LAURA JEAN
2194 OXFORD RD
REDDING CA 96002

44. APN 067-440-032
MCDONALD DEREK
2210 OXFORD RD
REDDING CA 96002

45. APN 067-070-065
SMITH CHERYL K
2230 OXFORD RD
REDDING CA 96002

46. APN 067-070-064
SMITH CHERYL K
2244 OXFORD RD
REDDING CA 96002

47. APN 067-070-066
SMITH CHERYL K
2262 OXFORD RD
REDDING CA 96002

48. APN 067-070-003
RUSSELL REBEKAH SUE ETAL
2288 OXFORD RD
REDDING CA 96002

49. APN 067-070-002
BOLTON JOE L & BONNIE LOU FAMILY TRUST
2290 OXFORD RD
REDDING CA 96002

50. APN 067-070-004
HATCH SHAUN A & KAYLA L
2310 OXFORD RD
REDDING CA 96002

51. APN 067-110-042
REDDING MEMORIAL PARK INC
1420 E CYPRESS AVE
REDDING CA 96002

52. APN 067-110-062
CENTER OF HOPE APARTMENTS II, LP
1011 PARKVIEW AVE STE A
REDDING CA 96002

53. APN 067-110-057
NO CALIF CONF ASSN/7TH DAY ADVENTISTS
1356 E CYPRESS AVE
REDDING CA 96002

54. APN 067-110-062
CENTER OF HOPE APARTMENTS, LP
1011 PARKVIEW AVE STE A
REDDING CA 96002

55. APN 067-110-062
CENTER OF HOPE APARTMENTS, LP
1011 PARKVIEW AVE STE A
REDDING CA 96002

56. APN 067-110-059
THE CENTER OF HOPE
1201 INDUSTRIAL ST
REDDING CA 96002

57. APN 067-120-019
PRICE LAWRENCE & KATHLEEN FAMILY TRUST
1200 INDUSTRIAL ST
REDDING CA 96002

CLIENT:
CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
8544 AIRPORT ROAD
REDDING, CA 96002

OWNER:
CUSHMAN 2002 TRUST ET AL
358 HARTNELL AVENUE, STE A
REDDING, CA 96002

ENGINEER:
SHARRAH DUNLAP SAWYER, INC.
320 HARTNELL AVENUE
REDDING, CA 96002

SITE DATA

A.P.N.:	067-110-041
EXISTING ZONING:	RM-9-PD
EXISTING GENERAL PLAN:	RES 6 TO 10
EXISTING USE:	VACANT
PROPOSED USE:	SCHOOL CAMPUS
SITE AREA:	10.15 AC
AREA IN FLOOD PLAIN:	0.38 AC
NET PROJECT AREA:	9.77 AC
ELECTRICITY:	REDDING ELECTRIC UTILITY
WATER:	CITY OF REDDING
SEWER:	CITY OF REDDING
TELEPHONE:	AT&T

LEGEND

100-YEAR FLOOD PLAIN BOUNDARY

PALUSTRINE EMERGENT WETLAND

60 0 30 60
1 INCH = 60 FEET

CHYBA SCHOOL CAMPUS USE PERMIT SITE PLAN

FOR

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

BY

SHARRAH DUNLAP SAWYER, INC.
Civil Engineering • Land Planning • Surveying & Mapping
Landscape Architecture • Presentation Graphics
320 Hartnell Avenue, Redding, CA 96002
530.221.1792 voice • info@sdsengineering.com

DATE: SEPTEMBER 4, 2025 SCALE: 1"=60' SHEET 1 OF 6

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Login Name: amason
Plot Date: September 04, 2025 3:14 pm
AM

NOTE:
'SAFE ROUTES TO SCHOOL'
CONCRETE WALKWAY NOT
A PART OF THIS PROJECT

FUTURE WALKWAY

STORMWATER
DETENTION BASIN
BOTTOM: 561.0
TOP: 566.0

2:1 SLOPE

2:1 SLOPE

(E) CREEK

CHYBA OFFSITE IMPROVEMENTS
PER PREVIOUSLY APPROVED MND

4-CELL BOX CULVERT
(EACH CELL INCLUDES 10'X4' BOX)

15" SDP

RIM 554.42

RIM 554.42

10" SSP

10" SSP

TO SSP (565)

10" SSP

15" SDP S=0.010

30" SDP

30" RCP

24" SDP

(E) 24" SDP

(E) 8" SSP

SDP

LEGEND

SDP	PROPOSED STORM DRAIN PIPE
	EXISTING STORM DRAIN PIPE
	PROPOSED STORM DRAIN CATCH BASIN
	PROPOSED UNDER SIDEWALK DRAIN
	PROPOSED STORM DRAIN MANHOLE
1.5%	FLOW
663.50	FINISHED GRADE SURFACE ELEVATION
BSL	BUILDING SETBACK LINE
(E)	EXISTING
FG	FINISHED GRADE
FF	FINISHED FLOOR
FL	FLOWLINE
	100-YEAR FLOOD PLAIN BOUNDARY

N

30 0 15 30
1 INCH = 30 FEET

CHYBA SCHOOL CAMPUS
USE PERMIT
GRADING & DRAINAGE
PLAN – WEST

FOR

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

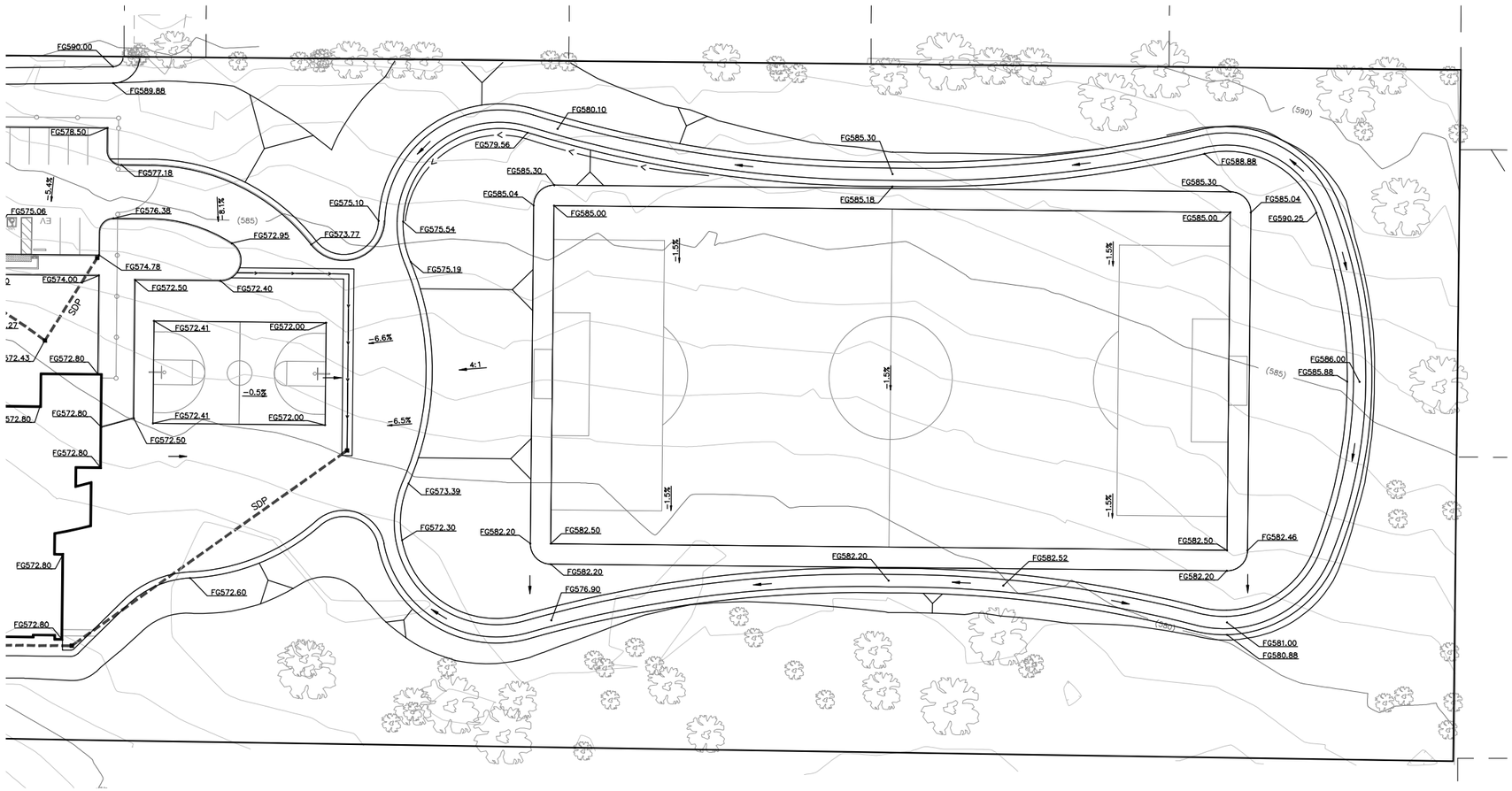
BY

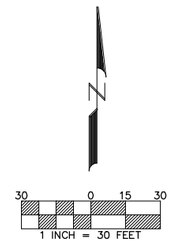
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Landscape Architecture • Presentation Graphics
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530.221.1792 voice • info@sdsengineering.com

DATE: SEPTEMBER 4, 2025 SCALE: 1"=30' SHEET 2 OF 6

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Login Name: amason
Plot Date: September 04, 2025 3:14 pm





CHYBA SCHOOL CAMPUS
USE PERMIT
GRADING & DRAINAGE
PLAN – EAST

FOR

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

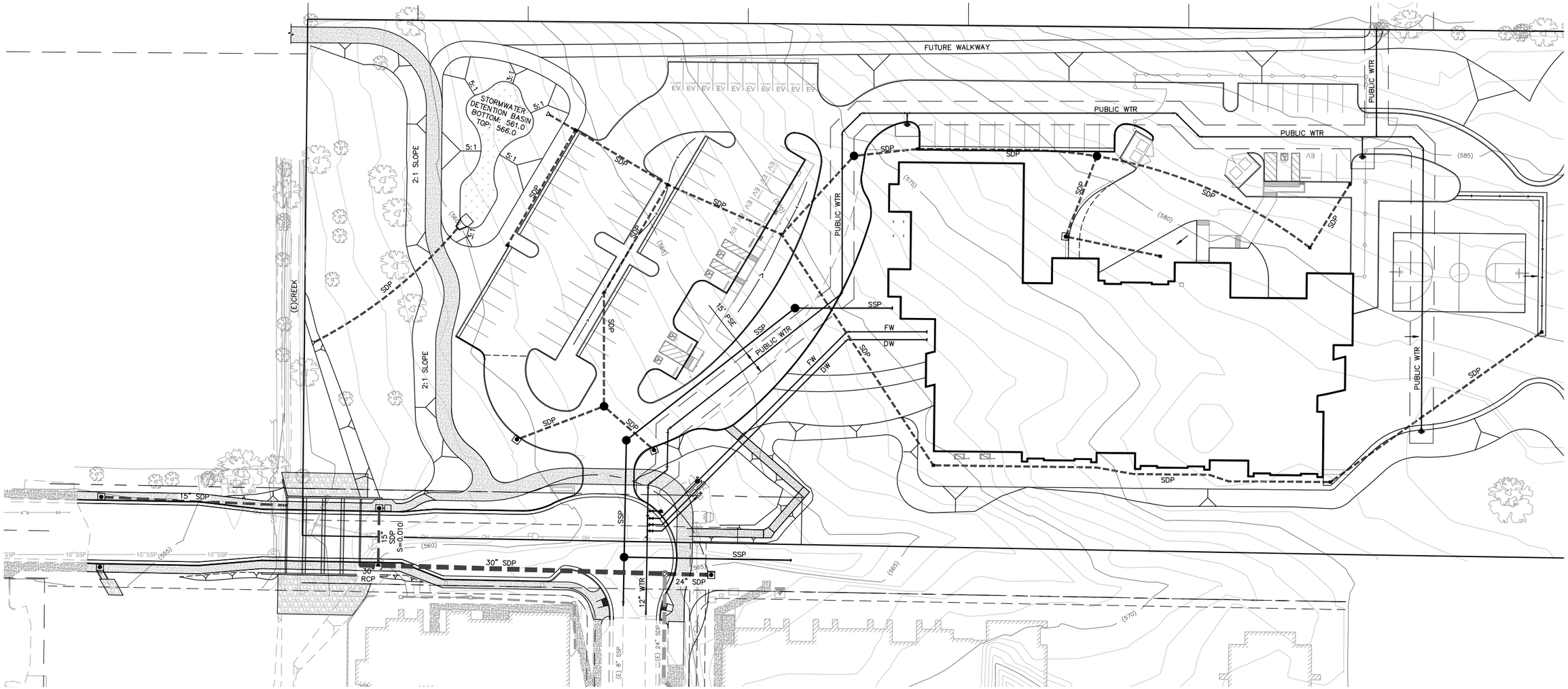
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DATE: SEPTEMBER 4, 2025 SCALE: 1"=30' SHEET 3 OF 6

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Plot Date: September 04, 2025 3:14 pm



LEGEND

EXISTING	PROPOSED	
	SDP	STORM DRAIN LINE
SSP	SSP	SANITARY SEWER LINE
W	DW	DOMESTIC WATER LINE
F	FW	FIRE LINE
	●	STORM DRAIN MANHOLE
Ⓢ	●	SANITARY SEWER MANHOLE
▣	▣	STORM DRAIN CATCH BASIN
▫	▪	STORM DRAIN AREA DRAIN
		FIRE HYDRANT
		FIRE DEPARTMENT CONNECTION RISER
		WATER VALVE
		WATER TEE
	FF	FINISHED FLOOR
	SDP	STORM DRAIN PIPE
	SSP	SANITARY SEWER PIPE
	W	WATER

N

30 0 15 30
1 INCH = 30 FEET

PRELIMINARY
CHYBA SCHOOL CAMPUS
USE PERMIT
UTILITY PLAN

FOR

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

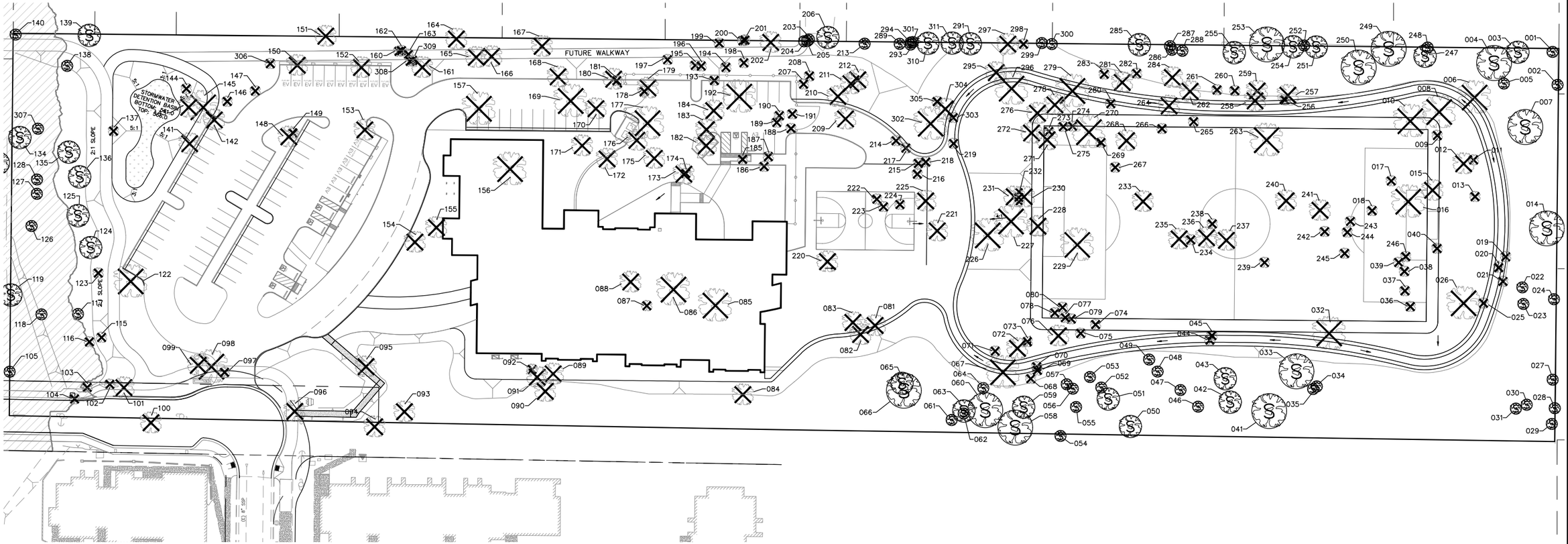
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DATE: SEPTEMBER 4, 2025 SCALE: 1"=30' SHEET 4 OF 6

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N

40 0 20 40

1 INCH = 40 FEET

TREE PRESERVATION PLAN

SITE DEVELOPMENT PERMIT

FOR

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

BY

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Landscape Architecture • Presentation Graphics
320 Hatchell Avenue, Redding, CA 96002
530.221.1792 voice/fax • info@sdsengineering.com

DATE: SEPTEMBER 4, 2025 SCALE: 1"=40' SHEET 5 OF 6

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Login Name: amason
Plot Date: September 04, 2025 3:14 pm

Attachment B

Biological Resource Assessment, prepared by Bole and Associates, September 20, 2024

Bole & Associates
An Environmental Consulting Firm

September 20, 2024

California Heritage Youthbuild Academy
Attn: Cathy Taylor
8544 Airport Road
Redding, CA 96001

BIOLOGICAL ASSESSMENT AND WETLAND DETERMINATION FOR SHASTA COUNTY APN A PORTION OF SHASTA COUNTY APN 067-110-041, LOCATED IN SECTION 5, TOWNSHIP 31 NORTH, RANGE 4 WEST, 1400 INDUSTRIAL STREET, REDDING, SHASTA COUNTY, CA 96002. BA FILE 0620-2024-2430.

INTRODUCTION

During August and September of 2024, a Biological Assessment was conducted on an approximately 10.15-acre parcel of undeveloped land located on the U.S. Geological Survey (USGS) Enterprise 7.5-minute topographic quadrangle Section 5, Township 31 North, Range 4 West (Enclosure B, Figure 1). Particular attention was focused on the project's potential impact on federal and state special-status plants and wildlife species and their habitats. Historically, the project area has been undeveloped land consisting of blue oak-foothill pine woodlands with a ruderal grass understory. Bole and Associates previously conducted foot surveys of the site in March of 2024 (see Site Photographs).

A records search was completed prior to field surveys of the United States Fish & Wildlife Service's *Federal Endangered and Threatened Species List* (IPaC, NEPA) for the Enterprise7 ½ minute quadrangle (Enclosure D). The USFWS document lists plants and wildlife that have Federal special species status. The IPaC database lists revealed several special status wildlife species with a potential to occur onsite. These species and their potential to use onsite habitats are discussed in Table 1.

Field studies were conducted on foot, making observations and noting habitat conditions, surrounding land uses, and plant and wildlife species. In accordance with guidance outlined in the United States Army Corps of Engineers' *1987 Wetlands Delineation Manual,* a wetland determination was conducted. Field surveys were conducted to determine the presence of sensitive species and/or suitable habitats for sensitive species (e.g., elderberry shrubs, riparian habitats, etc.). These surveys also included ocular reconnaissance of the entire study area and buffer zones for nesting (or burrowing) raptors and owls (*Strix occidentalis caurina).*

PROJECT DESCRIPTION:

California Heritage Youthbuild Academy proposes to develop the site to include a school building, asphalted parking areas, and sports/recreational fields, as shown on the Conceptual Site Map (see Enclosure B). The proposed action will involve grading and leveling portions of the site and may include the

removal of several oak and pine trees as part of the development process.
Construction is scheduled for the Spring of 2025. Work will be restricted to daylight hours only. Construction equipment will include backhoes, flatbed trucks, excavators, dump trucks, portable generators, air compressors, pumps, vibratory roller compactors, personal vehicles, power tools, and other equipment.

EXISTING SETTING

Habitat Description

The subject property is located in the foothills of the Sierra Nevada Mountain range. The site consists of relatively flat terrain. APN 067-110-041 consists of pine-oak woodland. The topography within the confines of the site consists of gently sloping terrain, with an elevation of approximately 580 feet at the eastern edge of the site, sloping to approximately 555 feet at the property's western boundary. According to Sawyer and Keeler-Wolf (1995), the vegetation series includes Oak-Pine Woodlands with a ruderal grass understory. Several large and small-diameter blue oak and gray pine were located throughout the site. A perennial drainage way runs north-south along the western boundary of the parcel; this feature is to be avoided via a 50-foot setback.

Oak-Foothill Pine Natural Community

The oak-foothill pine natural community is found within the project area. Foothill pines and interior live oak dominate these communities. Tree density can range from an open savanna with scattered trees to a closed-canopy forest. Other associated tree species include interior live oak, California buckeye, and valley oak. The understory consists primarily of annual grasses and forbs, sometimes with a shrub component. Due to the phenology of these grasses, they tend to dominate the landscape. Besides the brome, barley and ryegrass, other grasses included barbed goatgrass (*Aegilops triuncialis*). Non-native forbs found at the site were yellow starthistle (*Centaurea solstitialis*), filaree (*Erodium* spp.), and vetch (*Vicia* spp.). The shrub understory may include buckbrush, redberry, poison oak, silver bush lupine, and blue elderberry.

Wildlife Communities:

The oak-foothill pine natural community supports many common wildlife species, including the band-tailed pigeon, acorn woodpecker, western scrub-jay, oak titmouse, mule deer, bobcat, and striped skunk. Species observed in these habitats include American crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), western scrub jay (*Aphelocoma coerulescens*), turkey vulture (*Cathartes aura*), western meadowlark (*Sturnella neglecta*), black-tailed hare (*Lepus californicus*), coyote (*Canis latrans*), Botta's pocket gopher (*Thomomys bottae*) and the western fence lizard (*Sceloporus occidentalis*). Raptors observed include the black-shouldered kite (*Elanus caeruleus*), red-tailed hawk (*Buteo jamaicensis*), and the American kestrel (*Falco sparverius*).

Special Status Species:

The following discussion describes the plant and animal species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and may require specialized habitat conditions. Listed and special-status species are defined as one of the following:

- Listed or proposed for listing under the state or federal Endangered Species Acts.
- Protected under other regulations (e.g., Migratory Bird Treaty Act).
- California Department of Fish and Game (CDFG) Species of Special Concern.
- Receive consideration during environmental review under CEQA.

Special-status species were considered for this analysis based on field survey results, a review of the Federal Endangered and Threatened Species list for Shasta County, California Natural Diversity Database (CNDDB), CNPS literature, and database information provided by the U. S. Fish and Wildlife Service (IPaC Federal listed species database for Enterprise 7 ½ Minute Quad). Over ten hours of onsite surveys did not reveal the presence of special status wildlife or plant species or their specific micro-habitat.

Sensitive Habitats:

Sensitive habitats include those of special concern to resource agencies and those protected under NEPA, Section 1600 of the California Fish and Game Code, or Section 404 of the Clean Water Act. A biologist from Bole & Associates conducted over ten hours of field survey of the study area during August and September 2024. The project area was systematically surveyed to ensure total search coverage, with particular attention given to identifying those portions of the study area with the potential for supporting special-status species and sensitive habitats. No sensitive habitats were found within the footprint of the proposed development.

Determination of Waters of the United States

This determination intends to identify wetlands and "other waters of the United States" that are present within the Study Area that could fall under the regulatory jurisdiction of the U. S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. The *1987 Corps of Engineers Wetlands Delineation Manual* identifies several methodologies and combinations to make jurisdictional determinations. Bole & Associates has employed this study's Routine On-Site Determination methodology (as supplemented by the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region,* dated December 2006). The Routine On-Site Determination method uses a three-parameter approach (vegetation, soils, and hydrology) to identify and delineate the boundaries of jurisdictional wetlands. All three positive wetland parameters must be present to be considered a wetland. These parameters include (1) the dominance of wetland vegetation, (2) the presence of hydric soils, and (3) hydrologic conditions that result in periods of inundation or saturation on the surface from flooding or ponding. Further description of these parameters is provided below:

1) Vegetation. Wetland vegetation includes plants with physiological traits that allow them to grow and persist in soils subject to inundation and anaerobic soil conditions. Plant species are classified according to their probability of being associated with wetlands. Obligate (OBL) wetland plant species almost always occur in wetlands (more than 99 percent of the time), facultative wetland (FACW) plant species occur in wetlands most of the time (67 to 99 percent), and facultative (FAC) plant species have about an equal chance (33 to 66 percent) of occurring in wetlands as in uplands. This study considered vegetation to meet the vegetation criteria if more than 50% of the vegetative cover was FAC or wetter. A perennial drainage was noted running

north-south along the western boundary of the parcel; this feature contained cattails and other obligate wetland plants. Apart from this feature, no wetland vegetation was noted on the subject property. During our onsite evaluations, no other wetland habitats were found near or within the project site. There was no sign of vernal pools or vernal swales on the property.

2) Hydric Soils. Hydric soils are saturated, flooded, or ponded in the upper stratum long enough during the growing season to develop anaerobic conditions and favor the growth of wetland plants. Hydric soils include gleyed soils (soils with gray colors) or usually display indicators such as low chroma values, redoximorphic features, iron or manganese concretions, or a combination of these indicators. Low chroma values are generally defined as having a value of 2 or less using the Munsell Soil Notations (Munsell, 1994). For this study, the soil was considered to meet the hydric soil criteria for color if it had a chroma value of one or a chroma of two with redoximorphic features or if the soil exhibited iron or manganese concretions. Redoximorphic features (commonly referred to as mottles) are areas in the soils that have brighter (higher chroma) or grayer (lower chroma) colors than the soil matrix. Redoximorphic features result from the oxidation and reduction process under anaerobic conditions. Iron and manganese concretions form during the oxidation-reduction process when iron and manganese in suspension are sometimes segregated as oxides into concretions or soft masses. These accumulations are usually black or dark brown. Concretions 2 mm in diameter occur within 7.5 cm of the surface is evidence that the soil is saturated for long periods near the surface. Onsite soils were identified as Churn gravelly loam, 0 to 3 percent slopes; Red Bluff gravelly loam, 0 to 3 percent slopes; and Red Bluff gravelly loam, 3 to 8 percent slopes. These are well-drained soils; surface soils are moderately permeable. Except for the perennial drainage feature, onsite soils did not exhibit hydric indicators (see Enclosure C).

3) Hydrology. Wetlands by definition are seasonally inundated or saturated at or near the surface. In order for an area to have wetland hydrology, it has to be inundated or saturated for 5% of the growing season (approximately 12 days) (USDA, 1967). Indicators include visual soil saturation, flooding, watermarks, drainage patterns, encrusted sediment and plant deposits, cryptogrammic lichens, and algal mats. Apart from the perennial drainage feature, no hydrologic indicators were noted onsite.

Wetland Determination Results

Using the methodologies described in the *1987 Wetland Delineation Manual*, Bole & Associates found one wetland feature associated with the perennial drainage way running north-south along the east side of APN 067-120-019, immediately adjacent to the 10.15-acre parcel. This feature will be avoided with a 50-foot setback and will not be impacted during the proposed site development.

POTENTIAL PROJECT IMPACTS

Site development, as proposed, will not impact listed federal or state plants or wildlife species. Impacts on typical vegetation and wildlife habitats are as follows:

Common Vegetation and Wildlife Habitats:

Project implementation may result in unanticipated impacts on wildlife habitat.

Project implementation will result in alterations (removal) of ruderal grasslands and pine and oak trees. These habitats are regionally widespread, and the common wildlife species utilizing these habitats would likely be displaced to adjacent offsite habitats and, therefore, not adversely affected by the project. The development of this site will not interfere with the movement of any native resident or migratory fish or wildlife species or result in impacts to established native resident or migratory wildlife corridors. The project will not affect the use of native wildlife nursery sites.

Special-Status Species:

This analysis considered special-status species based on field survey results, a review of the California Natural Diversity Database (CNDDB), the United States Fish & Wildlife Service's IPaC species list, and CNPS literature. Based on the subject property's specific habitat characteristics, no plant or wildlife species will be impacted by this project.

Table 1: Status of Species

Common Name *(Scientific Name)*	**Federal Listing Status**	**Critical Habitat Status & General Habitat Description**	**Determination of Effects**
INVERTEBRATES			
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	Threatened	Critical Habitat: Final designated August 8, 1980. None within the action area. Habitat Description: Blue elderberry shrubs are usually associated with riparian areas.	No blue elderberry shrubs were observed within 1000 feet of the action area. **No effects.**
CRUSTACEANS			
Conservancy fairy shrimp *(Branchinecta*	Endangered	Critical Habitat: Final designated September 19, 1994. None within the action area. Habitat	No suitable habitat exists within or near the action area, and none

Common Name *(Scientific Name)*	**Federal Listing Status**	**Critical Habitat Status & General Habitat Description**	**Determination of Effects**
conservatio)		Description: Inhabit astatic pools located in swales formed by old, braided alluvium.	observed. **No effects**
Vernal Pool fairy shrimp (*Branchinecta lynchi)*	Threatened	Critical Habitat: Final designated September 19, 1994. None within the action area. Habitat Description: Inhabit small, clear-water pools and grassed swales.	No suitable habitat exists within or near the action area, and none has been observed. **No effects**
Vernal Pool Tadpole shrimp (*Lepidurus packardi)*	Endangered	Critical Habitat: Final designated September 19, 1994. None within the action area. Habitat Description: Pools commonly found in grass-bottomed swales of unplowed grasslands.	No suitable habitat exists within or near the action area, and none has been observed. **No effects**
FISHES			
Delta Smelt *(Hypomesus transpacificus)*	Threatened	Critical Habitat: Final designated December 19, 1994. None within the action area. Habitat Description: Sacramento-San Joaquin Delta, most often salinities <2ppt.	No rivers or streams are within the project area, and none are observed. **No effects**
Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha)*	Threatened	NOAA Critical Habitat designation for seven Evolutionarily Significant Units (ESUs) of Salmon & Steelhead, September 2, 2005: Habitat Description: Sacramento River and its tributaries.	No rivers or streams are within the project area, and none are observed. **No effects**
Sacramento River winter-run Chinook salmon *(Oncorhynchus tshawytscha)*	Endangered	NOAA Critical Habitat designation for seven Evolutionarily Significant Units (ESUs) of Salmon & Steelhead, September 2, 2005: Habitat Description: Sacramento River.	No rivers or streams are within the project area, and none are observed. **No effects**
AMPHIBIANS AND REPTILES			
California Red-legged Frog *(Rana draytonii)*	Threatened	Critical Habitat: Final designated May 23, 1996. Habitat Description: In or near deep water sources with dense, shrubby, or emergent riparian vegetation. Must have access to estivation habitat.	No suitable habitat within or near the action area, none observed. **No effects**
BIRDS			
Northern Spotted Owl *(Strix occidentalis*	Threatened	Critical Habitat: Final designated December 4, 2012. Habitat Description: Old growth	There is no suitable habitat within or near the action area, and none

Common Name *(Scientific Name)*	**Federal Listing Status**	**Critical Habitat Status & General Habitat Description**	**Determination of Effects**
caurina)		forests or mixed stands of old-growth and mature trees. It prefers a high, multistory canopy dominated by big trees, with many trees with cavities.	observed. **No effects**
PLANTS			
Slender Orcutt Grass (*Orcuttia tenuis*)	Threatened	Critical Habitat: Final Designated February 10, 2006. Habitat Description: Vernal pools, often with gravelly substrate.	There are no vernal pools within or near the action area, and none were observed. **No effects**

Other Raptors and Migratory Birds:

Raptor species, including the red-tailed hawk and barn owl forage within the ruderal non-native grasslands (onsite). Native and non-native trees within the site are too small to provide nesting habitat for these species, and no nests have been observed to date.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*):

The valley elderberry longhorn beetle (VELB) is a federally listed threatened species. This species inhabits elderberry (Sambucus sp.) shrubs and trees associated with riparian habitats throughout the Central Valley and foothill regions of California. Botanical evaluations did not reveal the presence of elderberry shrubs within the boundaries of the subject property.

Central Valley Vernal Pools:

Central Valley vernal pools provide habitat for several species of fairy shrimp (federal-listed threatened and endangered) and sensitive plant species native to California.
The California Department of Fish and Game's Natural Diversity Data Base does not identify suitable habitat for vernal pools or swales within 25 miles of the subject property, and no evidence of onsite vernal pooling was revealed during on-site surveys.

FINDINGS AND RECOMMENDATIONS

Findings:

Known potential biological constraints for the project site include:

1) No potential biological constraints were identified for this site. The site does not support sensitive habitats associated with special-status plants or wildlife species. There are no wetlands or riparian habitats within the proposed footprint of the development.

Recommendations:

1) Regarding California Department of Fish & Game requirements, pre-construction surveys for nesting raptors should be conducted on trees within 500 feet of the subject property if construction occurs between March 1 and September 15. These surveys should be accomplished no later than seven days before the commencement of grading activities.

Implementing the above mitigation measure would ensure the reduction of impacts to a less than significant level.

2) Impacts to the perennial drainage feature will be avoided via a 50-foot setback. No impacts to this feature are anticipated.

Implementing the above mitigation measure would ensure the reduction of impacts to a less than significant level.

This concludes our biological evaluation of the California Heritage Youthbuild Academy development project, involving an approximately 10.15-acre parcel of land (Shasta County APN 067-110-041) located on the U.S. Geological Survey (USGS) Enterprise 7.5-minute topographic quadrangle (Section 5, Township 31 North, Range 4 West). The property is located at 1400 Industrial Street in Redding, CA 96002.

If you have any questions concerning our findings, please feel free to contact me directly at Bole & Associates, Attn: David Bole, 6898 Penny Way, Browns Valley, CA 95918, phone 530-415- 6623, fax 530-633-0119, email: davidhbole@yahoo.com. For a complete copy of the Statement of Qualifications of the staff members conducting this evaluation, please visit our website at mhbole.com.

Respectfully Submitted:



David H. Bole, Principal
Environmental Scientist
Senior Wildlife Biologist

REFERENCES

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LIST OF ENCLOSURES

ENCLOSURE A: SITE PHOTOS

ENCLOSURE B: SITE MAPS AND AERIAL PHOTOS

ENCLOSURE C: SOIL INFORMATION

ENCLOSURE D: FEDERAL SPECIES LISTS AND DATABASES

ENCLOSURE A: SITE PHOTOS









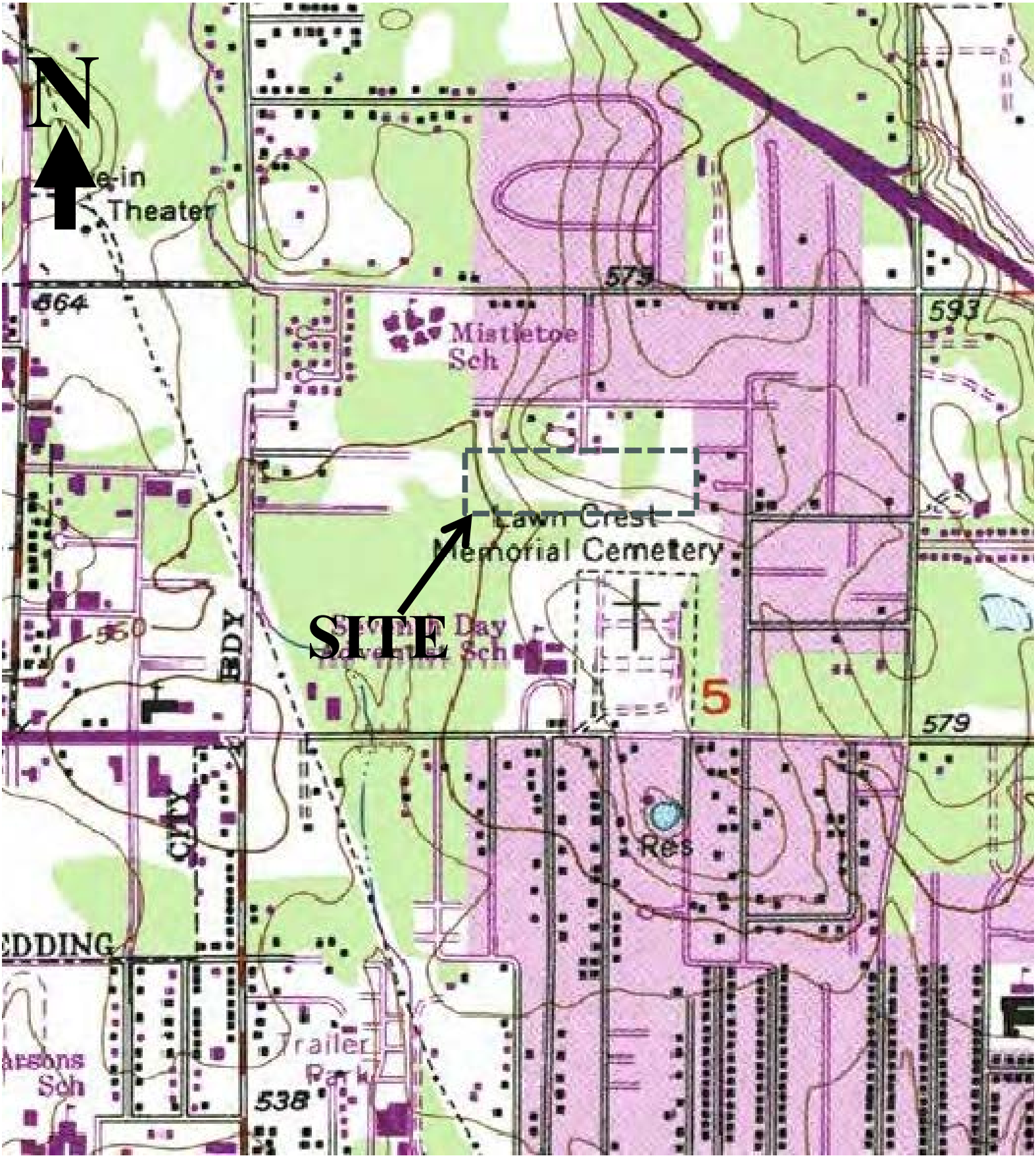




BOLE & ASSOCIATES
6898 Penny Way, Browns Valley, CA 95918
(530) 415-6623, email: davidhbole@yahoo.com

SITE: 1400 INDUSTRIAL STREET
ITEM: SITE PHOTOGRAPHS
PLATE: 1

ENCLOSURE B: SITE MAPS AND AERIAL PHOTOS



Site Location Map: APN 067-110-040, 1400 Industrial Street, Redding, Shasta County, CA 96002. Section 5, Township 31 North, Range 4 West, Enterprise (1969) USGS Quadrangle.

Figure 1



<u>Vicinity Map</u>: 1400 Industrial Street, Redding, Shasta County, CA 96002. Site is shown surrounded by single-family residences, undeveloped land, a cemetery, a school, apartments, and a plumbing/HVAC supply store.

Figure 2

DEL MONTE STREET

PENN DRIVE

60 PARKING SPACES

8 SECURE/ COVERED PARKING SPACES

CONTROLLED ACCESS

CONTROLLED ACCESS

FIRE ACCESS ONLY

CLEAR DROP-OFF

NEW HIGH SCHOOL

CONTROLLED ACCESS GATE

FIRE ACCESS ONLY

INDUSTRIAL STREET

ALFREDA WAY



HIGH SCHOOL CAMPUS

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

NORTH

CONCEPTUAL SITE PLAN

SCALE: 1" = 50'-0"

0' 15' 30' 60' 120'


INQUIRY #: 5920771.11
YEAR: 2016
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 2009
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 2006
= 500'
N
EDR

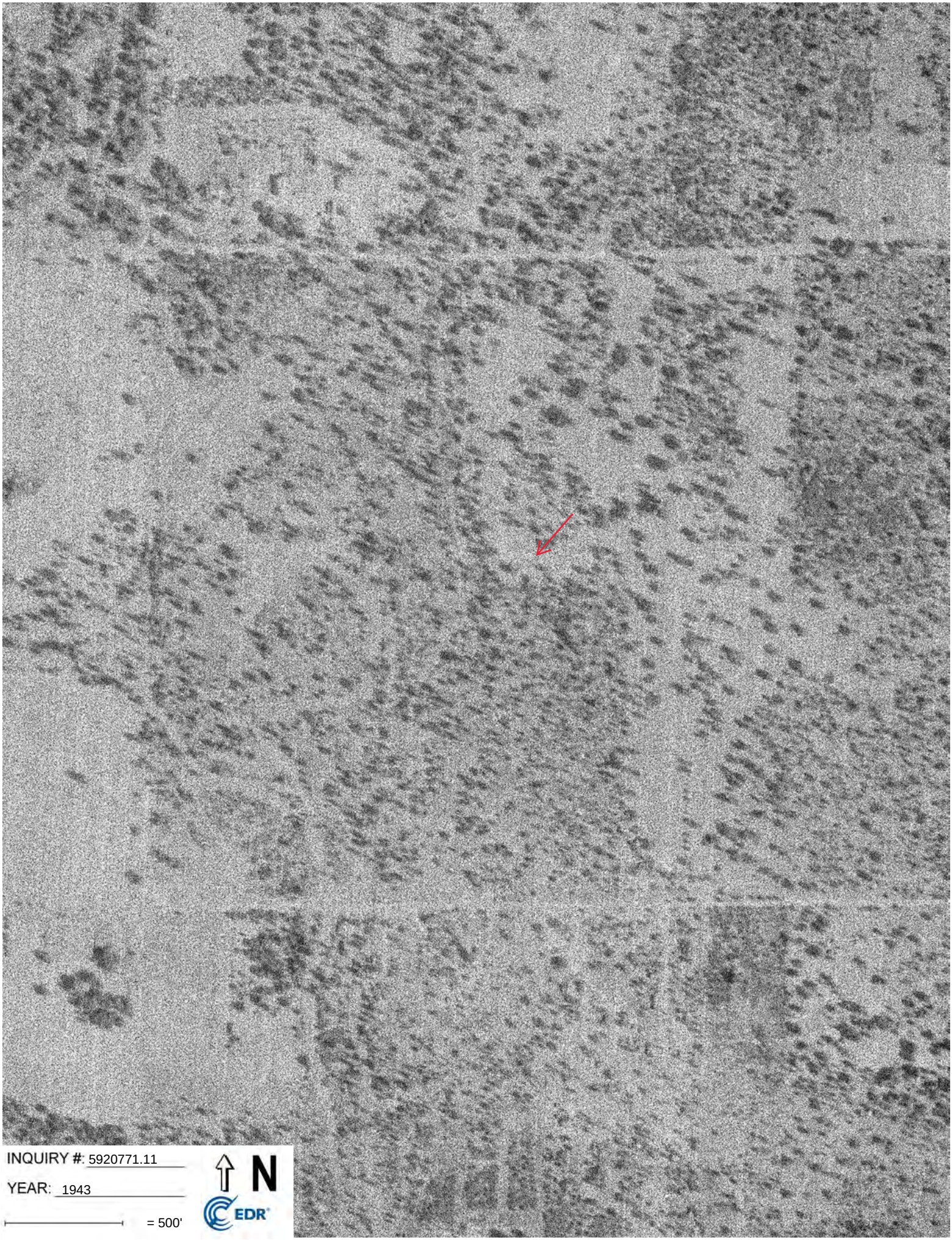

INQUIRY #: 5920771.11
YEAR: 1998
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 1983
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 1973
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 1969
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 1952
= 500'
N
EDR


INQUIRY #: 5920771.11
YEAR: 1943
= 500'
N
EDR

ENCLOSURE C: SOIL DATA

Soil Map—Shasta County Area, California
(1400 Industrial Street Soils Map)



Map Scale: 1:2,250 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Shasta County Area, California
Survey Area Data: Version 19, Aug 28, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 8, 2019—Jun 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CfA	Churn gravelly loam, deep, 0 to 3 percent slopes	0.6	5.8%
RbA	Red Bluff loam, 0 to 3 percent slopes, MLRA 17, moist	3.1	28.8%
RcB	Red Bluff gravelly loam, moderately deep, 3 to 8 percent slopes	7.1	65.3%
Totals for Area of Interest		**10.8**	**100.0%**

ENCLOSURE D: USFWS SPECIAL STATUS SPECIES LIST AND CDFG CNDDB SPECIES TABLE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:
Project Code: 2024-0146682
Project Name: California Youthbuild Academy

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

PROJECT SUMMARY

Project Code: 2024-0146682
Project Name: California Youthbuild Academy
Project Type: Commercial Development
Project Description: California Youthbuild Academy proposes to construct a school campus on the property, with multiple buildings and asphalted parking areas.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@40.5751536,-122.34603527499999,14z



Counties: Shasta County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

BIRDS

NAME	STATUS
Northern Spotted Owl *Strix occidentalis caurina* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1123	Threatened

REPTILES

NAME	STATUS
Northwestern Pond Turtle *Actinemys marmorata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

AMPHIBIANS

NAME	STATUS
Western Spadefoot *Spea hammondii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5425	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

CRUSTACEANS

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

FLOWERING PLANTS

NAME	STATUS
Slender Orcutt Grass *Orcuttia tenuis*	Threatened

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/1063

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: David Bole
Address: 6898 Penny Way
City: Browns Valley
State: CA
Zip: 95918
Email davidhbole@yahoo.com
Phone: 5304156623

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Enterprise (4012253))
 AND Federal Listing Status IS (Endangered OR Endangered OR Threatened OR Threatened) AND State Listing Status IS (Endangered OR Endangered OR Threatened OR Threatened)

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Oncorhynchus tshawytscha pop. 11	G5T2Q	Threatened	AFS_TH-Threatened	465	13	0	0	0	0	0	1	1	0	1	0	0
chinook salmon - Central Valley spring-run ESU	S2	Threatened		465	S:1											
Oncorhynchus tshawytscha pop. 7	G5T1Q	Endangered	AFS_EN-Endangered	280	2	0	0	0	0	0	1	1	0	1	0	0
chinook salmon - Sacramento River winter-run ESU	S2	Endangered		280	S:1											
Orcuttia tenuis	G2	Threatened	Rare Plant Rank - 1B.1 SB_UCBG-UC Botanical Garden at Berkeley	480	100	2	0	2	1	1	1	4	3	6	1	0
slender Orcutt grass	S2	Endangered		560	S:7											

Attachment C

Tree Inventory for CHYBA Campus, Gallaway Enterprises, September 16, 2024

gallaway
ENTERPRISES

117 Meyers Street • Suite 120 • Chico CA 95928 • 530-332-9909

September 16, 2024

Client:
Cathy Taylor
Executive Director
California Heritage YouthBuild Academy
2150 Churn Creek Rd.
Redding, Ca 96002

Representative:
Nicole Dues
Sharrah Dunlap Sawyer, Inc.
320 Hartnell Avenue, Redding, Ca 96002
530.221.1792

Re: Tree Inventory for CHYBA Campus (APN 067-110-041)

Ms. Taylor,

As requested, Gallaway Enterprises conducted a Tree Inventory for the approximately 10-acre parcel in the City of Redding, California (Project) site on August 26th and 27th, 2024. Please find enclosed a summary of the results of the inventory conducted.

Project Location and Environmental Setting

The Project site is located in the City of Redding, California, with Oakdale Lane on the north and Cypress Ave. on the south. The Project site is composed of one parcel, Assessor Parcel Number 067-110-041. The site falls within the "Enterprise" 7.5-minute United States Geological Survey (USGS) quadrangle, Section 5, Township 31N, Range 4W; latitude 40.575046, longitude –122.345796 The land within the Project site is a barren site with native trees and indications of vehicle traffic. The site is comprised of grasslands with patches of oak trees, and pines.

Regulatory Framework

City of Redding

The Project site is located within the City of Redding and, therefore, requires compliance with the Redding Zoning Ordinance. Pursuant to Chapter 18.45 of the Redding Zoning Ordinance, removal of any tree exceeding 6 inches in DBH requires a tree removal permit. The provisions for tree removal are described in Section 18.45.060 of the Zoning Ordinance.

Survey Method

The tree inventory was conducted on August 26th and 27th by Botanist Cheryl Ballantyne. This tree inventory involved documenting all trees with a DBH of 6 inches or greater. Trees present within the Project site that had any one co-dominant trunk with a DBH of 6 inches or greater were identified to the species level, the DBH was measured, and their locations were defined by survey information provided by SDS Engineering and, where needed, augmented using a Trimble Geo Explorer 6000 Series GPS Receiver.

Gallaway Enterprises then conducted a health assessment for all the trees identified. A level 2 basic visual assessment (per ISA's ANSI A300 Part 9 and companion BMP guidelines) of each tree was conducted from the ground by walking completely around the tree and looking at the growing site, trunk, trunk collar, and branches.

Following this visual assessment, each inventoried tree was assigned a health rating of 0 to 5, with 0 being a standing dead tree, 1 being a tree with poor health and 5 being a tree in excellent health. The ratings were based on the following standards:

0: These trees are considered dead.

1: These trees have a major defect that could result in instability of the tree or a portion of the tree failing that could be considered a hazard. The defect is typically extensive dead and/or decay.

2: These are generally sound trees but often have prominent leans, trunk elongation from competition with other trees, or general branching defects. Other potential health detractors include excessive deadwood or decay in the branches or overgrowth by vines.

3: These are average trees; they are generally in good health and without prominent defects in their branching pattern and overall structure. These trees also have adequate growing room and are not overgrown with vines (e.g. mistletoe, ivy, grape, blackberry).

4: These trees are above average, with good branch form. The trees are not overcrowded or light-starved and have plenty of room to grow. These trees often look much like a "3" except they are larger, older, and better established in the tree stand.

5: These trees are considered excellent in all aspects: form, branching, and structure.

Results of the Survey

Blue oaks (*Quercus douglasii*) were the dominant tree (173) throughout the site. Gray Pine (*Pinus Sabiana*) constitutes the majority (111) of the rest of the species, with seven (7) Interior live oak *(Quercus wislizeni)*, two (2) Black oaks (*Quercus kelloggii*) and one (1) Catalpa (Catalpa sp.). The location of all of the inventoried trees within the Project site is depicted in **Attachment A**. A total of 294 trees were surveyed within the Project site (**Attachment B**). The average DBH of trees within the Project site is 14.1 inches and the average health of the trees inventoried was 2.3.

A table listing each tree surveyed within the Project site and its assessed health rating is provided in **Attachment B**. Photos documenting representative samples of trees on the site are provided as **Attachment C**.

A level 2 basic visual assessment from ground level was conducted; however, visual signs of decline may not have been outwardly evident or evident from the ground surface. As such, the accuracy of the heath rating is limited by the visual appearance of the trees at the time of the survey. A Qualified Professional's Disclaimer Statement is provided as **Attachment D**.

Recommendations

It is recommended that as many healthy native tree species (trees with a health rating of 3 or greater, **Attachment B**) as feasible, based on the proposed Project goals, be retained within the Project site due to their aesthetics and usefulness to wildlife.

The removal of any City regulated trees (heritage trees and native oaks with a single trunk 6 inches or greater or multiple trunks 10 inches in aggregate or greater in DBH) on the Project site must be in compliance with the City's zoning ordinance. City regulated trees present within the Project site include the inventoried blue oak trees. If regulated trees are proposed to be removed on the site, a tree removal permit will be required to be obtained from the city. Mitigation for removal of trees will be determined through consultation with the city.

If any of the trees present within the Project site are proposed for preservation, care should be taken to implement the avoidance and minimization measures outlined in the City of Redding's *Trees & Construction: A Guide to Preservation*. If construction activities or soil compaction occur within the dripline of a tree proposed for preservation, these activities may harm the tree to the point of failure. Preserved trees in close proximity to structures or walkways should be regularly monitored by a qualified arborist following construction activities for signs of stress or failure and properly managed (e.g. pruning dead branches, ensuring appropriate water regime for the species).

Should you have any questions or need any additional information on managing trees during construction, please do not hesitate to contact Kevin Sevier at (530) 332-9909 or kevin@gallawayenterprises.com.

Sincerely,

Cheryl Ballantyne

Cheryl Ballantyne, Botanist
Gallaway Enterprises

Attachment A: Tree Inventory Map
Attachment B: Tree Inventory Data Table
Attachment C: Project Site Photos
Attachment D: Qualified professional's Disclaimer
Attachment E: Surveyor's Resume

Attachment A

Tree Inventory Map



1:1,800 1 inch = 150 feet

0 100 200 Feet

NORTH

Data Sources: ESRI, Maxar 09/18/2021, SDS Eng.

CHYBA Tree Inventory

gallaway ENTERPRISES

GE: #24-074 Map Date: 9/9/2024

Attachment B

Tree Inventory Data Table

ID	Species	DBH	Health (0-5)	Comments
1	Blue Oak	9	2	Leaning onto neighbor
2	Blue Oak	9	3	Good structure, some overhang
3	Interior Oak	10	3	good structure
4	Gray Pine	44	2	Forked, 3 leaders, lower branches dying back
5	Blue Oak	8	2	Lean
6	Gray Pine	38	2	3 leaders, lower branches dying back
7	Gray Pine	34	4	Good structure
8	Gray Pine	34	2	Forked, 4 leaders, lower branches dying back
9	Blue Oak	9	2	Lean, poor structure
10	Gray Pine	27	2	Lean, double leader
11	Blue Oak	7	3	Good structure
12	Gray Pine	14	3	Good structure
13	Gray Pine	12	3	Slight lean, good structure
14	Blue Oak	27	4	Good structure, canopy
15	Gray Pine	14	3	Good structure
16	Blue Oak	26	2	Forked, 4 stems, lower branches dying back
17	Blue Oak	7	3	Good structure
18	Blue Oak	8	3	Ok structure, canopy
19	Blue Oak	6	3	Ok structure, canopy
20	Blue Oak	8	3	Ok structure, canopy
21	Blue Oak	7	2	Poor structure, dying branches
22	Blue Oak	9	3	Good structure
23	Blue Oak	10	3	Good structure
24	Blue Oak	12	3	Good structure
25	Gray Pine	10	3	Slight lean, good structure
26	Blue Oak	27	2	Leaning, broken limbs
27	Blue Oak	9	2	Good structure, lower limbs dying
28	Blue Oak	10	2	Good structure, on fence
29	Blue Oak	9	2	Poor structure
30	Blue Oak	10	3	Good structure
31	Blue Oak	10	3	Slight lean, good structure
32	Blue Oak	27	3	Good structure, some lower branches dying back
33	Blue Oak	27	4	Good structure, forked
34	Gray Pine	12	2	Leaning
35	Gray Pine	12	2	Leaning
36	Blue Oak	7	3	Good structure
37	Blue Oak	7	3	Good structure
38	Gray Pine	8	3	Slight lean
39	Blue Oak	10	2	Forked, good structure
40	Blue Oak	6	3	Good structure

ID	Species	DBH	Health (0-5)	Comments
41	Blue Oak	38	2	Poor structure
42	Blue Oak	18	0	DEAD
43	Gray Pine	22	2	Burn scar, forked
44	Blue Oak	10	1	FORKED,DEAD
45	Gray Pine	9	3	Good structure
46	Gray Pine	9	3	slight lean
47	Blue Oak	8	2	Poor structure
48	Blue Oak	10	0	Dead
49	Blue Oak	10	2	Lower branches dead
50	Gray Pine	19	2	Forked, lead, poor structure
51	Gray Pine	22	0	Dead
52	Gray Pine	11	1	Poor structure, heavy lean
53	Gray Pine	12	3	Slight lean, good structure
54	Gray Pine	9	2	Good structure, lower branches dying back.
55	Gray Pine	7	0	Dead
56	Gray Pine	15	2	Lower branches dead
57	Gray Pine	15	3	Good structure
58	Gray Pine	25	2	Poor structure, lower branches dead
59	Gray Pine	20	2	Forked, lower branches dead
60	Gray Pine	25	2	Forked, lower branches dead
61	Gray Pine	9	2	Leaning
62	Gray Pine	9	2	Leaning
63	Gray Pine	22	3	Good structure
64	Gray Pine	10	2	Poor structure, leaning
65	Blue Oak	34	2	Poor structure
66	Blue Oak	14	2	Poor structure, leaning
67	Gray Pine	27	2	Forked, poor structure
68	Gray Pine	10	2	Leaning, burn scar
69	Gray Pine	10	2	Burn scar
70	Gray Pine	7	2	Slight lean, burn scar
71	Gray Pine	12	3	Slight lean
72	Gray Pine	11	3	Leaning slightly
73	Gray Pine	8	2	Leaning
74	Gray Pine	8	1	Leaning, burn scar
75	Gray Pine	10	2	Good structure, burn scar
76	Gray Pine	16	2	Forked top, ok structure
77	Gray Pine	10	2	Leaning, burn scar
78	Blue Oak	7	2	Poor structure, leaning
79	Gray Pine	10	2	Forked, burn scar
80	Gray Pine	12	2	Leaning, burn scar

ID	Species	DBH	Health (0-5)	Comments
81	Blue Oak	14	0	Dead
82	Blue Oak	15	0	Dead
83	Blue Oak	23	4	Good structure
84	Blue Oak	19	4	Good structure
85	Blue Oak	27	4	Good structure
86	Blue Oak	25	2	Lower branches dead
87	Gray Pine	12	3	Good structure
88	Blue Oak	22	2	Lower branches dead
89	Blue Oak	14	3	Forked, good structure
90	Blue Oak	13	2	Leaning
91	Blue Oak	16	2	Lower branches dead
92	Blue Oak	12	0	Dead
93	Blue Oak	22	2	Lower branches dead
94	Blue Oak	16	3	Good structure
95	Blue Oak	21	4	Good structure
96	Blue Oak	20	2	Poor structure, leaning toward power pole
97	Gray Pine	6	1	Lean, dead top
98	Blue Oak	24	3	Slight lean
99	Blue Oak	16	2	Leaning, crowded
100	Blue Oak	13	2	One sided, trimmed for power line
101	Blue Oak	19	3	Good structure
102	Blue Oak	9	2	Lean, competition
103	Blue Oak	12	3	Good structure
104	Blue Oak	12	2	Leaning, vines
105	Blue Oak	11	2	Forked, merged trunk
115	Gray Pine	9	2	Heavy lean
116	Blue Oak	12	3	Good structure
117	Blue Oak	9	2	Slight lean, good structure
118	Gray Pine	11	3	Good structure
119	Catalpa	11	2	Broken limb
122	Blue Oak	26	4	Forked, good structure
123	Gray Pine	9	2	Lean
124	Blue Oak	21	4	Good structure
125	Blue Oak	21	2	Forked, 1/2 pruned off
126	Blue Oak	10	3	Good structure
127	Gray Pine	9	2	Forked, lean
128	Gray Pine	10	2	Forked, lean
134	Gray Pine	21	2	Forked, lean
135	Blue Oak	18	4	Good structure
136	Blue Oak	15	2	Lean, good structure

ID	Species	DBH	Health (0-5)	Comments
137	Gray Pine	11	3	Good structure
138	Blue Oak	6	3	Good structure
139	Gray Pine	14	1	Lean, lower branches dead, forked top
140	Blue Oak	8	2	crowded,
141	Blue Oak	14	3	Slight lean, good structure
142	Blue Oak	14	3	Good structure
143	Blue Oak	18	2	Lean, good structure
144	Gray Pine	6	2	Lean
145	Blue Oak	30	3	Forked, slight branch die back
146	Gray Pine	6	3	Slight lean, good structure
147	Gray Pine	10	3	Slight lean, good structure
148	Gray Pine	13	2	Forked, lean
149	Gray Pine	12	2	Lean
150	Gray Pine	15	3	Good structure
151	Gray Pine	16	1	Bottom branches dead
152	Blue Oak	18	0	Dead
153	Blue Oak	20	4	Good structure
154	Blue Oak	21	2	Lean, poor structure
155	Blue Oak	18	4	Good structure
156	Blue Oak	27	4	Good structure
157	Blue Oak	26	2	Poor structure, lower branches dead
158	Blue Oak	13	2	Lean
159	Blue Oak	12	2	Lean, dead branches
160	Blue Oak	8	2	Lean, dead branches
161	Blue Oak	12	2	Lean toward neighbor
162	Blue Oak	7	2	Elongation
163	Blue Oak	10	2	Lean, poor structure
164	Gray Pine	18	2	Lean, lower branches dead
165	Blue Oak	20	4	Good structure
166	Blue Oak	13	2	Lean, poor structure
167	Blue Oak	15	2	Lean, poor structure
168	Blue Oak	13	2	Lean, poor structure
169	Blue Oak	25	4	Good structure
170	Blue Oak	16	2	Lean, lower branches broken
171	Blue Oak	13	3	Slight lean, good structure
172	Blue Oak	18	2	Lean, broken branches
173	Gray Pine	7	2	Lean
174	Gray Pine	14	2	Lean
175	Blue Oak	24	3	Good structure, lower branches dying back.
176	Blue Oak	16	2	Poor structure

ID	Species	DBH	Health (0-5)	Comments
177	Blue Oak	28	0	Dead
178	Blue Oak	10	2	Lean, poor structure
179	Blue Oak	16	2	Lean, poor structure
180	Blue Oak	11	2	Poor structure
181	Blue Oak	16	2	Lower branches dead
182	Blue Oak	16	2	Poor structure, lower branches dead
183	Blue Oak	16	2	Poor structure, broken branches
184	Blue Oak	15	1	Poor structure, gall, split trunk
185	Blue Oak	8	3	Ok structure, canopy
186	Blue Oak	8	2	Ok structure, crowded
187	Gray Pine	9	3	Good structure
188	Blue Oak	11	2	Forked, crowded
189	Blue Oak	7	2	Poor structure, vines
190	Blue Oak	6	2	Poor structure, vines
191	Blue Oak	6	2	Poo structure, vines
192	Blue Oak	28	4	Good structure
193	Blue Oak	2	2	Lean, lower branches dead
194	Blue Oak	7	2	Poor structure, leaning, dead branches
195	Blue Oak	7	2	Leaning
196	Blue Oak	8	3	Good structure
197	Blue Oak	9	3	Good structure
198	Blue Oak	7	3	Ok structure
199	Blue Oak	7	3	Good structure
200	Blue Oak	10	3	Good structure
201	Blue Oak	8	2	Lean, hangs over neighbor
202	Interior Oak	13	3	Good structure, no lean
203	Interior Oak	14	3	Good structure, canopy
204	Interior Oak	9	2	Poor structure
205	Gray Pine	12	2	Lean, crowded
206	Interior Oak	7	2	Poor structure
207	Blue Oak	8	2	Lean, poor structure, vines
208	Blue Oak	6	2	Lean, poor structure
209	Blue Oak	15	3	Good structure, some lower branches dying back
210	Blue Oak	15	3	Good structure, some lean
211	Blue Oak	18	4	Good structure
212	Blue Oak	13	2	Lower branches dead, vines
213	Blue Oak	11	3	Good structure
214	Blue Oak	7	3	Good structure
215	Blue Oak	6	2	Crowded
216	Blue Oak	6	2	Twisted trunk

ID	Species	DBH	Health (0-5)	Comments
217	Blue Oak	6	2	Crowded
218	Blue Oak	7	2	Poor structure
219	Blue Oak	2	2	One sided, crowded
220	Blue Oak	19	3	Good structure
221	Gray Pine	16	2	Double leader, lean, crook
222	Blue Oak	8	3	Ok structure
223	Blue Oak	7	2	Crowded, one sided
224	Blue Oak	7	2	Fork, lower branched dying back
225	Gray Pine	13	2	Lean, crook
226	Gray Pine	27	2	Burn scar, several leaders
227	Gray Pine	24	2	Burn scar, double leader, lower branches dying
228	Gray Pine	18	2	Burn scar, lower branched dying
229	Blue Oak	21	3	Slight lean, good structure
230	Gray Pine	18	2	Burn scar, three leaders
231	Gray Pine	16	2	Burn scar, lower branches dying
232	Gray Pine	12	2	Burn scar, lean, lower branches dying
233	Blue Oak	15	1	Dieback all over.
234	Blue Oak	16	2	Crowded, lower branched broken
235	Gray Pine	9	2	Crowded, leader broken
236	Blue Oak	16	2	One sided, lower branches dying
237	Gray Pine	18	1	Lean, burn scar, double leader
238	Gray Pine	9	2	Double leader, lower branched dying
239	Blue Oak	8	2	Lean, good structure
240	Blue Oak	21	1	Half of tree dead
241	Blue Oak	23	3	Slight lean
242	Blue Oak	6	3	Good structure
243	Blue Oak	8	3	Lower branch dying back
244	Blue Oak	6	2	Over crowded
245	Blue Oak	8	2	Lean
246	Gray Pine	6	2	Crowded, one sided
247	Interior Oak	8	3	Good structure, hangs over neighbor
248	Gray Pine	13	2	Lean, double leader
249	Gray Pine	38	1	Forked, leaning,lower branches dead
250	Gray Pine	28	2	Forked
251	Gray Pine	18	2	Lean, double leader
252	Gray Pine	8	2	Elongation
253	Gray Pine	32	4	Good composition
254	Gray Pine	16	2	Lower branch dying back, poor structure
255	Blue Oak	22	2	Lower branch dying back hanging over neighbor
256	Blue Oak	12	2	Lean, lower branched dying back

ID	Species	DBH	Health (0-5)	Comments
257	Blue Oak	18	3	Good composition
258	Blue Oak	15	2	Lean, lower branches dying back
259	Blue Oak	15	2	Lower branches dying back, double leader
260	Blue Oak	7	2	Trunk scar, good structure
261	Gray Pine	6	3	Slight lean, good structure
262	Gray Pine	16	2	Lean, double leader
263	Gray Pine	26	2	Lower branches dying back, burn scar, 3 leaders
264	Blue Oak	17	2	Hollow trunk, lower branches dying
265	Blue Oak	6	3	Good structure
266	Gray Pine	8	2	Burn scar, good structure
267	Blue Oak	7	2	Trunk scar
268	Blue Oak	22	3	Good structure
269	Gray Pine	12	2	Lean, lower branches dying back
270	Gray Pine	26	2	Lean, lower branches dying back
271	Gray Pine	17	2	Lean, burn scar
272	Gray Pine	18	2	Forked, burn scar, lean
273	Gray Pine	12	3	Slight lean, burn scar
274	Gray Pine	9	2	Lower branches dead, competition
275	Gray Pine	12	2	Lean, burn scar
276	Gray Pine	17	2	Lean, burn scar
278	Gray Pine	20	2	Lean,burn scar
279	Gray Pine	33	2	Forked, burn scar
280	Gray Pine	9	2	Lean, burn scar
281	Gray Pine	20	2	Burn scar, lower branches dead
282	Blue Oak	6	3	Good structure
283	Blue Oak	6	3	Good structure
284	Blue Oak	22	2	Forked, lower branches dead
285	Gray Pine	23	2	Forked, lower branches dead, double leader
286	Gray Pine	10	3	Good structure
287	Blue Oak	7	3	Good structure
288	Gray Pine	8	3	Good structure
289	Blue Oak	7	2	Lean, poor structure
290	Blue Oak	16	3	Good structure some over hang on neighbor
291	Blue Oak	13	2	Lower branches dead
292	Interior Oak	14	2	Lean over neighbor
293	Black Oak	6	2	Lean over neighbor
294	Black Oak	7	2	Lean
295	Gray Pine	22	1	Forked, lean, broken top
296	Gray Pine	24	1	Forked, one sided, lower branches dead
297	Blue Oak	12	2	Lower branches dead, leaning over neighbor

ID	Species	DBH	Health (0-5)	Comments
298	Blue Oak	16	2	Lower branches dead, leaning over neighbor
299	Blue Oak	7	2	Lean, lower branches dead
300	Blue Oak	9	3	Good structure
301	Blue Oak	7	2	Lean, competition
302	Blue Oak	26	2	Lean, lower branches dead
303	Gray Pine	6	2	Lean, crowded
304	Gray Pine	15	2	Lean, vines
305	Gray Pine	7	2	Lean, crook
306	Gray Pine	12	3	Good structure
307	Gray Pine	12	3	Good structure
308	Blue Oak	15	0	Dead
309	Blue Oak	17	2	Lean, poor structure
310	Blue Oak	8	2	Lean over neighbor
311	Gray Pine	20	2	Burn scar, lower branches dead.

Attachment C

Project Site Photos

Sample site photos taken August 26 and 27, 2024



Tree #122 (Blue oak)



Tree # 263 (Gray pine)



Tree #153 (Blue oak)



Tree # 268 (Blue oak)

Attachment D

Qualified Professional's Disclaimer

Qualified Professional Disclaimer Statement

Qualified professionals per Redding Municipal Code 18.61 include persons who demonstrates expertise in the biological sciences related to oak woodlands of the variety prevalent in the Redding area through an appropriate combination of education, training, and experience and is judged by his or her profession to be able to represent the profession in a competent manner. . Qualified professionals recommend measures to enhance the beauty and health of trees and forests, while attempting to reduce the risk of living near them. Clients may choose to accept or disregard the recommendations of the qualified professionals, or to seek additional advice.

Qualified professionals cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms subject to attack by disease, insects, fungi and other forces of nature. There are some inherent risks with trees that cannot be predicted with any degree of certainty, even by a skilled and experienced arborist. Qualified professionals cannot predict acts of nature including, without limitation, storms of sufficient strength, which can cause even a healthy tree to fail. Any entity who develops land and builds structures with a tree in the vicinity should be aware and inform future residents of the risks of living with trees and this qualified professionals disclaimer.

Qualified professionals cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise remedial treatments cannot be guaranteed 100%.

Treatment, pruning, and removal of trees may involve considerations beyond the scope of the qualified professional's services, such as property boundaries, property ownership, disputes between neighbors and other issues. Consulting qualified professional s cannot take such considerations into account unless complete and accurate information is disclosed to the Qualified professionals by the client.

The basic tree health assessment conducted herein does not constitute a tree risk assessment. Neither this author nor Gallaway Enterprises has assumed any responsibility for liability associated with the trees on or adjacent to this project site, their future demise and/or any damage, which may result therefrom. To live near trees is to accept some degree of risk.

Attachment E

Surveyor's Resume

Cheryl Ballantyne, Botanist

117 Meyers Street, Suite 120, Chico, CA 95928
cheryl@gallawayenterprises.com

gallaway ENTERPRISES
innovation · science · solutions

Education

Bachelor of Science in Plant Science

University of California, Davis - 1989

Experience 9 Years

Gallaway Enterprises
Botanist

Sierra Timber Services – Oroville, CA
Botanist/GIS Specialist

Expertise

Plant Identification

Data Analysis

Data Collection

Geographic Information Systems

Overview

Ms. Ballantyne has nine years of professional experience conducting rare plant surveys, nesting bird surveys, and California red-legged frog and foothill yellow-legged frog surveys. She has a working knowledge of CAL FIRE Timber Harvest Plans, Mitigated Negative Declarations, and NOEs. She is experienced in preparing maps for Timber Harvest Plans and Mitigated Negative Declarations using ArcGIS 10.8 and ArcGIS Pro as well as conducting geospatial analysis for cumulative effects for Timber Harvest Plans. Ms. Ballantyne has prepared CAL FIRE Emergency documents and Water Quality NOI documents for filing.

Select Project Experience:

Sierra Timber Services, Butte County, California: Botanist/GIS Specialist – Ms. Ballantyne conducted biological scoping for CAL FIRE Timber Harvest Plans, prepared Mitigated Negative Declarations, NOE, and water quality NOI documents. Ms. Ballantyne also conducted rare plant surveys, frog surveys and geospatial analysis.

Alder Creek Botanical Survey, Sequoia Crest, California: Lead Botanist – Ms. Ballantyne conducted a complete, protocol survey for Save The Redwoods, identifying to species any plants within plots, on 300 acres in the fire scar in Sequoia Crest, to determine base line species list for pre-treatment botanical data.

Butte County Fire Safe Council, Lake Madrone, California: Lead Botanist – Ms. Ballantyne conducted a protocol botanical survey for vegetation management for 225 acres in Lake Madrone as part of the Berry Creek NOE.

CALTRANS Nev49/But32 Vegetation Reduction: Ms. Ballantyne conducted nesting bird surveys prior to vegetation removal operations for NEV 49 near Grass Valley and BUT 32 above Forest Ranch.

Mt. Rose, Nevada: Lead Botanist – Ms. Ballantyne conducted a protocol botanical survey for newly listed White Bark Pine along the electric line corridor for NVE (Nevada Electric) for tree removal operations

Attachment D

Cultural Resources Inventory Survey, Genesis Society, September 19, 2024
On file in the Development Services Department, Planning Division

NOTE TO REVIEWER: Information contained in the Cultural Resources Inventory Survey for the Project related to the specific location of prehistoric and historic sites is confidential and exempt from the Freedom of Information Act (FOIA) and the California Public Records Act (CPRA); therefore, site specific cultural resource investigations are not appended to this Initial Study. Professionally qualified individuals, as determined by the California Office of Historic Preservation, may contact the City of Redding Development Services Department, Planning Division directly in order to inquire about its availability.

Attachment E

Geologic and Environmental Hazards Report, Mid Pacific Engineering, September 30, 2024

GEOLOGIC AND ENVIRONMENTAL HAZARDS REPORT
CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

1400 Industrial Drive
Assessor Parcel Number: 067-110-041
Redding, California
MPE No. 07207-01
September 30, 2024

MID PACIFIC ENGINEERING, INC.

GEOTECHNICAL ENGINEERING
EARTHWORK TESTING
MATERIALS ENGINEERING AND TESTING
SPECIAL INSPECTIONS

6310 STATE HIGHWAY 273, ANDERSON, CALIFORNIA 96007
840 EMBARCADERO DRIVE, SUITE 20, WEST SACRAMENTO, CALIFORNIA 95605
8910 EAST VICTOR ROAD, LODI, CALIFORNIA 95240

Geologic and Environmental Hazards Report

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

MPE No. 07207-01

Redding, California

TABLE OF CONTENTS

INTRODUCTION 1

Scope of Services 1

Figures and Attachments 2

Proposed Development 2

FINDINGS 2

Site Description 2

Historical Aerial Photographs 3

GEOLOGICAL 3

Seismic and Fault Hazard 3

Seismic Ground Deformation 5

Liquefaction, Subsidence, or Expansive Potential 8

Dam or Flood Inundation and Street Flooding 10

Slope Stability 11

Volcanic Hazard 11

Mitigations 11

ENVIRONMENTAL 12

Health Hazards 12

High-Pressure Pipelines and Electric Transmission Lines 12

Future Services 13

LIMITATIONS 13

CLOSURE 14

FIGURES

Vicinity Map ..... Figure 1

Regional Geologic Map ..... Figure 2

Regional Fault Map ..... Figure 3

Earthquake Epicenter Map ..... Figure 4

FEMA Flood Map ..... Figure 5

APPENDIX A – EQFAULT and EQSEARCH programs output

MPE

MID PACIFIC ENGINEERING, INC.

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Geologic and Environmental Hazards Report

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

1400 Industrial Drive

Assessor Parcel Number: 067-110-041

Redding, California

MPE No. 07207-01

September 30, 2024

INTRODUCTION

Mid Pacific Engineering, Inc. (MPE) has completed a *Geologic and Environmental Hazards Report* (GEHZ) for the proposed California Heritage YouthBuild Academy (CHYBA) project to be located at 1400 Industrial Drive (Assessor Parcel Number [APN]: 067-110-041) in Redding, California. The purposes of this study have been to review and evaluate potential geologic and environmental hazards that may be influential to the site; review published date containing the site, soil, geologic, seismic, and groundwater conditions at the project site; and, to prepare this report containing our preliminary findings, and conclusions for use in obtaining California Department of Educations (CDE) approval.

SCOPE OF SERVICES

Our scope of work included the following:

1. Site reconnaissance;
2. Review of the *Request for Proposals/Qualifications*, prepared by California Heritage YouthBuild Academy, undated;
3. Review of available historic aerial photographs, topographic maps and groundwater information within the project vicinity;
4. Review of geologic maps and fault maps
5. Engineering and Environmental analyses; and,
6. Preparation of this report.

FIGURES AND ATTACHMENTS

The following figures and attachments are included in this report:

- Figure 1 – Vicinity Map indicating the project location.
- Figure 2 – Regional Geologic Map showing previously mapped project vicinity geology.
- Figure 3 - Regional Fault Map.
- Figure 4 – Earthquake Epicenter Map.
- Figure 5 – Federal Emergency Management Agency (FEMA) Flood Map.

Appended to this report are:

- Appendix A – EQFAULT and EQSEARCH programs output.

PROPOSED DEVELOPMENT

Review of the *Initial School Site Evaluation Form Transmittal*, indicates the project will consist constructing 11 new classroom buildings of undetermined square footage or construction type. Associated development may include asphalt-paved parking lots and access ways, retaining walls, exterior concrete flatwork, underground utilities and typical landscaping.

A *Geologic Hazards Report* (GHZ) meeting the California Geological Survey (CGS) - Note 48 checklist would be required as part of the school development. In addition, a final *Geotechnical Engineering Report* (GER) would be required when project plans are available and building locations are finalized.

This report was prepared based on the information provided. When final site plans are available, or if the project plans change, Mid Pacific Engineering should be afforded the opportunity to review the plans and revise and/or update our conclusions as necessary.

FINDINGS

SITE DESCRIPTION

Based on our site reconnaissance and review of the *Initial School Site Evaluation Form Transmittal*, historical aerial photographs, and Google Earth images, the campus would be located at 1400 Industrial Drive (APN: 067-110-041) in Redding, California. The project site is

covered with low grasses and weeds, trash/debris, and exposed soil. The site currently supports a gravel access road, chain link fencing, and numerous mature trees. The project site is generally bounded to the north and east by residential developments; to the south by a cemetery and apartments; and to the west by a commercial facility. Project site topography is relatively level to gently sloping. The approximate location of the project center is north latitude 40.5750° and west longitude -122.3457°. Review of historical aerial photographs and Google Earth images indicates no previous site usage.

Review of the United States Geological Survey (USGS) *Enterprise Quadrangle, California – Shasta County, 7.5-minute series* (2018), indicates approximate project site ground surface elevations between +550 to +580 feet relative to mean sea level (msl). Project site topography is relatively level to gently sloping. A portion of the USGS *Enterprise Quadrangle, California – Shasta County* topographic map containing the site and vicinity, is included with this report as Figure 1.

Historical Aerial Photographs

Review of the historical aerial photographs (https://www.historicaerials.com/viewer) dated 1943, 1955, 1969, 1983, 1998, 2005, 2009, 2010, 2012, 2014, 2016, 2018, and 2020; and, Google Earth images (http://earth.google.com) dated 2004, 2006, 2007, 2011, 2013, 2015, 2017, and 2021 through 2024 indicates the project site was undeveloped in 1943 (earliest available photograph). The project site appears to have remained relatively unchanged since 1943.

Our review of available literature and historical photographs provides a limited site history. Therefore, unknown buried structures (wells, foundations, utility lines, septic systems, etc.) may be present on-site and may be encountered during construction.

GEOLOGICAL

Seismic and Fault Hazard

The project site is not located across the mapped trace of any known fault, nor was there any indication of surface rupture or fault-related surface disturbance at the site during our review of aerial photographs, field inspection, and site reconnaissance. No active or potentially active faults are known to cross the project site as indicated by the published geologic maps, websites, or aerial photographs reviewed for this project. The project site is

not located within an Alquist-Priolo Earthquake Fault Zone or designated seismic hazard zone. In addition, the site is not situated on or near a pressure ridge, geologic fault, or fault trace that may rupture during the life of the campus. The project area is located within an area of minor seismic activity; however, design of the structures in conformance with the 2022 California Building Code (CBC) (Title 24 of the California Cod of Regulations, Chapter 16A), should be sufficient to prevent significant damage from ground shaking during seismic events resulting from movement on any of the faults or fault system discussed in this report. Based on the few faults or fault zones within the project area, it is our opinion the student risk factor is low.

The site is not located within an Alquist-Priolo Earthquake Fault Zone as currently designated by CGS Special Publication No. 42 (revised 2018). However, no hazard zonation map has been released by CGS for the project site area. The nearest Earthquake Fault Zone is the Hat Creek-McArthur-Mayfield fault zone, located approximately 51 miles (82 kilometers) east-northeast of the project site. According to the United States Geological Survey (USGS), 2008 National Seismic Hazard Maps – Source Parameters website, (https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm), the closest active and/or potentially active fault to the site is the Battle Creek fault zone, located approximately 14½ miles (23¼ kilometers) south-southeast of the project site. Based on the few faults or fault zones within the project area, it is our opinion the potential for ground shaking is low to moderate. A Regional Fault Map (Figure 3) is included with this report.

Using the USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps-Source Parameters, we have prepared the following table containing CGS Class A and B faults and fault systems within 62 miles (100 kilometers) of the site that are considered capable of producing earthquakes with moment magnitudes (M_W) of 6.5 or greater.

Faults Influential to the CHYBA Campus

Fault Name	Maximum Magnitude (M_W)	Distance To Site Miles (Kilometers)
Battle Creek fault zone	6.7	14.5 (23.2)
Hat Creek-McArthur-Mayfield fault zone	7.2	50.9 (81.9)
Great Valley fault system, Segment 1	6.5	61.9 (99.6)

Although not included in the table above, it is our opinion the Cascadia megathrust should be considered influential to the project site. Based on our review of the regional faulting and historic seismic activity, it is our opinion the faults listed in the table above, as well as the Cascadia megathrust, can be considered causative faults due to their relatively close proximity to the project site and potential for large earthquakes.

SEISMIC GROUND DEFORMATION

The California State Legislature passed the Seismic Hazards Mapping Act (SHMA) in 1990 (Public Resources Code Division 2, Chapter 7.8) as a result of earthquake damage caused by the 1987 Whittier Narrows and 1989 Loma Prieta earthquakes. The purpose of the SHMA is to protect public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes (California Geological Survey [CGS] Special Publication [SP] 117).

There are currently 15 State designated Seismic Hazard Zone maps for Shasta County. The project site is not located within a State designated Seismic Hazard Zone.

Three active and/or potentially active faults are mapped within 62 miles (100 kilometers) of the project site. These include the Battle Creek fault zone; the Hat Creek-McArthur-Mayfield fault zone, and the Great Valley fault system, segment 1. In addition, the surface manifestation of the southern portion of the Cascadia megathrust is 110 miles (177 kilometers) west of the project site.

The Battle Creek fault zone is located approximately 14½ miles (23½ kilometers) southeast of the project site. The Maximum Magnitude Earthquake (M_{max}) assumed for the Battle Creek fault zone in this region is 6.7. The M_{max} is the maximum earthquake believed possible for the fault.

The closest active fault is the Hat Creek-McArthur-Mayfield fault zone, located approximately 51 miles (82 kilometers) east-northeast of the project site. The Maximum Magnitude Earthquake (M_{max}) listed for the fault zone in the project area is 7.2.

Segment 1 of the Great Valley fault system is located approximately 62 miles (100 kilometers) south-southwest of the project site. The Maximum Magnitude Earthquakes (M_{max}) assumed for the Great Valley1 fault in this region is 6.8.

The Cascadia megathrust, located approximately 110 miles (117 kilometers) west of the project site. The Maximum Magnitude Earthquakes (M_{max}) assumed for the Cascadia megathrust in this region is 9.0.

Seismic Risk

The primary seismic risk at the site are earthquakes along the Battle Creek fault zone, the Hat Creek-McArthur-Mayfield fault zone, and the southern extension of the Cascadia megathrust, all of which are capable of producing relatively large earthquakes. Results of the EQFAULT analysis indicate an M_w 6.5 earthquake on the Battle Creek fault zone would result in a site acceleration of 0.185 g, based on the Boore et al (1997) NEHRP D (250) attenuation relation.

Historic Seismicity

Seismological data regarding significant historical earthquakes affecting the site was obtained using the commercially available software program EQSEARCH (Blake, 2000; database updated 2021). The EQSEARCH database was developed by extracting records of events greater than magnitude 5.0 from the DMG Comprehensive Computerized Earthquake Catalog, and supplemented by records from the USGS; University of California, Berkeley; the California Institute of Technology; and, the University of Nevada at Reno. A search radius of 62 miles (100 kilometers) was specified for this analysis. A historic earthquake epicenter map showing earthquakes (magnitude 5.0 or greater) within a minimum 62-mile (100 kilometer) radius of the project site is presented as Figure 4.

Review of the historical earthquake data indicates the closest earthquake to the site measuring M_w 5.0 or greater, and the most significant earthquake shaking (acceleration) experienced at the project site, occurred during the M_R 5.2 earthquake of November 26, 1998 with an epicenter located approximately 4.6 miles (7.4 kilometers) northwest of the site. An examination of the tabulated EQSEARCH data suggests the project site has experienced ground shaking equivalent to Modified Mercalli Intensity VIII[1] as the result of one earthquake.

[1] VIII – Severe: Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.

The two largest earthquakes to occur within the EQSEARCH radius of 62 miles (100 kilometers) were measured at M_w 5.9. The largest estimated acceleration experienced at the site was 0.195 g. Sixteen earthquakes measuring M_w 5.0 or greater have occurred within a 62-mile (100-kilometer) radius of the project site.

Subsurface Conditions

The USGS *Digital Geologic Map of the Redding 1°X2° Degree Quadrangle, Shasta, Tehama, Humboldt, and Trinity Counties, California* compiled by L.A. Fraticelli, J.P. Albers, W.P. Irwin, M.C. Blake, Jr., and C.M. Wentworth (2012), indicates the project site is underlain by Pleistocene age Red Bluff Formation soils consisting of a thin veneer of distinctive, highly weathered, bright red gravels overlying the Tehama, Tuscan, and Laguna Formations.

Based on our knowledge, and previous work in the project area, it is our opinion the soils underlying the project site are generally consistent with soils mapped as Red Bluff Formation. The distribution of geologic units in the project vicinity is shown on the Regional Geologic Map, Figure 2.

The United States Department of Agriculture, Natural Resources Conservation Service website (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx), maps the site as underlain by Churn gravelly loam, deep, 0 to 3 percent slopes and Red Bluff gravelly loam, moderately deep, 0 to 3 percent slopes. The Churn series consists of well-drained and moderately well-drained soils formed in alluvium from mixed sources. In a representative profile, the surface layer is light yellowish-brown, medium acid gravelly loam approximately nine inches thick. The upper part of the subsoil is light yellowish-brown, medium acid gravelly loam approximately four inches thick. The lower part of the subsoil is light yellowish-brown and strong brown, medium acid gravelly clay loam that extends to a depth of more than 60 inches. The Churn gravelly loam, deep, 0 to 3 percent slopes has a profile similar to the one described as representative for the series, except that consolidated alluvium is at a depth of 36 to 60 inches. The soil is moderately well-drained, exhibits slow permeability and runoff and none to slight hazard of erosion.

The Red Bluff series consists of well-drained and moderately well-drained soils formed in gravelly old alluvium from mixed sources. In a representative profile, the surface layer is brown, very strongly acid loam approximately six inches thick. The upper 22 inches of the subsoil is yellowish-red, very strongly acid and strongly acid clay loam. The lower 29 inches

of the subsoil is red, strongly acid heavy clay loam and light clay. A light-brown, medium acid clay loam substratum that extends to a depth of more than 60 inches is at a depth of approximately 57 inches.

The Red Bluff gravelly loam, moderately deep, 0 to 3 percent slopes soil has a profile similar to the one described as representative for the series, except that it is 24 to 36 inches deep over a silica-indurated gravelly or cobble substratum. The soil is moderately-well drained and has very slow permeability. Runoff is slow and the hazard of erosion none to slight.

LIQUEFACTION, SUBSIDENCE, OR EXPANSIVE POTENTIAL

Liquefaction is a soil strength and stiffness loss phenomenon that typically occurs in loose, saturated cohesionless soils as a result of strong ground shaking during earthquakes. The potential for liquefaction at a site is usually determined based on the results of a subsurface geotechnical investigation [including a 50 foot exploration boring or cone penetration test (CPT)] and the groundwater conditions beneath the site. Hazards to buildings associated with liquefaction include bearing capacity failure, lateral spreading, and differential settlement of soils below foundations, which can contribute to structural damage or collapse. The site is not located within a State Designated Seismic Hazard Zone for liquefaction.

Data from the California Department of Water Resources website (https://wdl.water.ca.gov/waterdatalibrary/) closest groundwater monitoring wells located approximately one mile southeast of the project site indicates groundwater elevations in the project area range from approximately +405 to +459 feet above msl, which corresponds to 91 to 175 feet below ground surface.

Groundwater levels may fluctuate beneath the site depending on the time of year, and rainfall amounts. Therefore, groundwater conditions presented in this report may not be representative of those which may be encountered during or subsequent to construction.

The site is underlain by native Red Bluff Formation soils generally consisting of a thin veneer of distinctive, highly weathered bright-red gravels overlying the Tehama Formation (sedimentary rock) and Tuscan Formation (lahars, volcanic conglomerate, volcanic sandstone, siltstone, and pumiceous tuff).

Groundwater elevations in the project area range from approximately +405 to +459 feet above msl. Therefore, we do not consider liquefaction as a significant hazard for this site. Mitigating factors are considered minimal for liquefaction potential.

Lateral Spreading

Liquefaction-induced lateral spreading is defined as the finite, lateral displacement of gently sloping ground as a result of pore pressure build up or liquefaction in a shallow underlying deposit during an earthquake. Lateral spreading usually occurs on gently sloping ground exposed to a slope or free face. Based on the typically stiff/dense nature of the on-site soils, and the absence of sloping ground exposed to a slope or free face, it is our opinion the potential for lateral spreading at the site is low.

Dry Sand Seismic Settlement

Dry sand seismic settlement can be evaluated using the Pradel method (1998). This method is a simplified method based on earlier work by Tokimatsu and Seed (1987) applicable to sands. Based on the typically stiff/dense nature of the on-site soils, and absence of loose, clean sands, it is our opinion the potential for dry sand and seismic settlement is low.

Cyclic Softening

The site is underlain by relatively dense, native Red Bluff Formation soils generally consisting of a thin veneer of distinctive, highly weathered bright-red gravels overlying the Tehama Formation (sedimentary rock) and Tuscan Formation (lahars, volcanic conglomerate, volcanic sandstone, siltstone, and pumiceous tuff). Therefore, we do not consider cyclic softening as a significant site hazard.

Subsidence and Hyrdrocollapse

Regional subsidence occurs when large areas of land sink in response to withdrawal of groundwater, petroleum, or natural gas. The site is not located within a region generally subject to groundwater, petroleum, or natural gas withdrawal. In our opinion, the site is not subject to high subsidence, due to the absence of factors and conditions needed to cause subsidence.

Due to the age and composition of the native soils and geologic materials underlying the site, it is our opinion that hydrocollapse of the on-site soils as the result of rain or irrigation water percolation is unlikely.

Expansive Soils

The site is underlain by native Red Bluff Formation soils generally consisting of a thin veneer of distinctive, highly weathered bright-red gravels overlying the Tehama Formation (sedimentary rock) and Tuscan Formation (lahars, volcanic conglomerate, volcanic sandstone, siltstone, and pumiceous tuff). Based on our knowledge of the Red Bluff Formation, it is our opinion the on-site soils may possess very low to medium expansion potential.

Mitigating Factors

Based on our assessment of the project site, and proposed construction, it is our opinion there are no mitigating factors.

DAM OR FLOOD INUNDATION AND STREET FLOODING

Inundation maps for Shasta and Whiskeytown dams are unavailable from the California Department of Water Resources or the Division of Safety of Dams (DSOD). Per the Shasta County General Plan, Public Safety Group, Dam Failure Inundation (updated December 11, 2018), "Dam failure inundation hazards present major health and safety implications in the Shasta County Region Planning Area, particularly in the vicinity of the Shasta Lake and Whiskeytown Reservoir dams. Failure of Shasta Dam would result in the inundation of most of Redding within less than an hour of failure. Within two hours, all of Anderson and much of the Sacramento River Valley downstream of Redding would be inundated." In addition, "Failure of Whiskeytown Dam would be less disastrous. Redding would not be affected, but over half of Anderson would be inundated with two hours of failure."

The site is not located within a Special Flood Hazard Area (SFHA) as designated by the Federal Emergency Management Agency (FEMA). According to the Flood Insurance Rate Maps (FIRM) Panel 06089C, Map Number 06089C1553G, published by FEMA, with an effective date of March 17, 2011, the project site lies within Zone X.

Zone X is defined as areas determined to be within the 0.2 percent annual chance flood hazard, areas of one percent chance flood with average depth less than one foot, or with drainage areas of less than one square mile. It is our opinion that the site is not at significant risk of flooding (Figure 5).

The project site is located approximately 0.8 miles east of a Regulatory Floodway (Zone AE). However, project site sheet flooding potential is considered minimal.

SLOPE STABILITY

The project site is not located on or near a slope. Site topography and the surrounding area is relatively flat to gently sloping. In addition, it is our understanding no on-site cut and fill slopes will be constructed. Based on the absence of mapped or observed slope instabilities within the project site or vicinity, it is our opinion that slope stability is not considered a factor in site development.

VOLCANIC HAZARD

Review of the USGS Map of Potential Hazards from Future Volcanic Eruptions in California (Miller, 1989), indicates the project site lies approximately 45 miles (62 kilometers) west of Lassen Peak and the Lassen Volcanic Center, within Areas Subject to Tephra Hazards, Zone Y – Area Subject to 5 centimeters (2 inches) or more of compacted ash. Lassen Peak last erupted from 1914 to 1917. Although the potential exists for ash fall from an eruption to reach the project site, the site does not lie within any known hazard zones associated with Lassen Peak and the Lassen Volcanic Center. Based on the above information, it is our opinion that a minimal potential volcanic hazard exists for the project site.

MITIGATIONS

Based on our assessment of the project site and proposed construction, it is our opinion the student safety and staff use is low.

ENVIRONMENTAL

HEALTH HAZARDS

The site is not on or near a hazardous or solid waste disposal facility. Therefore, we consider the potential hazard to be negligible.

Soil and Water Samples

A geotechnical subsurface investigation, including soil and groundwater sampling, was not completed as part of our work scope for this project. However, groundwater elevations in the project area range from approximately +405 to +459 feet above msl, which corresponds to 91 to 175 feet below ground surface. Based on the absence of toxic generating facilities in the project area, relatively dense soils underlying the project site, and depth to groundwater, it is our opinion toxic hazards are minimal.

Naturally Occurring Asbestos (NOA)

Asbestos is the generic term for the naturally occurring fibrous (asbestiform) varieties of six silicate minerals. Asbestos also refers to an industrial product obtained by mining and processing deposits of asbestiform minerals. According to California Geological Survey Open-File Report 2000-19, *A General Location Guide for Ultramafic rocks in California-Areas More Likely to Contain Naturally Occurring Asbestos* (2000), and the USGS Open-File Report 2011-1188, *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California* (2011), the project site does not lie within an area mapped as containing Naturally Occurring Asbestos (NOA) or ultramafic rock in outcrop.

Hazardous Air Emissions

No known facilities emitting hazardous emissions are located within ¼-mile of the project site. It is our opinion hazardous air emissions are negligible. Potential hazards to students and staff are minimal.

HIGH-PRESSURE PIPELINES AND ELECTRIC TRANSMISSION LINES

Identifying proximity to all high-pressure gas lines, fuel transmission lines, pressurized sewer lines, and high-pressure water pipelines within 1,500 feet of the site; and identifying supply lines other than gas lines to the site or neighborhood will be provided in the Petrologix Environmental Hazards Report.

No known utility easements are located on or adjacent to the project site.

Radon Gas

Sections 307 and 309 of the Indoor Radon Abatement Act of 1988 (IRAA) directed EPA to list and identify areas of the U.S. with the potential for elevated indoor radon levels. EPA's Map of Radon Zones assigns each of the 3,141 counties in the U.S. to one of three zones based on radon potential. Shasta County and the project site are located in Zone 3 for radon potential. Zone 3 counties have a predicted average indoor radon screening level less than two pCi/L and are indicated to have a Low Potential for radon.

FUTURE SERVICES

We recommend that our firm be given the opportunity to review the final project plans and specifications, perform a Geotechnical Engineering investigation, and prepare a Geotechnical Engineering Report providing our findings, conclusions, and recommendations.

LIMITATIONS

We have used our best engineering judgment based upon the information provided and the data generated from our work. This report has been prepared in accordance with generally accepted standards of practice existing in northern California at the time of the report. No warranty, either express or implied, is provided.

CLOSURE

We emphasize that this report is applicable only to the proposed site and should not be utilized for construction at this site or on any other site. The findings of this report are considered valid for a period of two years. If design is not completed and construction has not started within two years of the date of this report, the report must be reviewed and updated, as necessary.

Mid Pacific Engineering, Inc.

Woody Joe Pollard
Senior Engineering Geolo

REGISTERED GEOLOGIST
WOODY JOE POLLARD
No. 2297
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

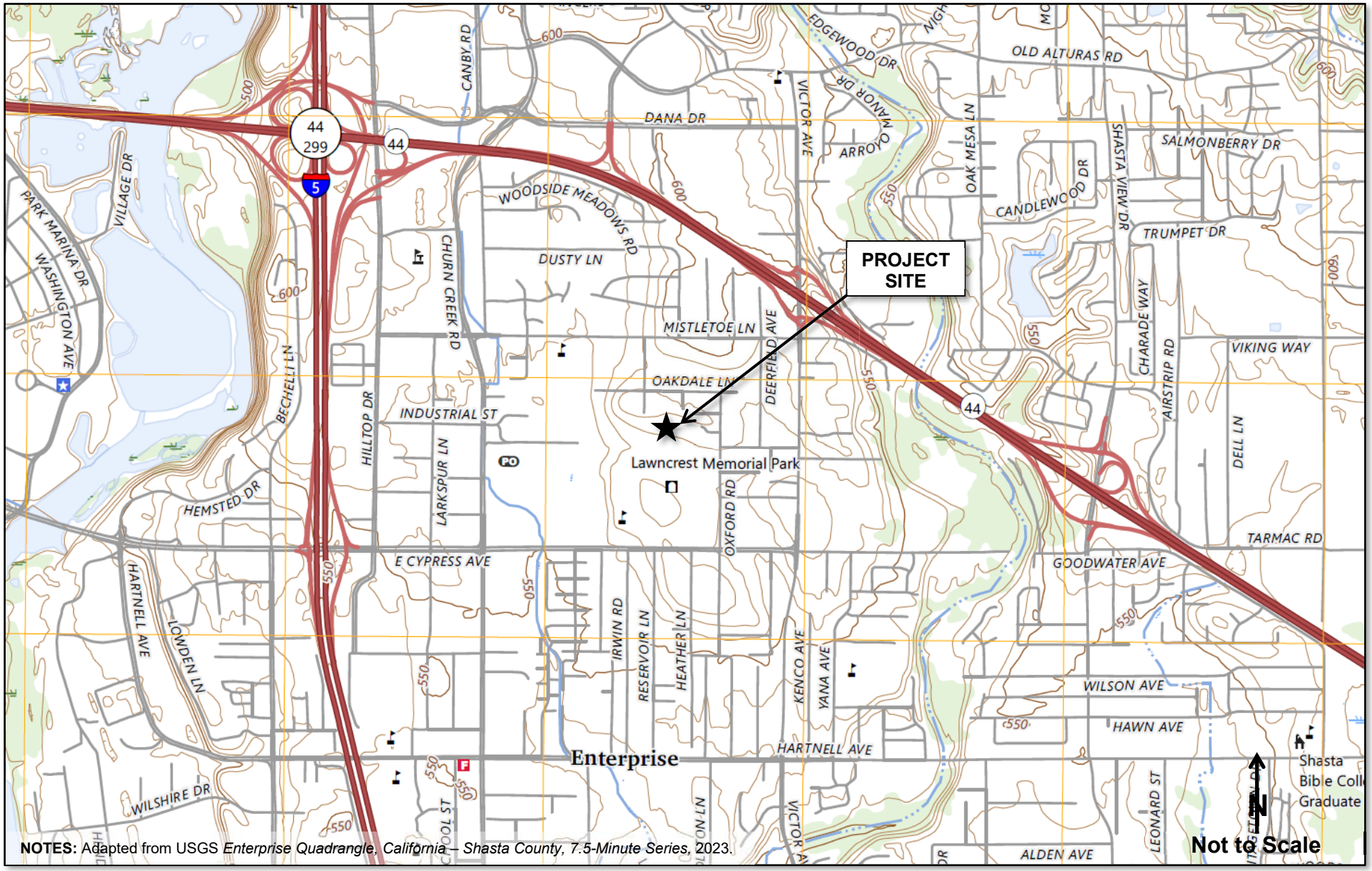
Fred Yi, Ph.D., P.E., G.E., F. ASCE
Chief Engineer

REGISTERED PROFESSIONAL ENGINEER
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Exp. 6/30/25
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Troy W. Kamisky
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
TROY W. KAMISKY
No. 68350
Exp. 9/30/25
CIVIL
STATE OF CALIFORNIA

FIGURES



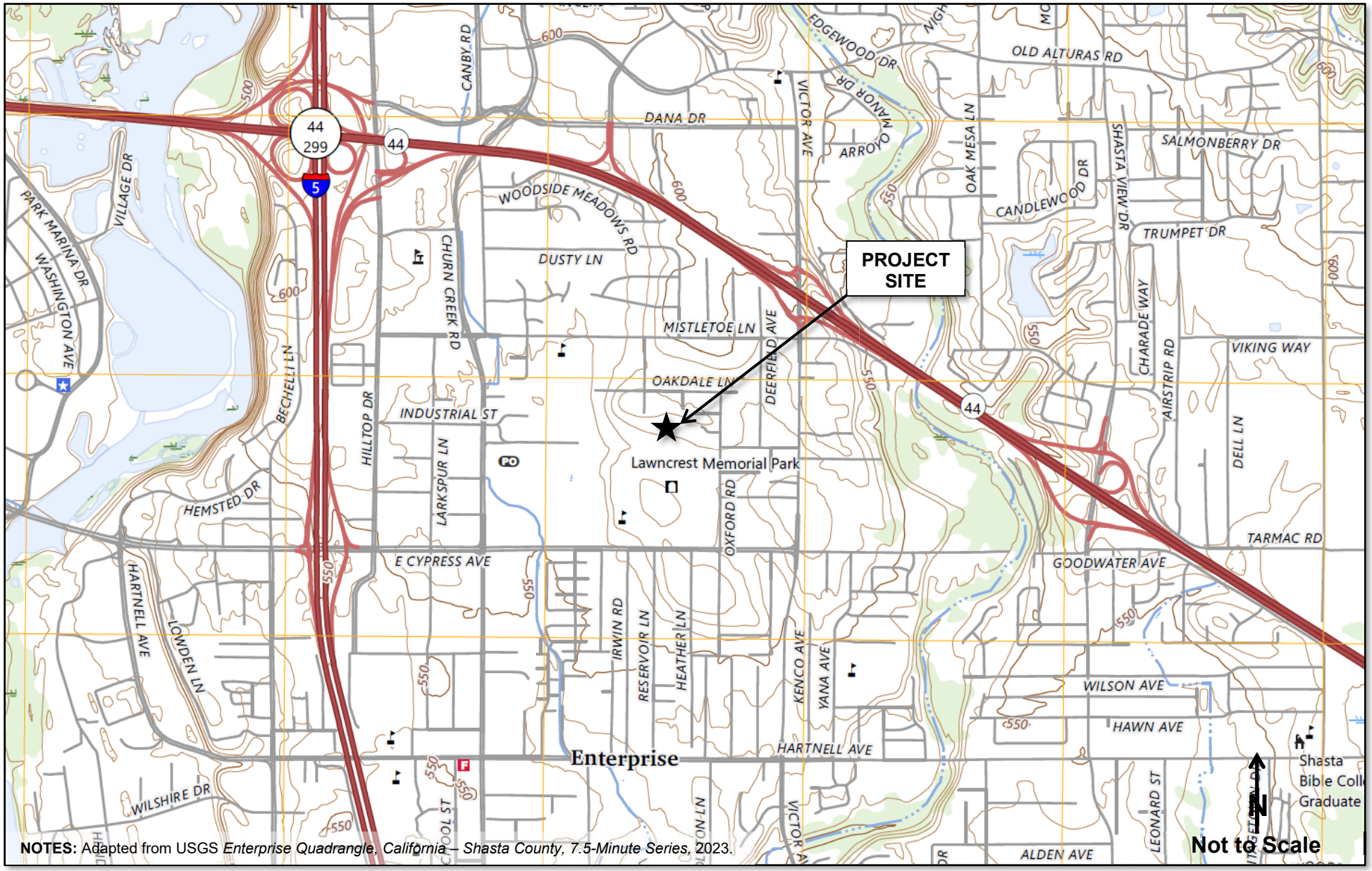
NOTES: Adapted from USGS *Enterprise Quadrangle, California – Shasta County, 7.5-Minute Series*, 2023.

MPE
MID PACIFIC ENGINEERING, INC.

VICINITY MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
1400 Industrial Street
Redding, California

FIGURE 1
Date: 09/24
MPE No. 07207-01



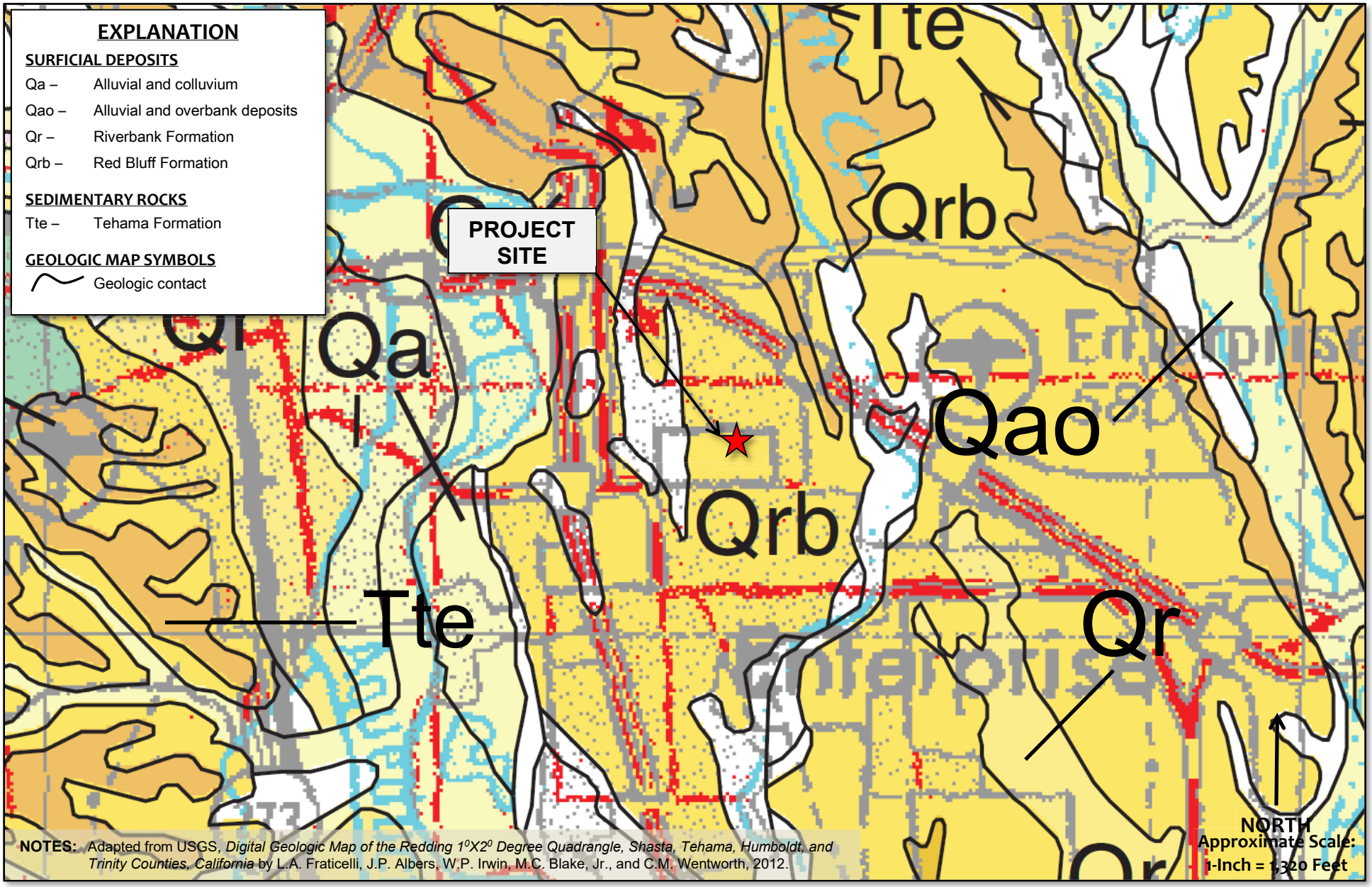
NOTES: Adapted from USGS *Enterprise Quadrangle, California – Shasta County, 7.5-Minute Series*, 2023.

MPE
MID PACIFIC ENGINEERING, INC.

VICINITY MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
1400 Industrial Street
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Date: 09/24
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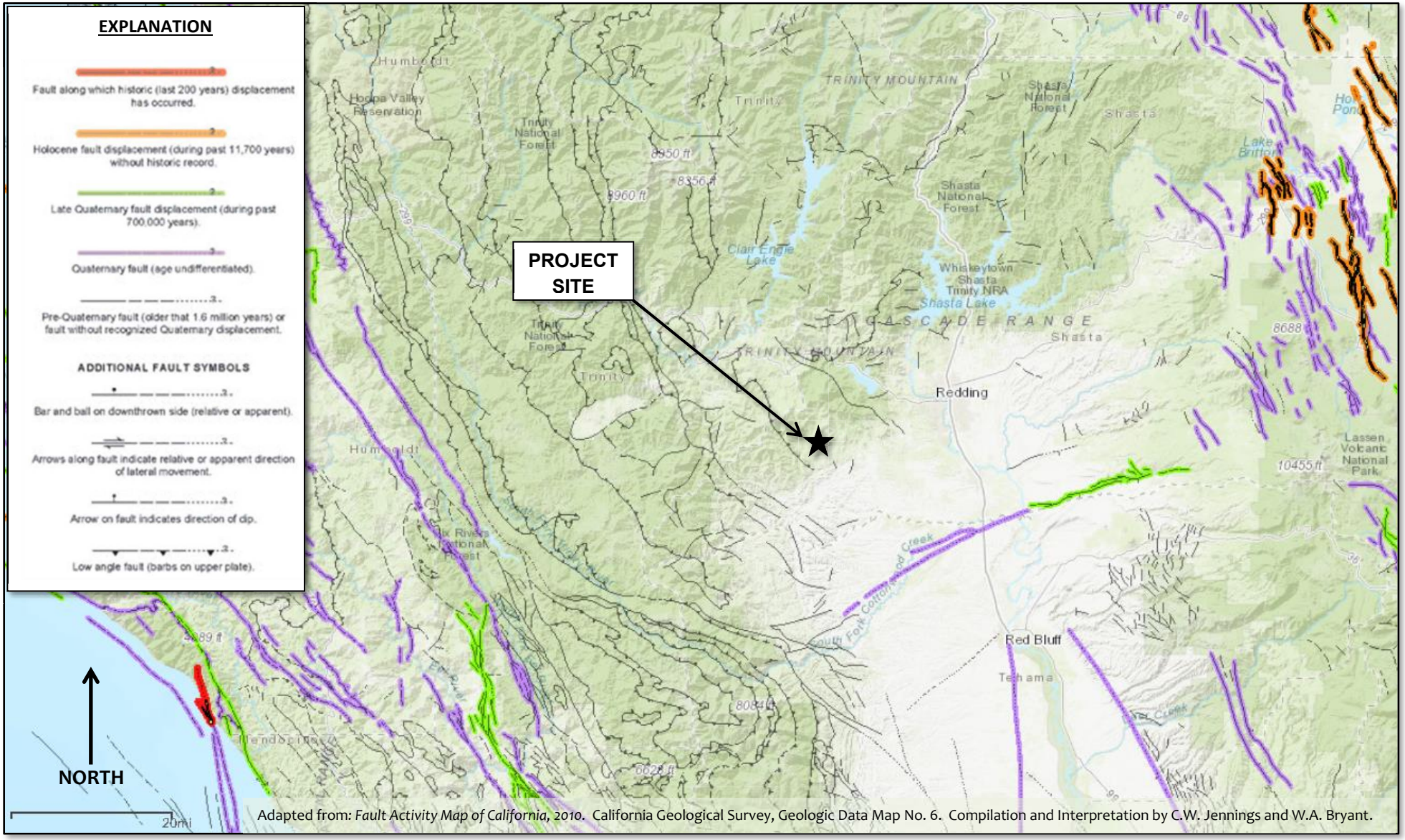
NOTES: Adapted from USGS, *Digital Geologic Map of the Redding 1^0X2^0 Degree Quadrangle, Shasta, Tehama, Humboldt, and Trinity Counties, California* by L.A. Fraticelli, J.P. Albers, W.P. Irwin, M.C. Blake, Jr., and C.M. Wentworth, 2012.

MPE
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REGIONAL GEOLOGIC MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
1400 Industrial Street
Redding, California

FIGURE 2
Date: 09/24
MPE No. 07207-01



Adapted from: *Fault Activity Map of California, 2010.* California Geological Survey, Geologic Data Map No. 6. Compilation and Interpretation by C.W. Jennings and W.A. Bryant.

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REGIONAL FAULT MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

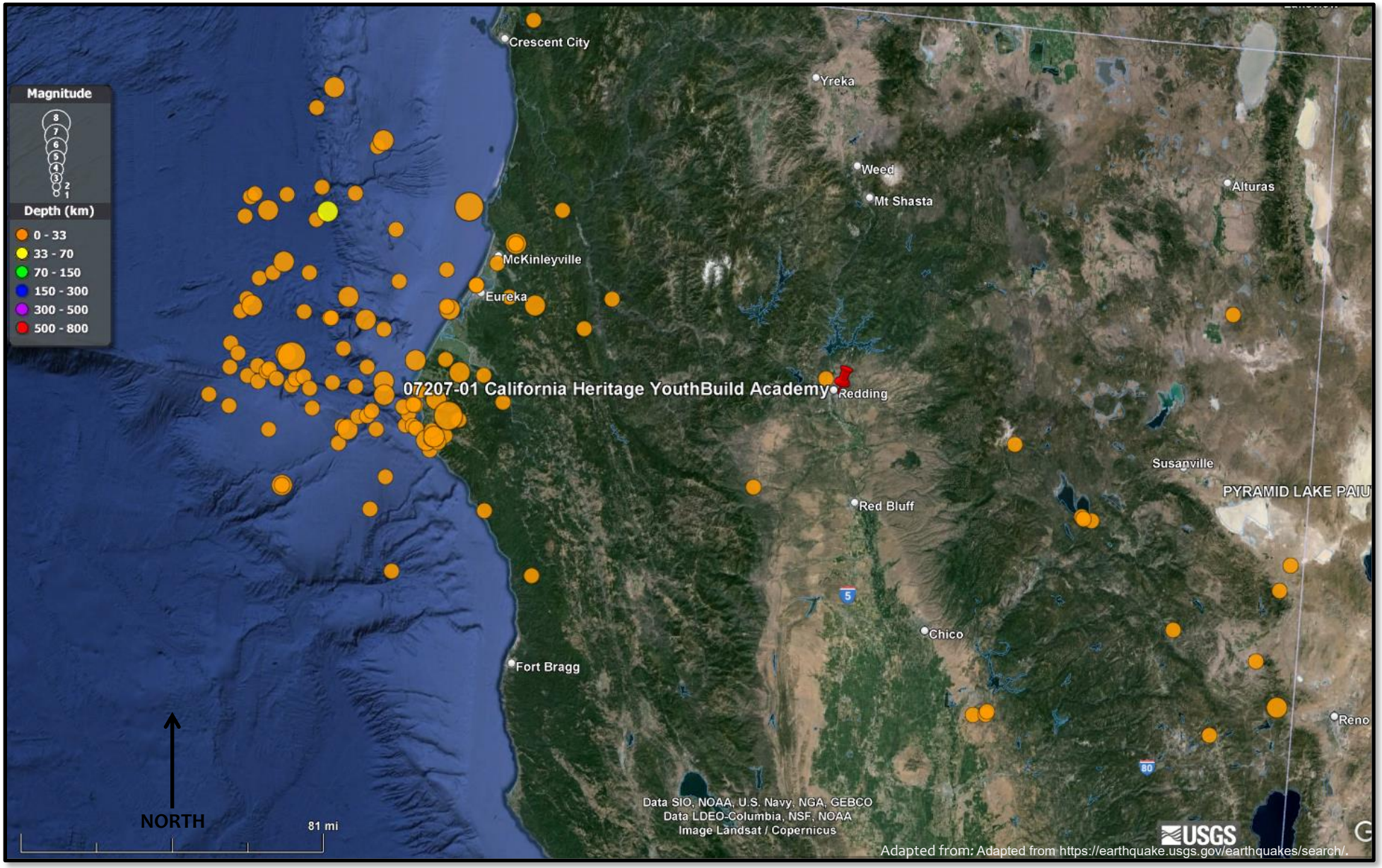
1400 Industrial Street

Redding, California

FIGURE 3

Date: 09/24

MPE No. 07207-01



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EARTHQUAKE EPICENTER MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

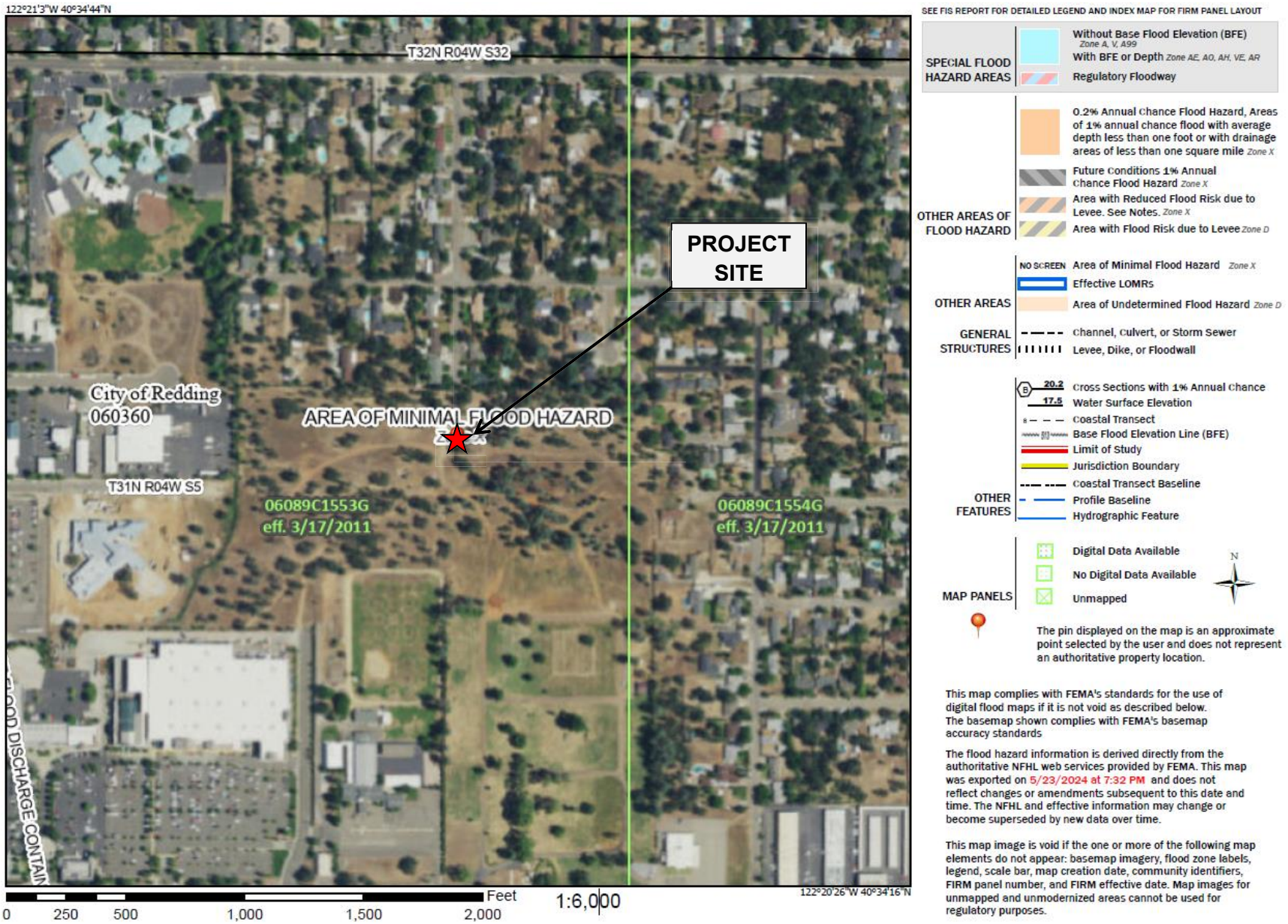
1400 Industrial Street

Redding, California

FIGURE 4

Date: 09/24

MPE No. 07207-01



NOTES: Adapted from *Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM), Map Numbers 06089C1553G/06089C1554G*, Effective Date 03/17/2011.

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FEMA FLOOD MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

1400 Industrial Street

Redding, California

FIGURE 5

Date: 09/24

MPE No. 07207-01

APPENDICES

APPENDIX A

****
*   *
* E Q F A U L T *
*   *
* Version 3.00 *
*   *
****

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 07020-01

DATE: 07-18-2024

JOB NAME: chyba

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CGSFLTE.DAT

SITE COORDINATES:
   SITE LATITUDE: 40.5750
   SITE LONGITUDE: 122.3457

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
   DISTANCE MEASURE: cd_2drp
   SCOND: 0
   Basement Depth: .05 km   Campbell SSR: Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g	ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC.
BATTLE CREEK	14.5(23.4)	6.5	0.185	VIII
FOOTHILLS FAULT SYSTEM 1	25.0(40.2)	6.5	0.123	VII
FOOTHILLS FAULT SYSTEM 2	25.3(40.7)	6.5	0.122	VII
FOOTHILLS FAULT SYSTEM 3	29.5(47.4)	6.5	0.108	VII
RATE FOR NE CA 5	37.6(60.5)	7.3	0.112	VII
MOHWAK-HONEY LAKE ZONE 5	46.0(74.0)	7.3	0.096	VII
HAT CREEK-MacARTHUR-MAYFIELD	47.3(76.1)	7.2	0.109	VII
RATE FOR NE CA 4	57.4(92.4)	7.3	0.081	VII

****

-END OF SEARCH - 8 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE BATTLE CREEK FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 14.5 MILES (23.4 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.1846 g

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*                      *
*    E Q S E A R C H   *
*                      *
*     Version 3.00     *
*                      *
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ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 07027-01

DATE: 07-18-2024

JOB NAME: CHYBA

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE: 5.00
   MAXIMUM MAGNITUDE: 9.00

SITE COORDINATES:
   SITE LATITUDE: 40.5750
   SITE LONGITUDE: 122.3457

SEARCH DATES:
           START DATE: 1800
           END DATE: 2021

SEARCH RADIUS:
           62.0 mi
           99.8 km

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
   ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND: 0 Depth Source: A
   Basement Depth: .50 km   Campbell SSR: Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 0.0

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSG	40.6240	122.4060	11/26/1998	194953.8	23.0	5.20	0.195	VIII	4.6(7.4)
MGI	40.5000	121.8300	07/23/1920	355 0.0	0.0	5.70	0.075	VII	27.5(44.3)
MGI	40.5800	121.8200	01/04/1919	23 0 0.0	0.0	5.90	0.083	VII	27.6(44.4)
MGI	40.5800	121.8200	02/22/1915	0 0 0.0	0.0	5.90	0.083	VII	27.6(44.4)
T-A	40.7500	122.9200	01/26/1859	420 0.0	0.0	5.00	0.046	VI	32.4(52.2)
T-A	40.7500	122.9200	01/12/1861	9 0 0.0	0.0	5.00	0.046	VI	32.4(52.2)
MGI	40.3500	121.6000	07/02/1936	1738 0.0	0.0	5.00	0.037	V	42.1(67.8)
DMG	40.0000	122.0000	01/07/1881	225 0.0	0.0	5.00	0.036	V	43.7(70.3)
DMG	40.5000	121.5000	07/07/1946	65515.0	0.0	5.00	0.036	V	44.7(71.9)
DMG	40.4500	121.4700	03/20/1950	152217.0	0.0	5.50	0.045	VI	46.8(75.3)
DMG	40.0000	121.6000	02/08/1940	8 559.0	0.0	5.70	0.043	VI	55.8(89.9)

-END OF SEARCH- 11 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2021

LENGTH OF SEARCH TIME: 222 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 4.6 MILES (7.4 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 5.9

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.195 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
-a-value= 0.415
b-value= 0.205
beta-value= 0.473

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	11	0.04955
4.5	11	0.04955
5.0	11	0.04955
5.5	5	0.02252

Attachment F

CHYBA Entitlement Storm Drain Analysis, Sharrah Dunlap Sawyer Inc., January 7, 2025

CHYBA

APN 067-110-041
REDDING, CA

ENTITLEMENT STORM DRAINAGE ANALYSIS

Prepared by

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FAX: 530-221-8369
WWW.SDSENGINEERING.COM

This report was written by or under the direct supervision of:

Ian T. Stripling, P.E.
Civil Engineer

1/7/2025
Date



TABLE OF CONTENTS

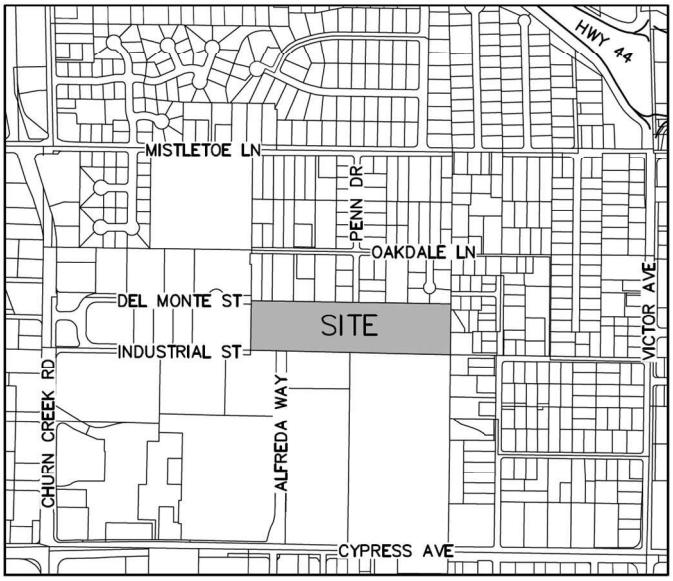
Section **Page**

Executive Summary 1
Design Criteria 1
Pre-Project Condition 2
Post-Project Condition 2
Detention Basin 2
Conclusion 3

Appendix A Site Details 4
Appendix B Pre-Project Condition 8
Appendix C Post-Project Condition 26
Appendix D Detention Calculations 43
Appendix E Reference Materials 64

EXECUTIVE SUMMARY

The Chyba project is a proposed school campus that would include parking lots, campus buildings and a sports field. The project is located at 1400 Industrial Street, Redding CA 96002 (APN 067-110-041). The project is located east of Del Monte and Industrial Street and north of Lowes. As described in the following report, the project's drainage system has been designed to incorporate a single stormwater detention facility in order to maintain or reduce pre-project storm water runoff once the project is complete in accordance with the City of Redding Engineering Division requirements.



VICINITY MAP

DESIGN CRITERIA

To meet City Council Policy 1806, and City of Redding Engineering Division requirements for protection of floodplains and downstream drainage concerns, the design is required to maintain or reduce pre-project peak flows for the 10-, 25-, and 100-year design storm events. This report compares the pre-project condition against the post-project condition. To meet these requirements, the post-project peak runoff flows must be equal to, or less than, the pre-project peak runoff flows.

Methodology

The projects largest drainage basin is less than 10 acres. Per the City of Redding Construction Standards (CORCS) 200.00, the modified rational method shall be used to calculate, route, and compare the runoff for the project. For this project, HydroCAD version 10.20-4a and precipitation data from NOAA Atlas 14, Volume 6, Version 2 is used to satisfy this requirement when calculating the detention orifice and volume. HydroCAD requires certain settings to perform these calculations per its documentation: storm time span is set to 3 hours with 0.01-hour increments, the rising limb of the hydrograph is set to a rate of rise of 1 times the concentration with the falling limb set to a rate of 2. The Detention Basin's critical duration (the storm duration resulting in the highest flow out of the detention basin) is used to set the rainfall duration for the post-project basins and detention basin. In this project, the detention basin has the same critical duration as the

post-project total peak flow. The pre-project critical duration (the storm duration resulting in the largest flow from PRE-T) is used to calculate the peak intensity for the pre-project peak flow. This analysis has two locations to prevent an increase in peak flows: just south of the Industrial Street Culvert, and the tributary flow being conveyed to the Industrial Street storm drain pipe.

Per the CORCS, a 100-year design storm shall be used to size the detention basin to ensure that the project complies with City Council Policy 1806 and the City of Redding Engineering Division requirements. The hydrologic soil groups used in this report were taken from the *USDA NRCS Web Soil Survey of the Shasta County Area.* See Appendix A for site specific details.

PRE-PROJECT CONDITION

The site is currently a vacant lot with natural grass covering the ground and a few scattered trees. The site receives run-on from the single-family subdivision to the north. The site drains from east to west with roughly 20 feet of fall across the width of the site. Run-on from the east collects in Little Churn Creek which flows from the north to the south along the westerly property line.

In the pre-project condition, the site includes two drainage basins as shown in the Pre-Project Basin Map in Appendix 'B'. Basin PRE1 is 7.9 acres in size and includes the area tributary to the Industrial Street storm drain system. Basin PRE1 is 5.6 acres in size and includes the area tributary to the proposed culvert that will be built with Industrial Street. Pre-project 'C' values have been derived from Table 819.2A from the Caltrans Highway Design Manual (HDM). See Appendix 'B' for the Pre-Project Basin Map, pre-project basin data and the pre-project calculations.

POST-PROJECT CONDITION

In the post-project condition, the site includes three drainage basins as shown in the Post-Project Basin Map in Appendix 'C'. Basin POST1 is 7.4 acres in size and includes the area tributary to the proposed detention basin. This basin will drain from east to west via a storm drainage system. The project mostly consists of impervious areas, sharply increasing the rational 'C' value. Basin UNDET1 is 4.1 acres in size and is tributary to Industrial Street. The peak flow from UNDET1 needs to be lower than the peak flow from PRE1 since Industrial Street's infrastructure was sized to convey the pre-existing flows. Bain UNDET 2 includes the rest of the site and is tributary to the culvert in Industrial Street. All three flows combine just south of the culvert (PRE-T).

Post-project 'C' values have been derived from Table 819.2B from the Caltrans Highway Design Manual (HDM). See Appendix 'C' for the Post-Project Basin Map, post-project basin data and the post-project calculations.

Detention Basin

The proposed detention basin is an above ground detention basin with a "Safe Routes to School" path on the west, a 6' wide berm on the west side and 3:1 interior slopes. The detention basin is located at the western side of the project. The detention basin outlet structure is anticipated to be an area drain with a circular opening and a teepee grate.

See the table below containing the details, pre-project, and post-project flows for the site and the proposed detention basin.

Per the City of Redding's MS4 requirements, the 2-year peak flow rate must not exceed pre-project flow rates in the post-project condition. The Drainage Summary Table below shows that the peak flow rate in the 2-year storm has not increased.

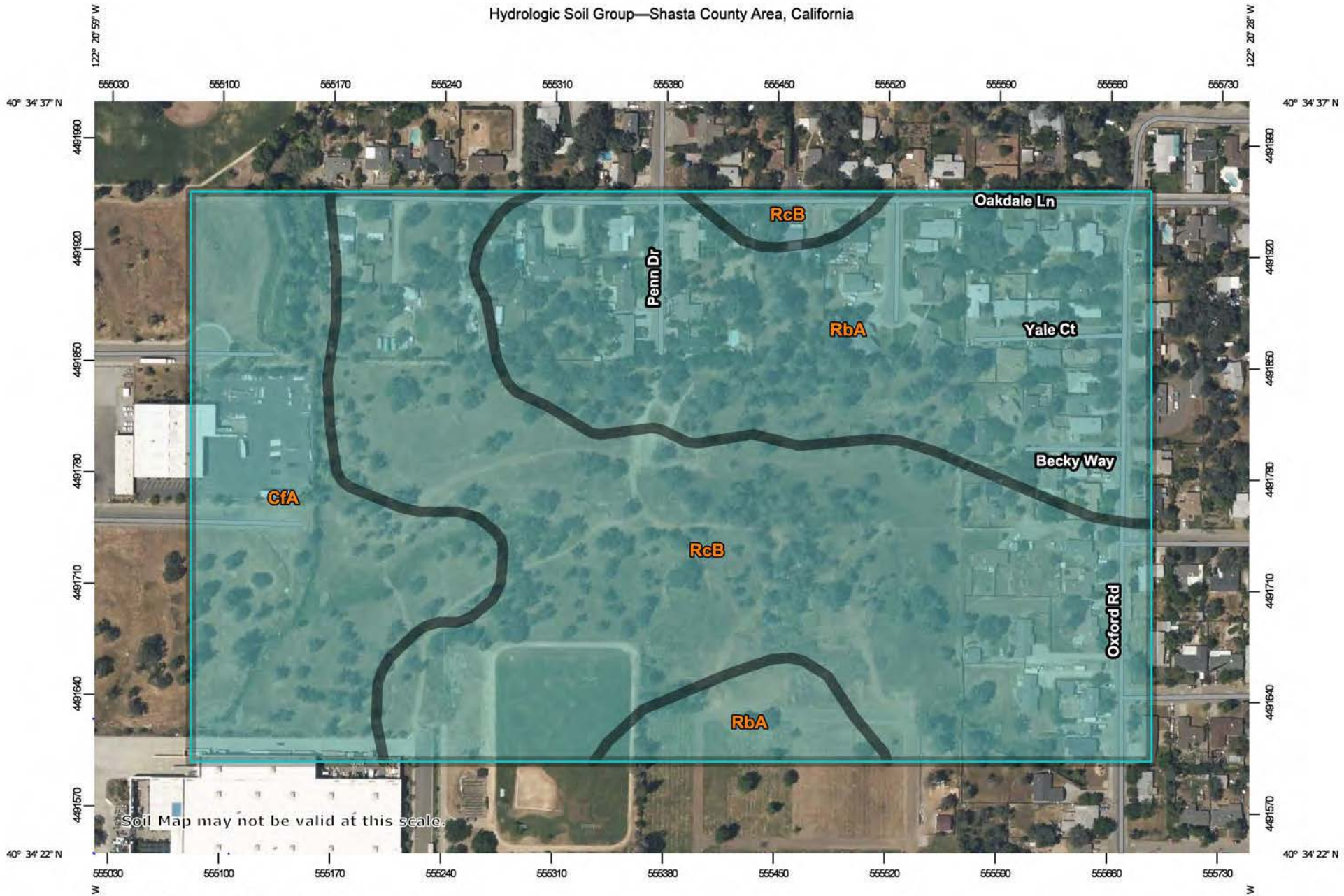
Detention Basin: Drainage Summary					
Elevations		**Openings**		**Opening Inverts**	
Top elevation:	565.00	Bottom Opening:	12" Diameter Circle	561.00 ft	
Bottom elevation:	561.00	2nd Opening:	-	-	
100-year WSE:	563.84	Top Opening:	24x24 AD Grate	563.50 ft	
	Pre-Project Total (PRE-T)	Post-Project Total (POST-T)	Pre-Project Industrial Street (PRE1)	Post-Project Industrial Street (UNDET1)	
2-year	**7.59 cfs**	**5.83 cfs**	**3.68 cfs**	**2.05 cfs**	
10-year	**10.67 cfs**	**7.93 cfs**	**5.18 cfs**	**2.88 cfs**	
25-year	**13.86 cfs**	**10.11 cfs**	**6.73 cfs**	**3.80 cfs**	
100-year	**19.85 cfs**	**16.19 cfs**	**9.56 cfs**	**5.37 cfs**	

CONCLUSION

As described above, the project's storm drain system manages the storm water runoff in a way that maintains or reduces pre-project runoff volumes in the post-project condition. The proposed storm drain design complies with City Council Policy 1806, and City of Redding Engineering Division requirements for protection of floodplains and downstream drainage concerns.

Appendix A
SITE DETAILS

USDA Web Soil Survey 5-6
NOAA Precipitation Data 7



Map Scale: 1:3,330 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CfA	Churn gravelly loam, deep, 0 to 3 percent slopes	C	10.6	19.6%
RbA	Red Bluff loam, 0 to 3 percent slopes, MLRA 17, moist	C	18.1	33.5%
RcB	Red Bluff gravelly loam, moderately deep, 3 to 8 percent slopes	C	25.3	46.8%
Totals for Area of Interest			**53.9**	**100.0%**

NOAA Atlas 14, Volume 6, Version 2
Location name: Redding, California, USA*
Latitude: 40.575°, Longitude: -122.3458°
Elevation: 578 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.207 (0.179-0.243)	0.248 (0.213-0.291)	0.303 (0.260-0.356)	0.349 (0.296-0.414)	0.413 (0.337-0.511)	0.464 (0.370-0.588)	0.517 (0.401-0.675)	0.574 (0.430-0.774)	0.654 (0.467-0.925)	0.718 (0.493-1.06)
10-min	0.297 (0.256-0.348)	0.355 (0.306-0.417)	0.434 (0.372-0.511)	0.500 (0.425-0.594)	0.592 (0.484-0.732)	0.665 (0.530-0.843)	0.742 (0.574-0.967)	0.823 (0.617-1.11)	0.937 (0.669-1.32)	1.03 (0.706-1.52)
15-min	0.359 (0.309-0.420)	0.430 (0.370-0.504)	0.525 (0.450-0.618)	0.604 (0.514-0.718)	0.716 (0.585-0.885)	0.804 (0.641-1.02)	0.897 (0.695-1.17)	0.995 (0.746-1.34)	1.13 (0.809-1.60)	1.24 (0.854-1.83)
30-min	0.480 (0.414-0.563)	0.575 (0.495-0.675)	0.702 (0.603-0.827)	0.809 (0.687-0.961)	0.958 (0.783-1.18)	1.08 (0.858-1.36)	1.20 (0.929-1.56)	1.33 (0.998-1.80)	1.52 (1.08-2.14)	1.67 (1.14-2.45)
60-min	0.677 (0.584-0.793)	0.811 (0.698-0.951)	0.990 (0.850-1.16)	1.14 (0.969-1.36)	1.35 (1.10-1.67)	1.52 (1.21-1.92)	1.69 (1.31-2.21)	1.88 (1.41-2.53)	2.14 (1.53-3.02)	2.35 (1.61-3.46)
2-hr	0.963 (0.830-1.13)	1.13 (0.975-1.33)	1.36 (1.17-1.60)	1.56 (1.32-1.85)	1.83 (1.49-2.26)	2.05 (1.63-2.60)	2.28 (1.77-2.97)	2.53 (1.90-3.41)	2.88 (2.06-4.08)	3.17 (2.18-4.67)
3-hr	1.16 (0.998-1.36)	1.36 (1.17-1.59)	1.62 (1.39-1.91)	1.85 (1.57-2.20)	2.17 (1.77-2.68)	2.42 (1.93-3.07)	2.69 (2.09-3.51)	2.98 (2.24-4.02)	3.40 (2.42-4.80)	3.73 (2.56-5.50)
6-hr	1.59 (1.37-1.87)	1.87 (1.61-2.19)	2.24 (1.92-2.64)	2.55 (2.17-3.03)	2.98 (2.43-3.68)	3.32 (2.65-4.21)	3.68 (2.85-4.80)	4.06 (3.04-5.47)	4.60 (3.28-6.50)	5.04 (3.46-7.41)
12-hr	2.13 (1.83-2.49)	2.57 (2.22-3.02)	3.16 (2.71-3.71)	3.62 (3.08-4.30)	4.25 (3.48-5.26)	4.74 (3.78-6.00)	5.22 (4.04-6.81)	5.72 (4.29-7.72)	6.40 (4.57-9.06)	6.93 (4.76-10.2)
24-hr	2.82 (2.48-3.26)	3.54 (3.12-4.10)	4.46 (3.91-5.18)	5.17 (4.51-6.06)	6.11 (5.17-7.37)	6.81 (5.65-8.37)	7.50 (6.09-9.42)	8.18 (6.48-10.5)	9.08 (6.92-12.1)	9.75 (7.20-13.5)
2-day	3.70 (3.26-4.28)	4.66 (4.10-5.40)	5.86 (5.15-6.81)	6.81 (5.94-7.97)	8.05 (6.82-9.71)	8.98 (7.45-11.0)	9.89 (8.03-12.4)	10.8 (8.55-13.9)	12.0 (9.15-16.1)	12.9 (9.53-17.8)
3-day	4.33 (3.81-5.01)	5.42 (4.77-6.28)	6.80 (5.98-7.91)	7.90 (6.89-9.25)	9.34 (7.90-11.3)	10.4 (8.65-12.8)	11.5 (9.33-14.4)	12.6 (9.94-16.2)	14.0 (10.7-18.7)	15.0 (11.1-20.8)
4-day	4.86 (4.29-5.63)	6.08 (5.35-7.05)	7.63 (6.70-8.86)	8.85 (7.72-10.4)	10.5 (8.85-12.6)	11.7 (9.68-14.3)	12.9 (10.4-16.2)	14.1 (11.1-18.1)	15.6 (11.9-20.9)	16.8 (12.4-23.2)
7-day	6.03 (5.32-6.98)	7.51 (6.62-8.71)	9.39 (8.25-10.9)	10.9 (9.48-12.7)	12.8 (10.9-15.5)	14.3 (11.9-17.6)	15.7 (12.8-19.8)	17.2 (13.6-22.1)	19.1 (14.5-25.5)	20.5 (15.2-28.3)
10-day	6.92 (6.10-8.01)	8.60 (7.58-9.97)	10.7 (9.43-12.5)	12.4 (10.8-14.5)	14.6 (12.4-17.6)	16.3 (13.5-20.0)	17.9 (14.5-22.5)	19.5 (15.4-25.1)	21.6 (16.5-29.0)	23.2 (17.2-32.1)
20-day	9.23 (8.14-10.7)	11.5 (10.1-13.3)	14.3 (12.6-16.7)	16.6 (14.4-19.4)	19.4 (16.4-23.4)	21.5 (17.9-26.5)	23.6 (19.2-29.6)	25.6 (20.3-33.0)	28.3 (21.6-37.8)	30.2 (22.3-41.7)
30-day	11.2 (9.87-13.0)	14.0 (12.3-16.2)	17.4 (15.3-20.2)	20.0 (17.4-23.4)	23.4 (19.8-28.2)	25.9 (21.5-31.8)	28.2 (22.9-35.5)	30.6 (24.2-39.4)	33.6 (25.6-45.0)	35.8 (26.4-49.4)
45-day	14.0 (12.3-16.2)	17.4 (15.3-20.2)	21.6 (18.9-25.1)	24.8 (21.6-29.0)	28.8 (24.4-34.8)	31.7 (26.4-39.0)	34.5 (28.1-43.4)	37.2 (29.5-48.0)	40.7 (31.0-54.4)	43.2 (31.9-59.6)
60-day	16.5 (14.5-19.1)	20.5 (18.0-23.7)	25.3 (22.2-29.4)	29.0 (25.3-33.9)	33.6 (28.4-40.5)	36.9 (30.6-45.3)	40.0 (32.5-50.2)	43.0 (34.0-55.4)	46.7 (35.6-62.5)	49.4 (36.5-68.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

APPENDIX B
PRE-PROJECT CONDITION

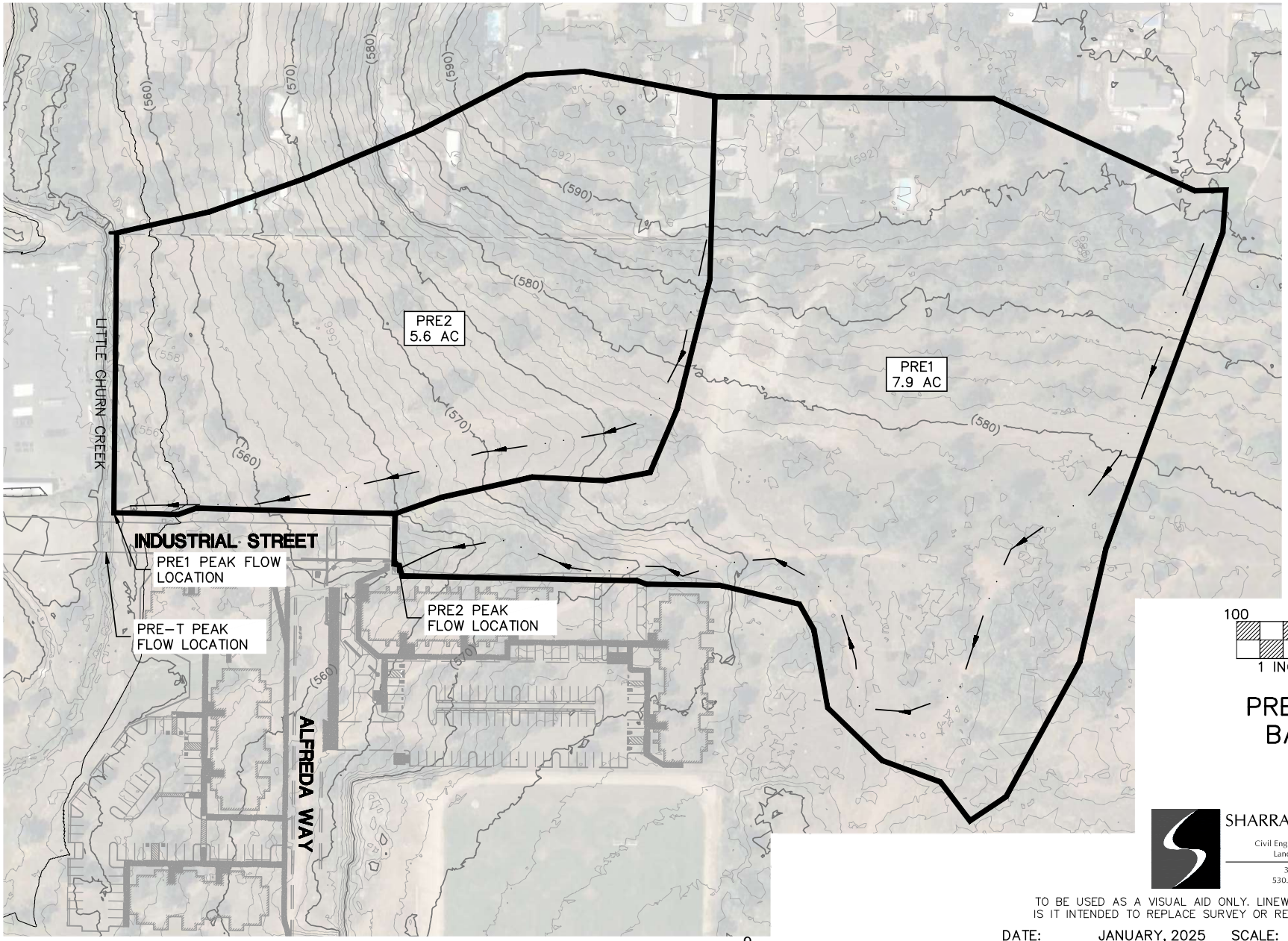
Pre-Project Basin Map 9
Stormwater Runoff Coefficient for Undeveloped Areas 10

PRE1 Subbasin Characteristic Calculations 11
PRE1 HydroCAD Runoff Results 12-15

PRE2 Subbasin Characteristic Calculations 16
PRE2 HydroCAD Runoff Results 17-20

PRE-T Critical Duration Analysis 21

PRE Total (PRE-T) HydroCAD Runoff Results 22-25



PRE-PROJECT BASIN MAP

CHYBA

BY

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DATE: JANUARY, 2025 SCALE: 1"=100' SHEET 1 OF 1

RTT "P:\proj\p\23161\Dwg\23161det-ent.dwg" JOB#:23.0161.000

Stormwater Runoff Coefficient for Undeveloped Areas

Calculate Composite Runoff Coefficient

$$C_{ave} = \frac{A_1*C_1 + A_2*C_2 + A_3*C_3 + A_4*C_4 + A_5*C_5}{A_T}$$

C-values obtained from Table 819.2A (Caltrans Highway Design Manual)

Surface Type		'C' Value 10-yr x1.00	25-yr x1.10	100-yr x1.25
Relief	~5% Fall Across Site	0.14		
Soil Infiltration	Type 'C' Gravelly Loam	0.10		
Vegetal Cover	Short Grass with Trees	0.07		
Surface Storage	Normal Surface Depressions	0.08		
		0.39	0.43	0.49

Subbasin Characteristics Calculations

For Input into HydroCAD
Basin: PRE1

Calculate Composite Runoff Coefficient:

$$C_{ave} = \frac{A_1*C_1 + A_2*C_2 + A_3*C_3 + A_4*C_4 + A_5*C_5}{A_{Total}}$$

C-values obtained using Table 819.2B (Caltrans Highway Design Manual)

Surface Type	Areas		'C' Value 10-yr x1.00	25-yr x1.10	100-yr x1.25
Impervious Area			0.90		
Road Area			0.90		
Undeveloped Area	6.3 ac		0.39		
Landscaped Area			0.17		
Single Family Residential	1.6 ac		0.50		
Total Basin Area =	7.9 ac		0.41	0.45	0.51

Calculate Time of Concentration:

Time of Concentration (Overland) $i = 13.5(Tc)^{-0.61}$ $Tco = (0.66\ L^{0.5}\ n^{0.52}) / (S^{0.31}\ i^{0.38})$

COR Hydro Manual — Estimated — Calculated
pg. C-14 & C-16 — i = 2.53 in/hr — 2.53 in/hr

$Tc_{overland}$ = 15.6 min — Tco_{min} = 5.0 min

L = 300 ft — Length of Flowpath
S = 0.037 ft/ft — Average Slope of Flowpath
n = 0.50 — Few trees/natural grass, Table C-9

Time of Concentration (Shallow Concentrated Flow) $Tcg = (L / V)$

Hydraulic Design Series No. 2 pg. 2-24

$V_{shallow} = \alpha\kappa S^{0.5}$
$V_{shallow}$ = 2.1 ft/s
L / (60 V) = $Tc_{Shallow}$ = 7.9 min

L = 1000 ft — Length of Flowpath
S_{ave} = 0.017 ft/ft — Average Longitudinal Slope
κ = 0.491 — Unpaved
α = 33 — Unit Conversion (33)

ΣTc = 23.5 min

Summary for Subcatchment 1S: PRE1

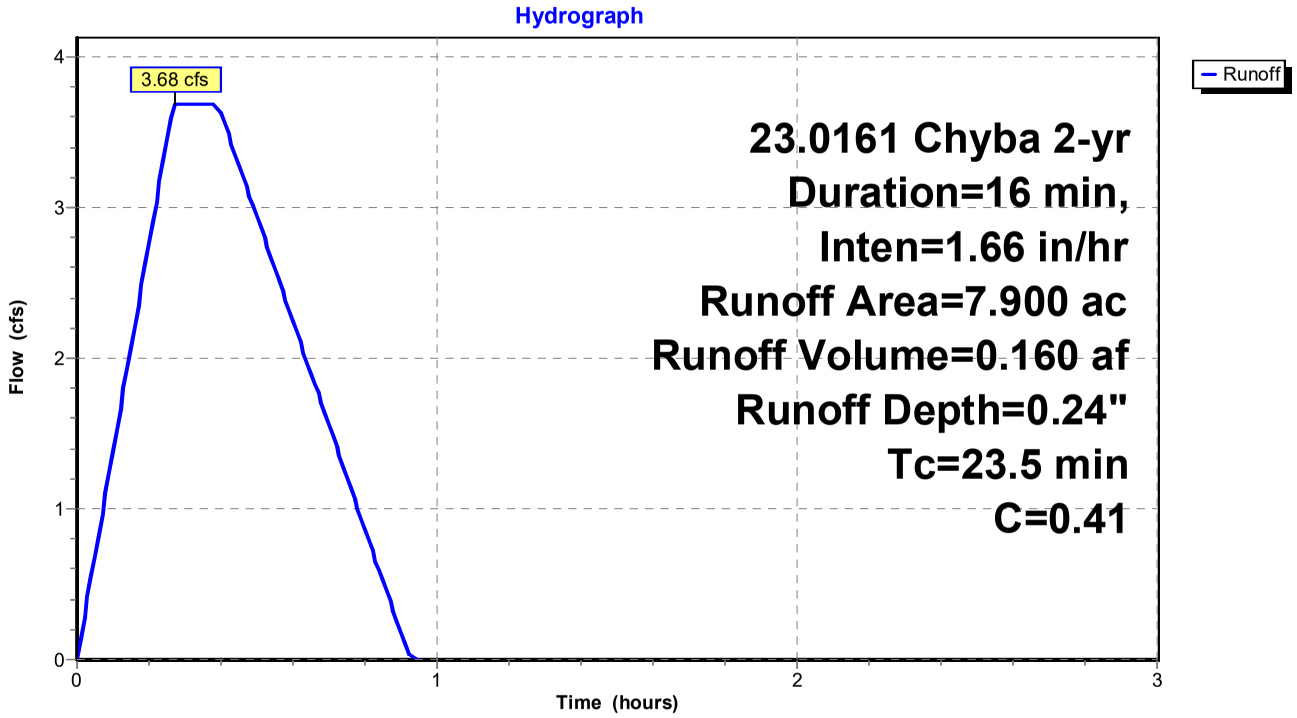
Runoff = 3.68 cfs @ 0.27 hrs, Volume= 0.160 af, Depth= 0.24"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 2-yr Duration=16 min, Inten=1.66 in/hr

Area (ac)	C	Description
6.300	0.39	Undeveloped Area
1.600	0.50	Single Family Residential
7.900	0.41	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5					**Direct Entry, TC**

Subcatchment 1S: PRE1



Summary for Subcatchment 1S: PRE1

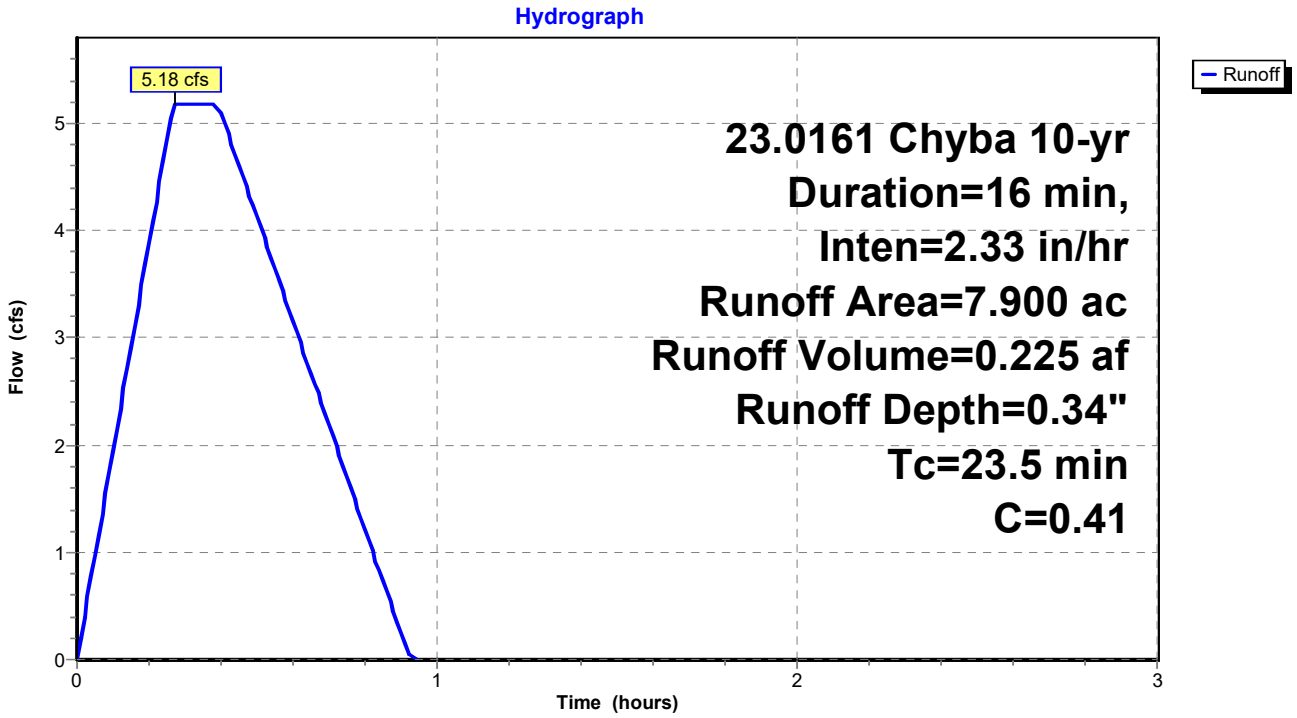
Runoff = 5.18 cfs @ 0.27 hrs, Volume= 0.225 af, Depth= 0.34"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 10-yr Duration=16 min, Inten=2.33 in/hr

Area (ac)	C	Description
6.300	0.39	Undeveloped Area
1.600	0.50	Single Family Residential
7.900	0.41	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5					**Direct Entry, TC**

Subcatchment 1S: PRE1



Summary for Subcatchment 1S: PRE1

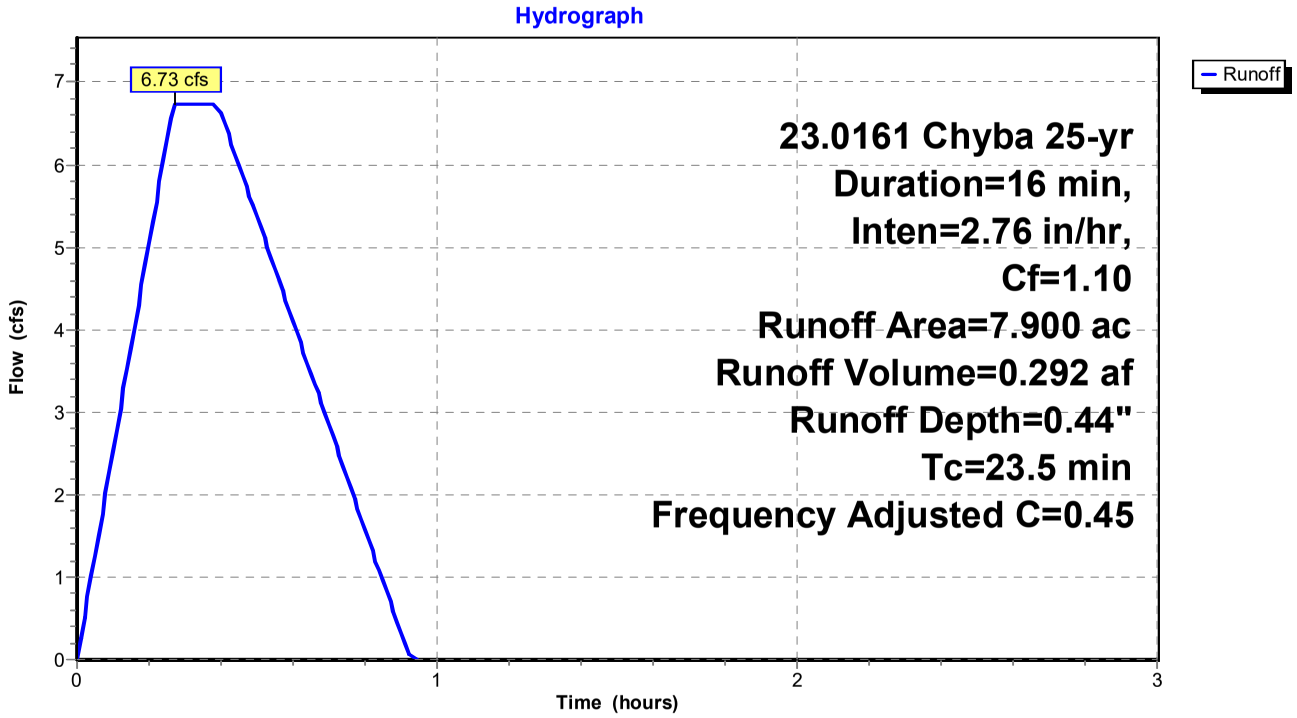
Runoff = 6.73 cfs @ 0.27 hrs, Volume= 0.292 af, Depth= 0.44"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 25-yr Duration=16 min, Inten=2.76 in/hr, Cf=1.10

Area (ac)	C	Adj	Description
6.300	0.39		Undeveloped Area
1.600	0.50		Single Family Residential
7.900	0.41	0.45	Weighted Average, Frequency Adjusted
7.900			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5					**Direct Entry, TC**

Subcatchment 1S: PRE1



Summary for Subcatchment 1S: PRE1

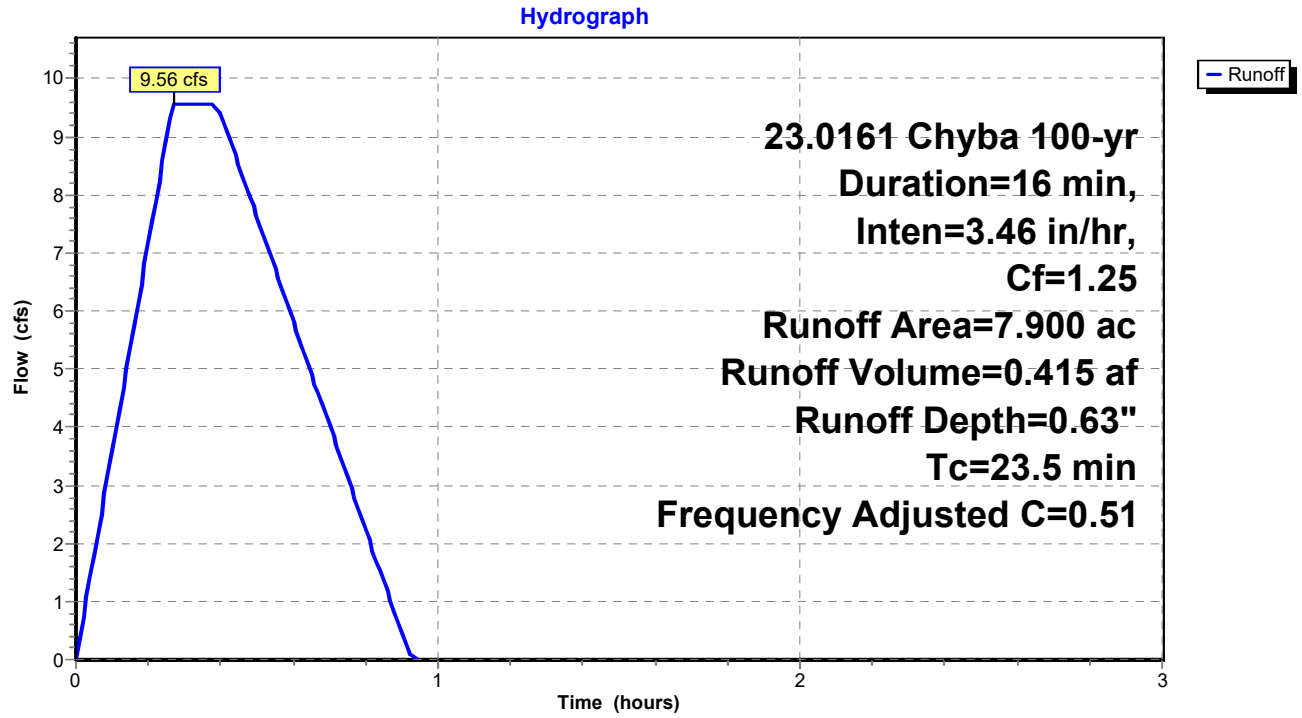
Runoff = 9.56 cfs @ 0.27 hrs, Volume= 0.415 af, Depth= 0.63"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 100-yr Duration=16 min, Inten=3.46 in/hr, Cf=1.25

Area (ac)	C	Adj	Description
6.300	0.39		Undeveloped Area
1.600	0.50		Single Family Residential
7.900	0.41	0.51	Weighted Average, Frequency Adjusted
7.900			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5					**Direct Entry, TC**

Subcatchment 1S: PRE1



Subbasin Characteristics Calculations

For Input into HydroCAD
Basin: PRE2

Calculate Composite Runoff Coefficient:

$$C_{ave} = \frac{A_1*C_1 + A_2*C_2 + A_3*C_3 + A_4*C_4 + A_5*C_5}{A_{Total}}$$

C-values obtained using Table 819.2B (Caltrans Highway Design Manual)

Surface Type	Areas		'C' Value 10-yr x1.00	25-yr x1.10	100-yr x1.25
Impervious Area			0.90		
Road Area			0.90		
Undeveloped Area	4.1 ac		0.39		
Landscaped Area			0.17		
Single Family Residential	1.5 ac		0.50		
Total Basin Area =	5.6 ac		0.42	0.46	0.53

Calculate Time of Concentration:

Time of Concentration (Overland) $i = 13.5(Tc)^{-0.61}$ $Tco = (0.66\ L^{0.5}\ n^{0.52}) / (S^{0.31}\ i^{0.38})$

COR Hydro Manual pg. C-14 & C-16

	Estimated	Calculated			
i =	2.77 in/hr	2.77 in/hr	L =	300 ft	Length of Flowpath
			S =	0.054 ft/ft	Average Slope of Flowpath
$Tc_{overland}$ = 13.4 min	Tco_{min} = 5.0 min		n =	0.50	Few trees/natural grass, Table C-9

Time of Concentration (Shallow Concentrated Flow) Tcg = (L / V)

Hydraulic Design Series No. 2 pg. 2-24

$V_{shallow} = \alpha\kappa S^{0.5}$		L =	475 ft	Length of Flowpath
$V_{shallow}$ = 3.1 ft/s		S_{ave} =	0.036 ft/ft	Average Longitudinal Slope
		κ =	0.491	Unpaved
L / (60 V) = $Tc_{Shallow}$ = 2.6 min		α =	33	Unit Conversion (33)

ΣTc = 16.0 min

Summary for Subcatchment 2S: PRE2

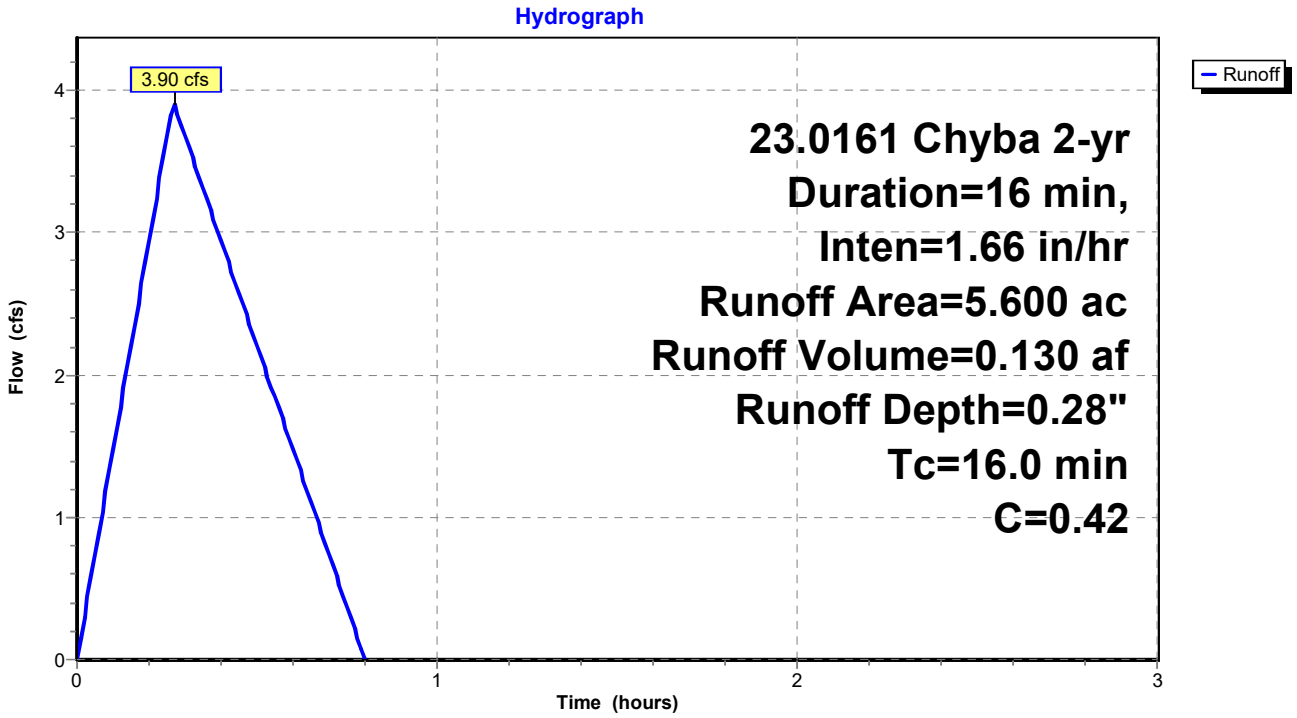
Runoff = 3.90 cfs @ 0.27 hrs, Volume= 0.130 af, Depth= 0.28"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 2-yr Duration=16 min, Inten=1.66 in/hr

Area (ac)	C	Description
1.500	0.50	Single Family Residential
4.100	0.39	Undeveloped
5.600	0.42	Weighted Average
5.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0					**Direct Entry, TC**

Subcatchment 2S: PRE2



Summary for Subcatchment 2S: PRE2

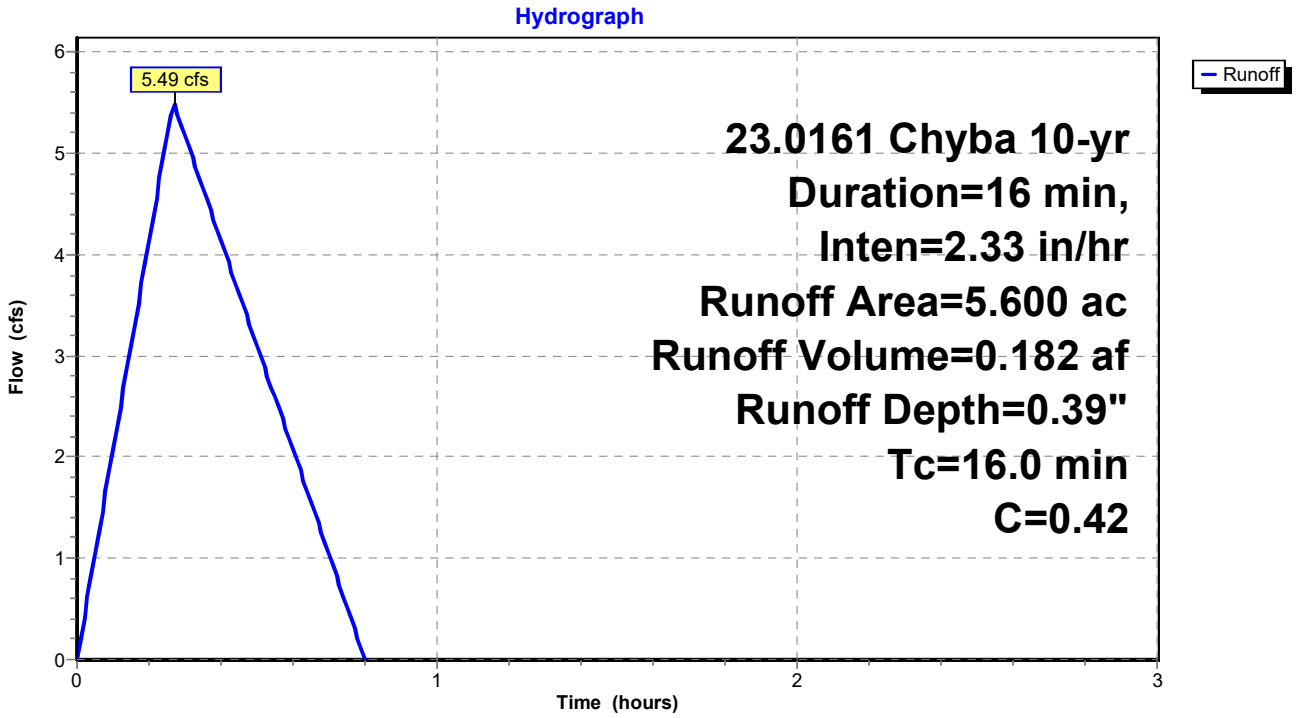
Runoff = 5.49 cfs @ 0.27 hrs, Volume= 0.182 af, Depth= 0.39"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 10-yr Duration=16 min, Inten=2.33 in/hr

Area (ac)	C	Description
1.500	0.50	Single Family Residential
4.100	0.39	Undeveloped
5.600	0.42	Weighted Average
5.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0					**Direct Entry, TC**

Subcatchment 2S: PRE2



Summary for Subcatchment 2S: PRE2

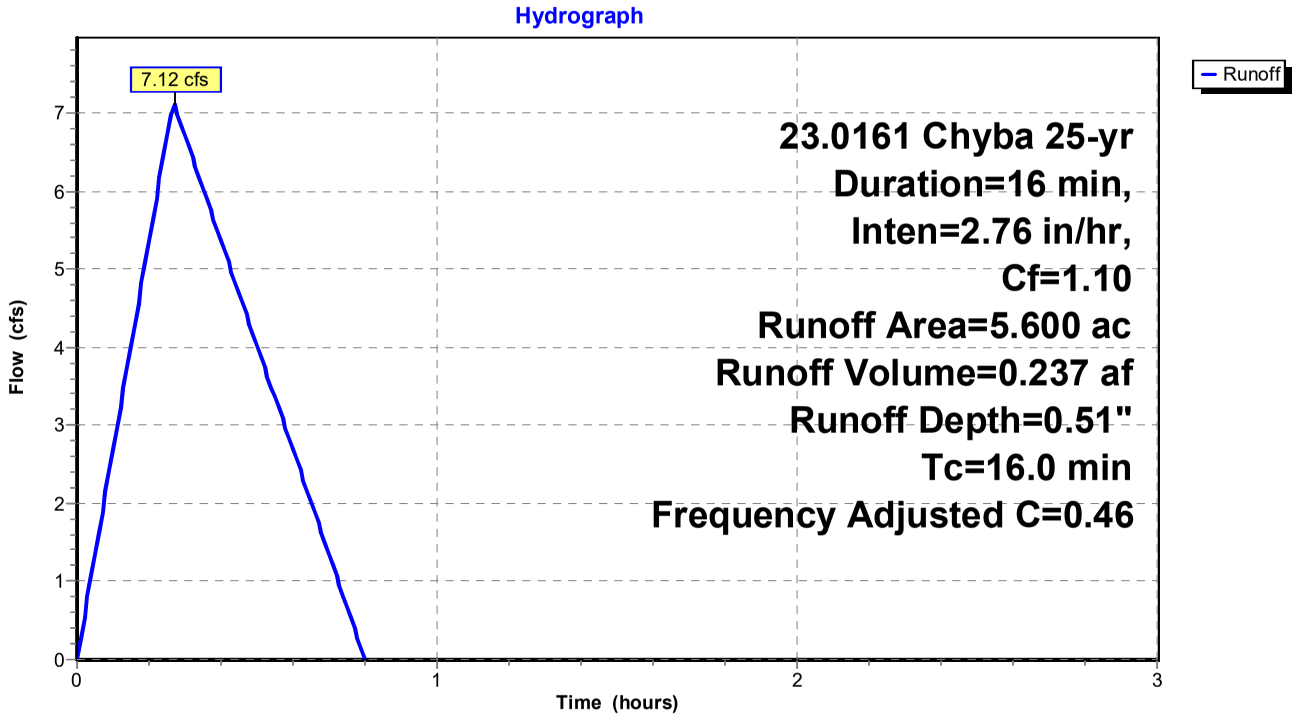
Runoff = 7.12 cfs @ 0.27 hrs, Volume= 0.237 af, Depth= 0.51"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 25-yr Duration=16 min, Inten=2.76 in/hr, Cf=1.10

Area (ac)	C	Adj	Description
1.500	0.50		Single Family Residential
4.100	0.39		Undeveloped
5.600	0.42	0.46	Weighted Average, Frequency Adjusted
5.600			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0					**Direct Entry, TC**

Subcatchment 2S: PRE2



Summary for Subcatchment 2S: PRE2

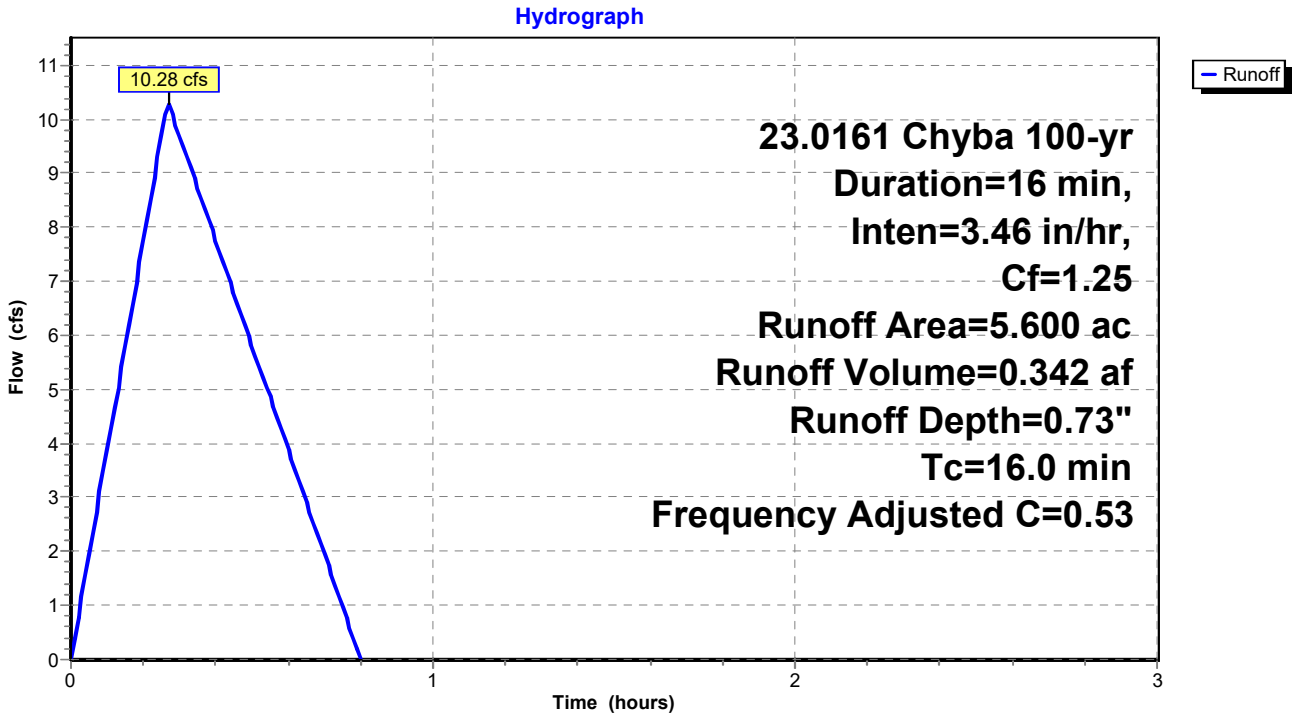
Runoff = 10.28 cfs @ 0.27 hrs, Volume= 0.342 af, Depth= 0.73"
Routed to Link 3L : PRE-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 100-yr Duration=16 min, Inten=3.46 in/hr, Cf=1.25

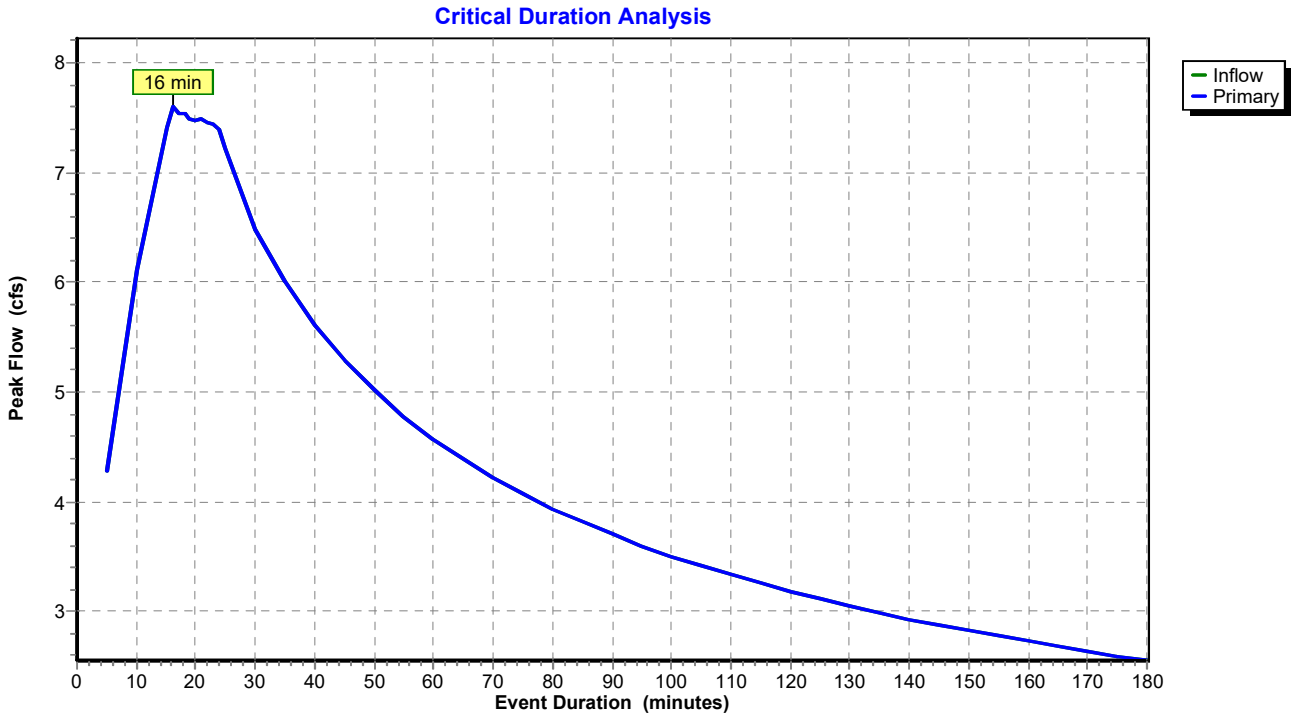
Area (ac)	C	Adj	Description
1.500	0.50		Single Family Residential
4.100	0.39		Undeveloped
5.600	0.42	0.53	Weighted Average, Frequency Adjusted
5.600			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0					**Direct Entry, TC**

Subcatchment 2S: PRE2



Link 3L: PRE-T

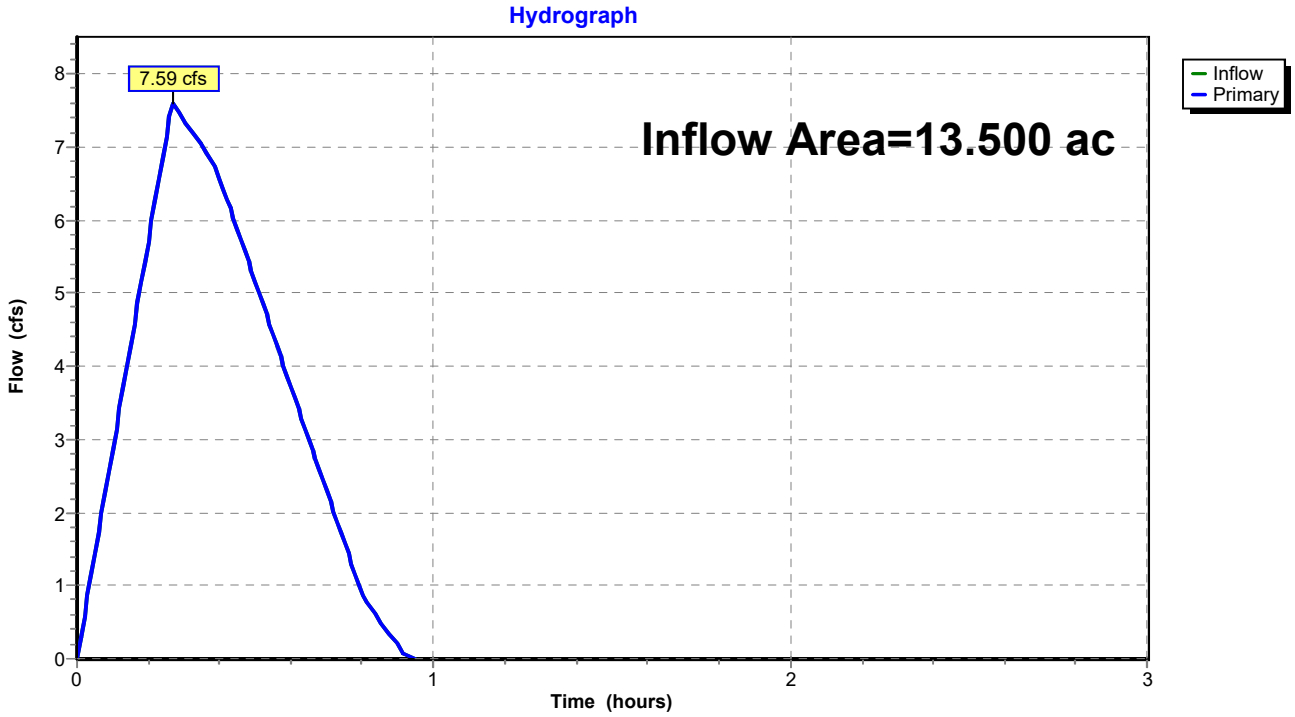

Critical Duration Analysis
16 min
Inflow
Primary
Peak Flow (cfs)
Event Duration (minutes)
8
7
6
5
4
3
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180

Summary for Link 3L: PRE-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth = 0.26" for 2-yr event
Inflow = 7.59 cfs @ 0.27 hrs, Volume= 0.290 af
Primary = 7.59 cfs @ 0.27 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 3L: PRE-T

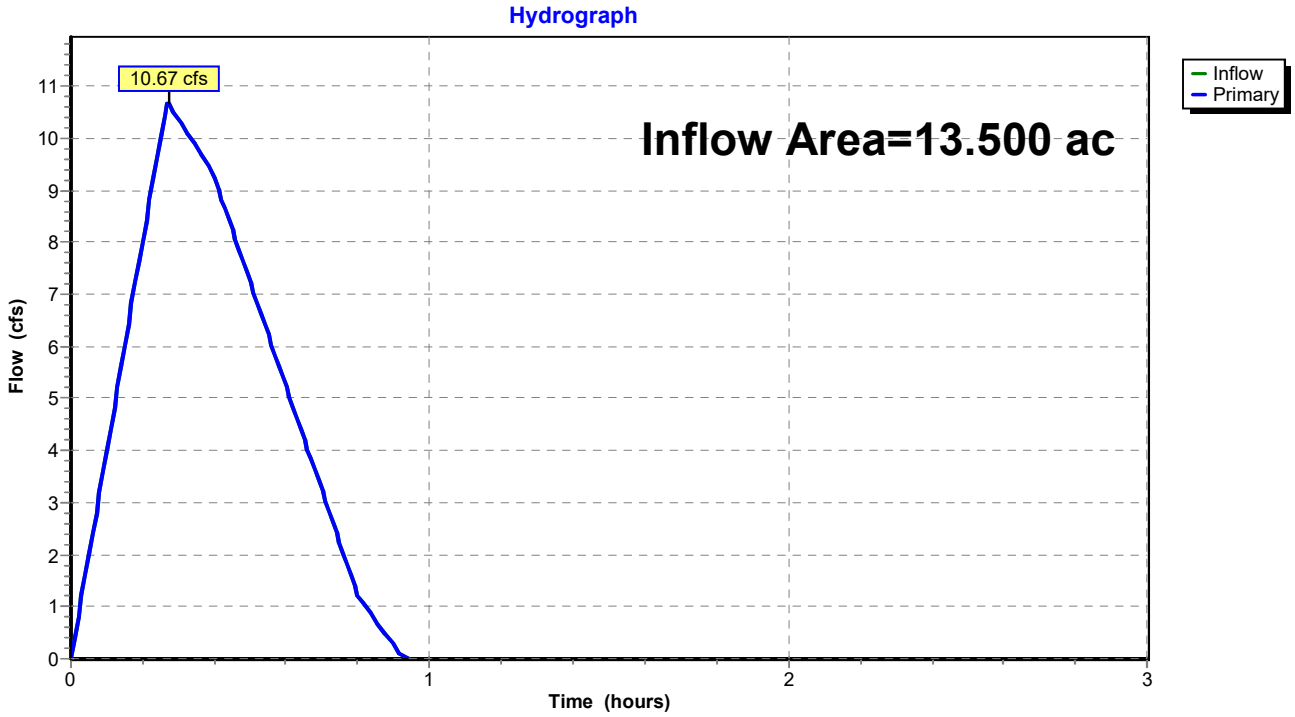


Summary for Link 3L: PRE-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth = 0.36" for 10-yr event
Inflow = 10.67 cfs @ 0.27 hrs, Volume= 0.407 af
Primary = 10.67 cfs @ 0.27 hrs, Volume= 0.407 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 3L: PRE-T

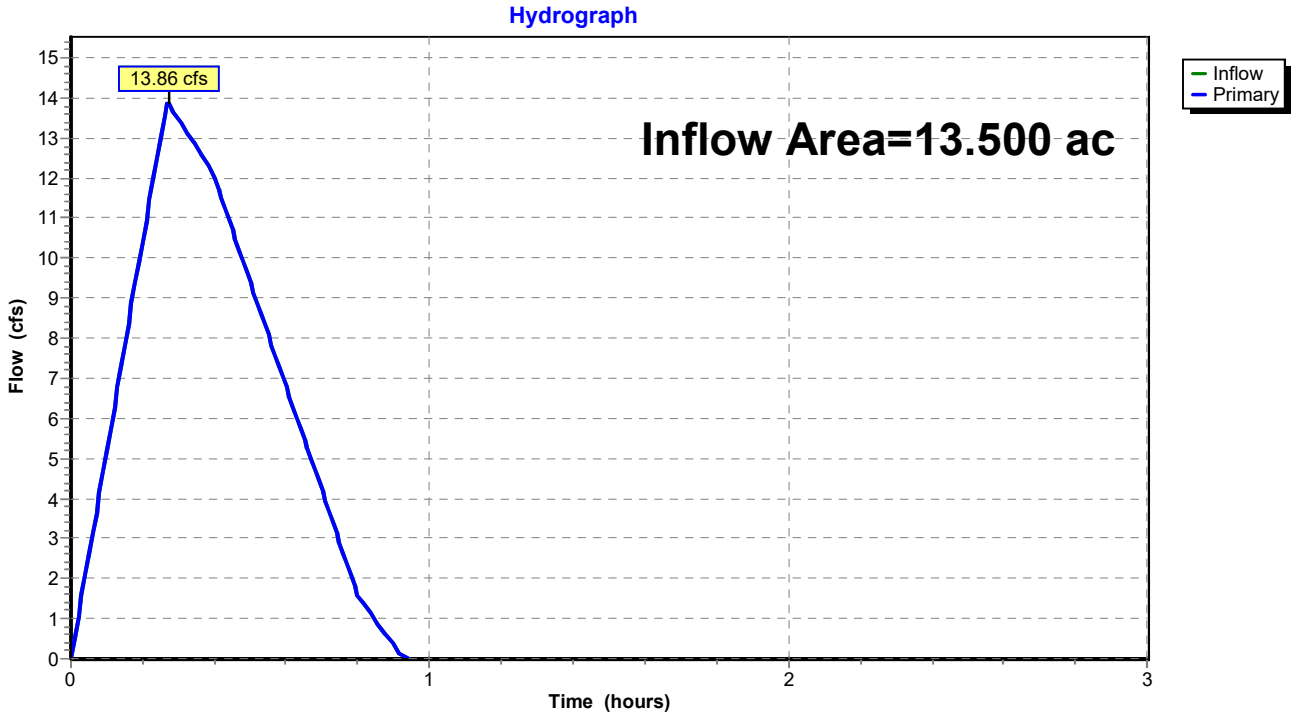


Summary for Link 3L: PRE-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth = 0.47" for 25-yr event
Inflow = 13.86 cfs @ 0.27 hrs, Volume= 0.529 af
Primary = 13.86 cfs @ 0.27 hrs, Volume= 0.529 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 3L: PRE-T

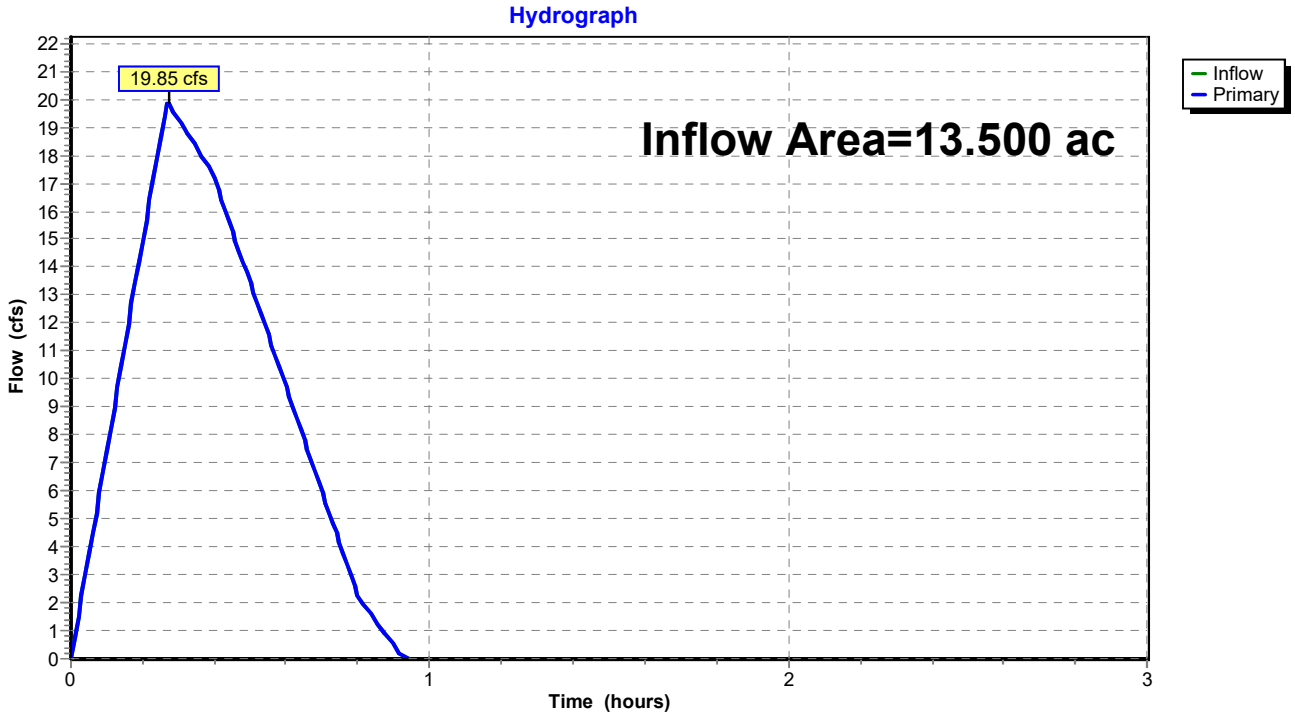


Summary for Link 3L: PRE-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth = 0.67" for 100-yr event
Inflow = 19.85 cfs @ 0.27 hrs, Volume= 0.757 af
Primary = 19.85 cfs @ 0.27 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 3L: PRE-T



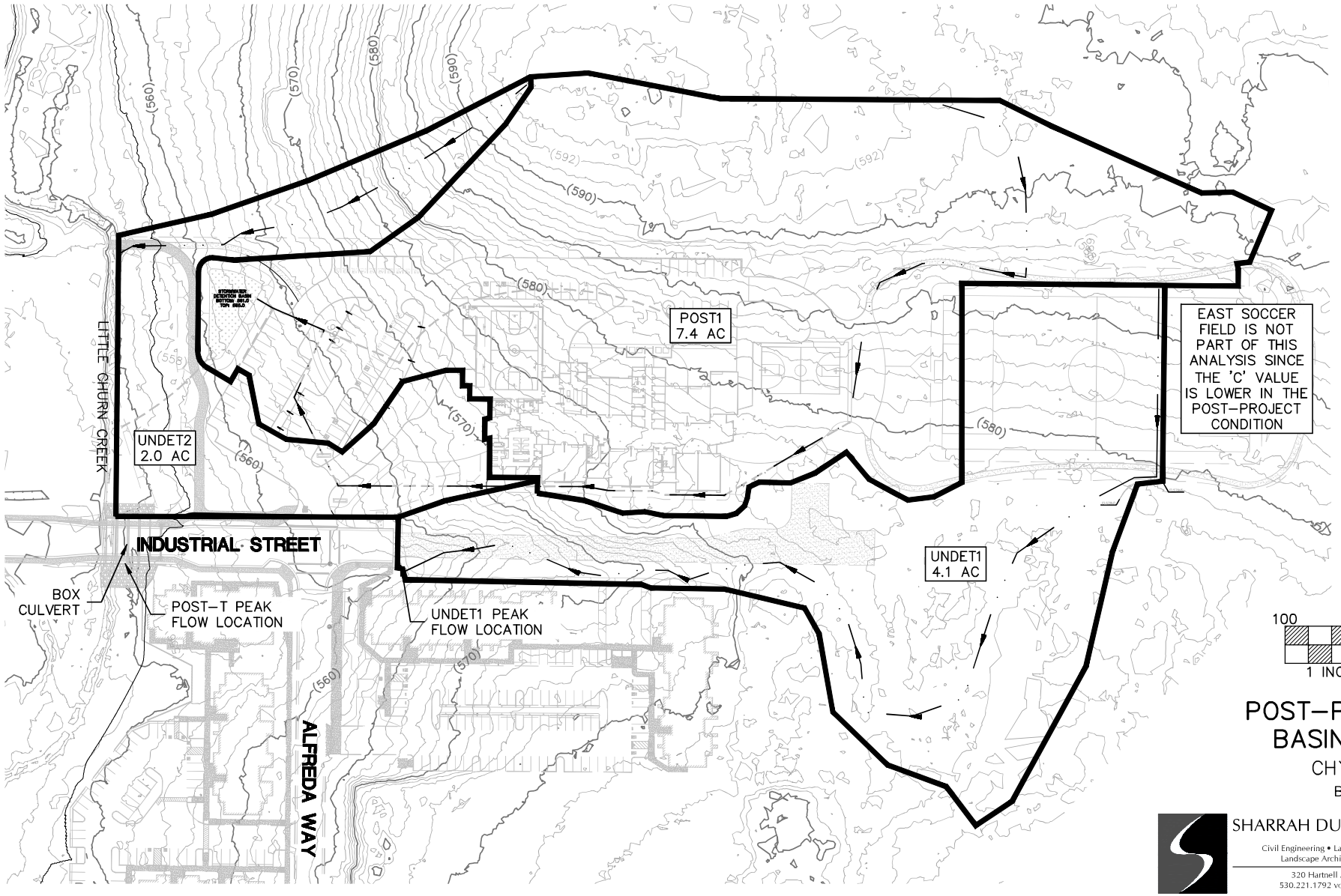
Appendix C
POST-PROJECT CONDITION

Post-Project Basin Map 27

POST1 Subbasin Characteristic Calculations 28
POST1 HydroCAD Runoff Results 29-32

UNDET1 Subbasin Characteristic Calculations 33
UNDET1 HydroCAD Runoff Results 34-37

UNDET2 Subbasin Characteristic Calculations 38
UNDET2 HydroCAD Runoff Results 39-42



POST-PROJECT BASIN MAP

CHYBA

BY

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DATE: JANUARY, 2025 SCALE: 1"=100' SHEET 1 OF 1

RTT "P:\proj\p\23161\Dwg\23161det-ent.dwg" JOB#:23.0161.000

Subbasin Characteristics Calculations

For Input into HydroCAD
Basin: POST1

Calculate Composite Runoff Coefficient:

$$C_{ave} = \frac{A_1*C_1 + A_2*C_2 + A_3*C_3 + A_4*C_4 + A_5*C_5}{A_{Total}}$$

C-values obtained using Table 819.2B (Caltrans Highway Design Manual)

Surface Type	Areas		'C' Value 10-yr x1.00	25-yr x1.10	100-yr x1.25
Impervious Area	2.7 ac		0.90		
Road Area			0.90		
Undeveloped Area	1.1 ac		0.39		
Landscaped Area	1.0 ac		0.17		
Single Family Residential	2.6 ac		0.50		
Total Basin Area =	7.4 ac		0.59	0.65	0.74

Calculate Time of Concentration:

Time of Concentration (Overland) $i = 13.5(Tc)^{-0.61}$ $Tco = (0.66\ L^{0.5}\ n^{0.52}) / (S^{0.31}\ i^{0.38})$

COR Hydro Manual pg. C-14 & C-16

	Estimated	Calculated		
i =	2.53 in/hr	2.53 in/hr	L = 230 ft	Length of Flowpath
			S = 0.024 ft/ft	Average Slope of Flowpath
$Tc_{overland}$ = 15.6 min	Tco_{min} = 5.0 min		n = 0.50	Few trees/natural grass, Table C-9

Time of Concentration (Shallow Concentrated Flow) Tcg = (L / V)

Hydraulic Design Series No. 2 pg. 2-24

	L = 318 ft	Length of Flowpath
$V_{shallow} = \alpha\kappa S^{0.5}$	S_{ave} = 0.030 ft/ft	Average Longitudinal Slope
$V_{shallow}$ = 3.5 ft/s	κ = 0.619	Paved
L / (60 V) = $Tc_{Shallow}$ = 1.5 min	α = 33	Unit Conversion (33)

Time of Concentration (Pipes/Channels) Tcs = (L / V)

COR Hydro Manual pg. C-15

	L = 840 ft	Length of Flowpath
$V_{mann} = (1.49/n)\ R^{0.67}\ S^{0.5}$	S_{ave} = 0.005 ft/ft	Average Longitudinal Slope
R= A / P = 0.33 ft	n = 0.012	HDPE
V_{mann} = 4.2 ft/s	A = 1.0 sf	Area of Flow
L / (60 V) = Tc_{mann} = 3.3 min	P = 3 ft	Wetted Perimeter

ΣTc = 20.4 min

Summary for Subcatchment 4S: POST1

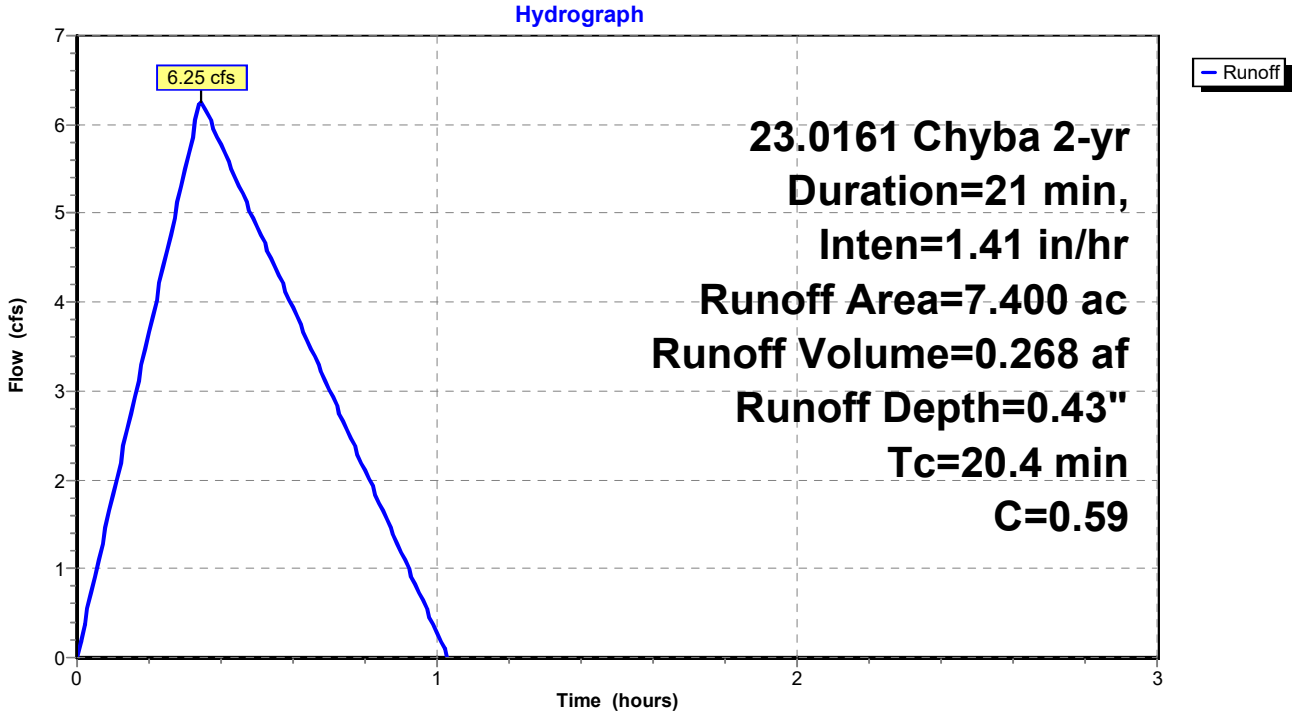
Runoff = 6.25 cfs @ 0.35 hrs, Volume= 0.268 af, Depth= 0.43"
Routed to Pond 5P : DET-A

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 2-yr Duration=21 min, Inten=1.41 in/hr

Area (ac)	C	Description
2.700	0.90	Impervious
1.100	0.39	Undeveloped
2.600	0.50	Single Family Residential
1.000	0.17	Landscaping
7.400	0.59	Weighted Average
7.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4					**Direct Entry, TC**

Subcatchment 4S: POST1



Summary for Subcatchment 4S: POST1

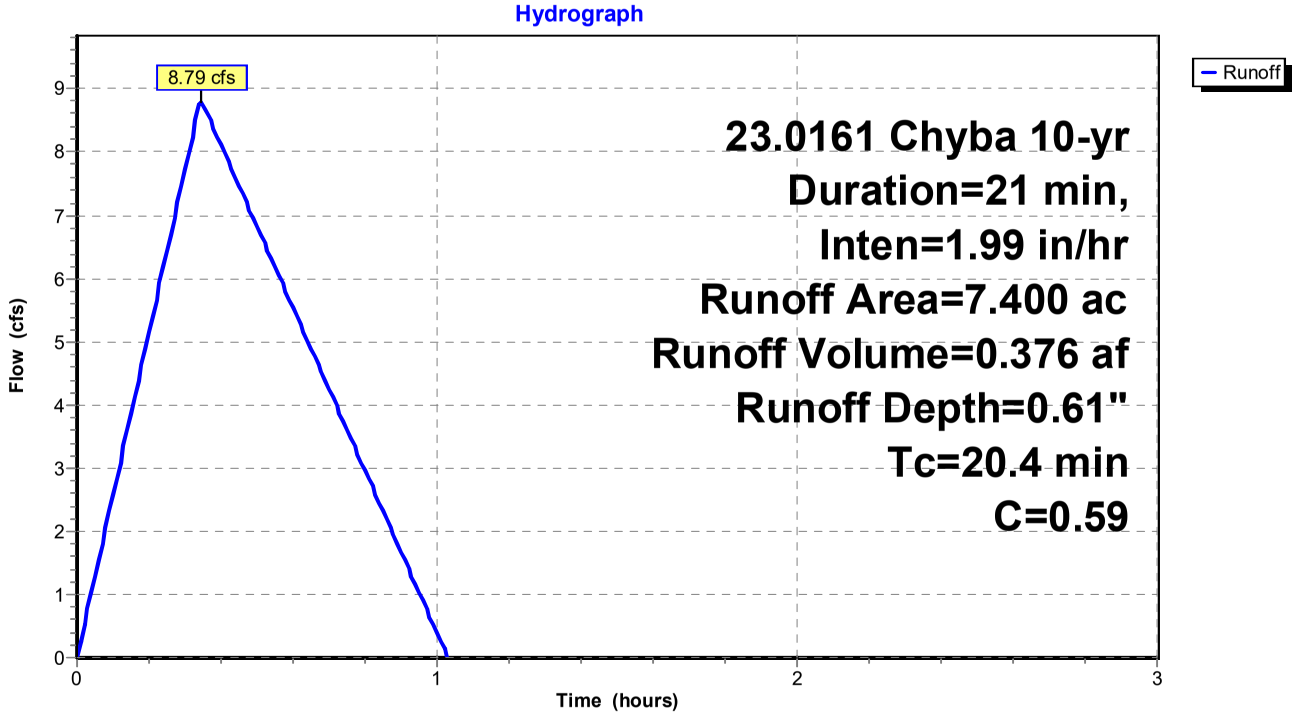
Runoff = 8.79 cfs @ 0.35 hrs, Volume= 0.376 af, Depth= 0.61"
Routed to Pond 5P : DET-A

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 10-yr Duration=21 min, Inten=1.99 in/hr

Area (ac)	C	Description
2.700	0.90	Impervious
1.100	0.39	Undeveloped
2.600	0.50	Single Family Residential
1.000	0.17	Landscaping
7.400	0.59	Weighted Average
7.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4					**Direct Entry, TC**

Subcatchment 4S: POST1



Summary for Subcatchment 4S: POST1

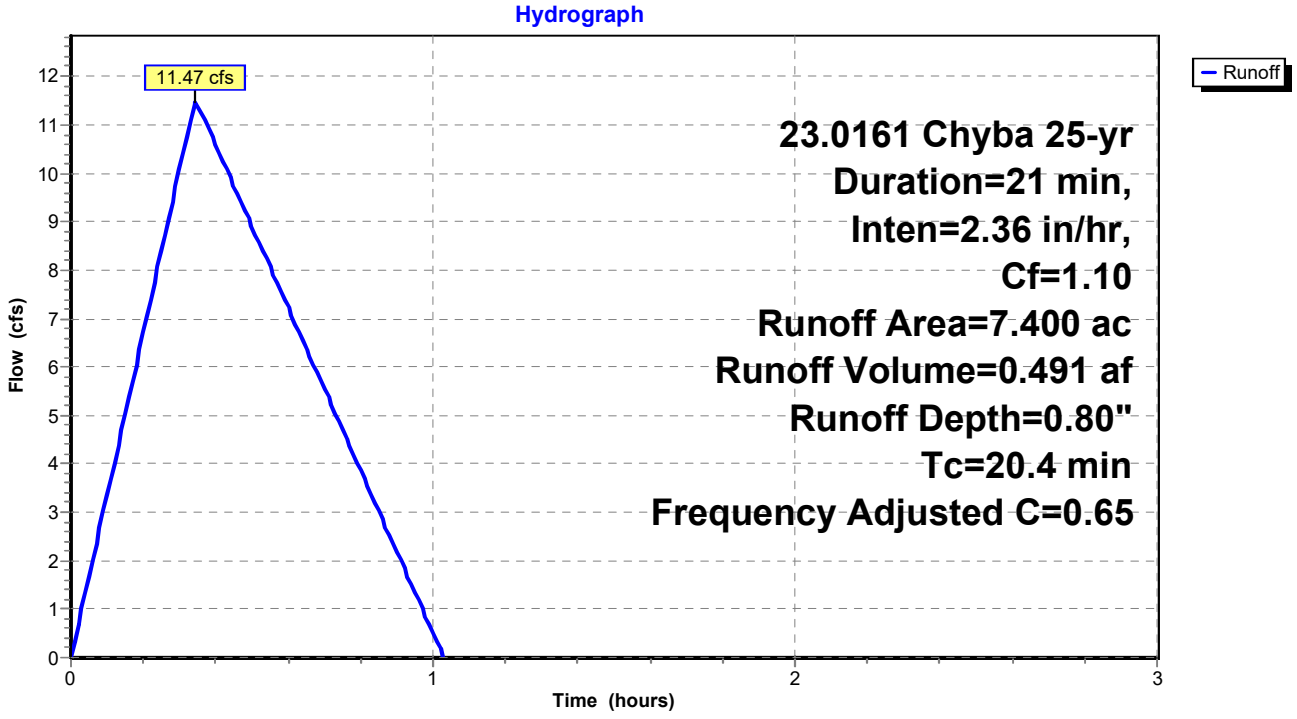
Runoff = 11.47 cfs @ 0.35 hrs, Volume= 0.491 af, Depth= 0.80"
Routed to Pond 5P : DET-A

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 25-yr Duration=21 min, Inten=2.36 in/hr, Cf=1.10

Area (ac)	C	Adj	Description
2.700	0.90		Impervious
1.100	0.39		Undeveloped
2.600	0.50		Single Family Residential
1.000	0.17		Landscaping
7.400	0.59	0.65	Weighted Average, Frequency Adjusted
7.400			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4					**Direct Entry, TC**

Subcatchment 4S: POST1



Summary for Subcatchment 4S: POST1

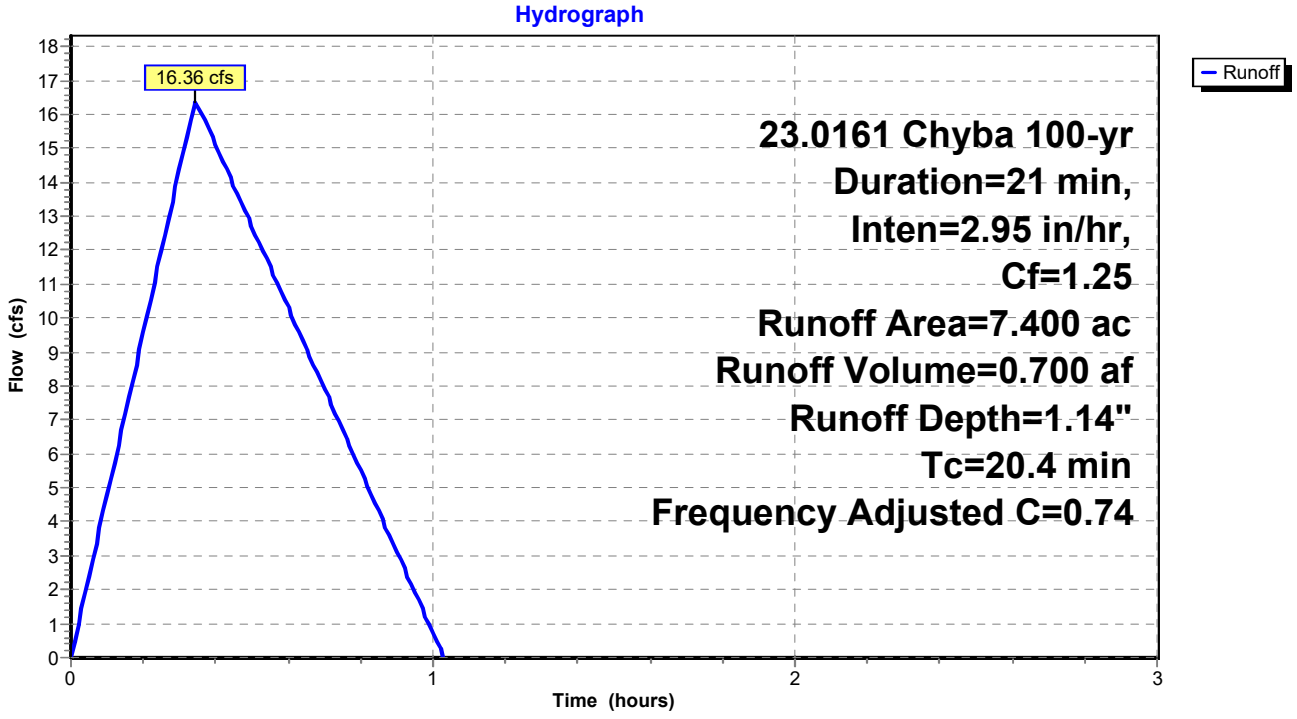
Runoff = 16.36 cfs @ 0.35 hrs, Volume= 0.700 af, Depth= 1.14"
Routed to Pond 5P : DET-A

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 100-yr Duration=21 min, Inten=2.95 in/hr, Cf=1.25

Area (ac)	C	Adj	Description
2.700	0.90		Impervious
1.100	0.39		Undeveloped
2.600	0.50		Single Family Residential
1.000	0.17		Landscaping
7.400	0.59	0.74	Weighted Average, Frequency Adjusted
7.400			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4					**Direct Entry, TC**

Subcatchment 4S: POST1



Subbasin Characteristics Calculations

For Input into HydroCAD
Basin: UNDET1

Calculate Composite Runoff Coefficient:

$$C_{ave} = \frac{A_1*C_1 + A_2*C_2 + A_3*C_3 + A_4*C_4 + A_5*C_5}{A_{Total}}$$

C-values obtained using Table 819.2B (Caltrans Highway Design Manual)

Surface Type	Areas	'C' Value 10-yr x1.00	25-yr x1.10	100-yr x1.25
Gravel Area	0.4 ac	0.50		
Road Area		0.90		
Undeveloped Area	2.7 ac	0.39		
Landscaped Area	1.0 ac	0.17		
Single Family Residential		0.50		
Total Basin Area =	4.1 ac	0.35	0.39	0.44

Calculate Time of Concentration:

Time of Concentration (Overland) $i = 13.5(Tc)^{-0.61}$ $Tco = (0.66\ L^{0.5}\ n^{0.52}) / (S^{0.31}\ i^{0.38})$

COR Hydro Manual pg. C-14 & C-16

	Estimated	Calculated		
i =	3.49 in/hr	3.49 in/hr	L = 200 ft	Length of Flowpath
			S = 0.015 ft/ft	Average Slope of Flowpath
$Tc_{overland}$ = 9.2 min	Tco_{min} = 5.0 min		n = 0.20	lawns/golf course, Table C-9

Time of Concentration (Shallow Concentrated Flow) Tcg = (L / V)

Hydraulic Design Series No. 2 pg. 2-24

$V_{shallow} = \alpha\kappa S^{0.5}$
$V_{shallow}$ = 2.1 ft/s
L / (60 V) = $Tc_{Shallow}$ = 8.5 min

L = 1070 ft — Length of Flowpath
S_{ave} = 0.017 ft/ft — Average Longitudinal Slope
κ = 0.491 — Unpaved
α = 33 — Unit Conversion (33)

ΣTc = 17.7 min

Summary for Subcatchment 8S: UNDET1

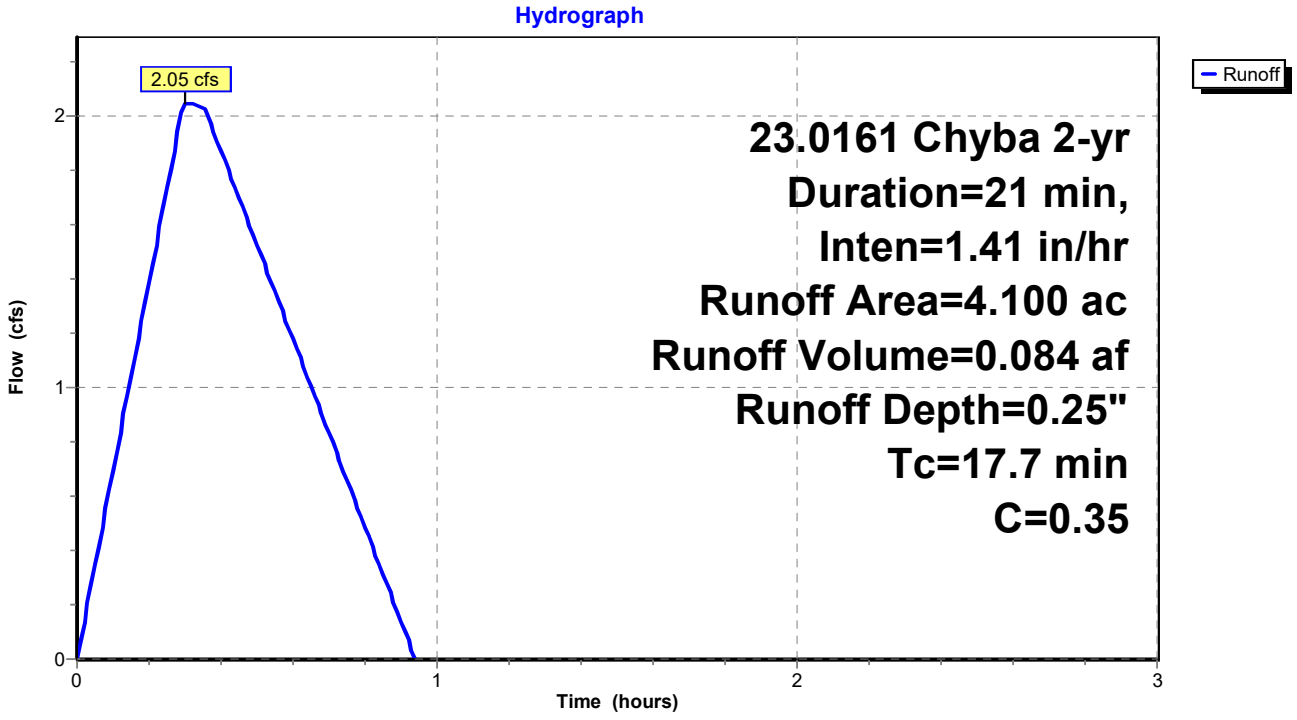
Runoff = 2.05 cfs @ 0.30 hrs, Volume= 0.084 af, Depth= 0.25"
Routed to Link 9L : POST-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 2-yr Duration=21 min, Inten=1.41 in/hr

Area (ac)	C	Description
0.400	0.50	Gravel Area
2.700	0.39	Undeveloped Area
1.000	0.17	Landscaped Area
4.100	0.35	Weighted Average
4.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7					**Direct Entry, TC**

Subcatchment 8S: UNDET1



Summary for Subcatchment 8S: UNDET1

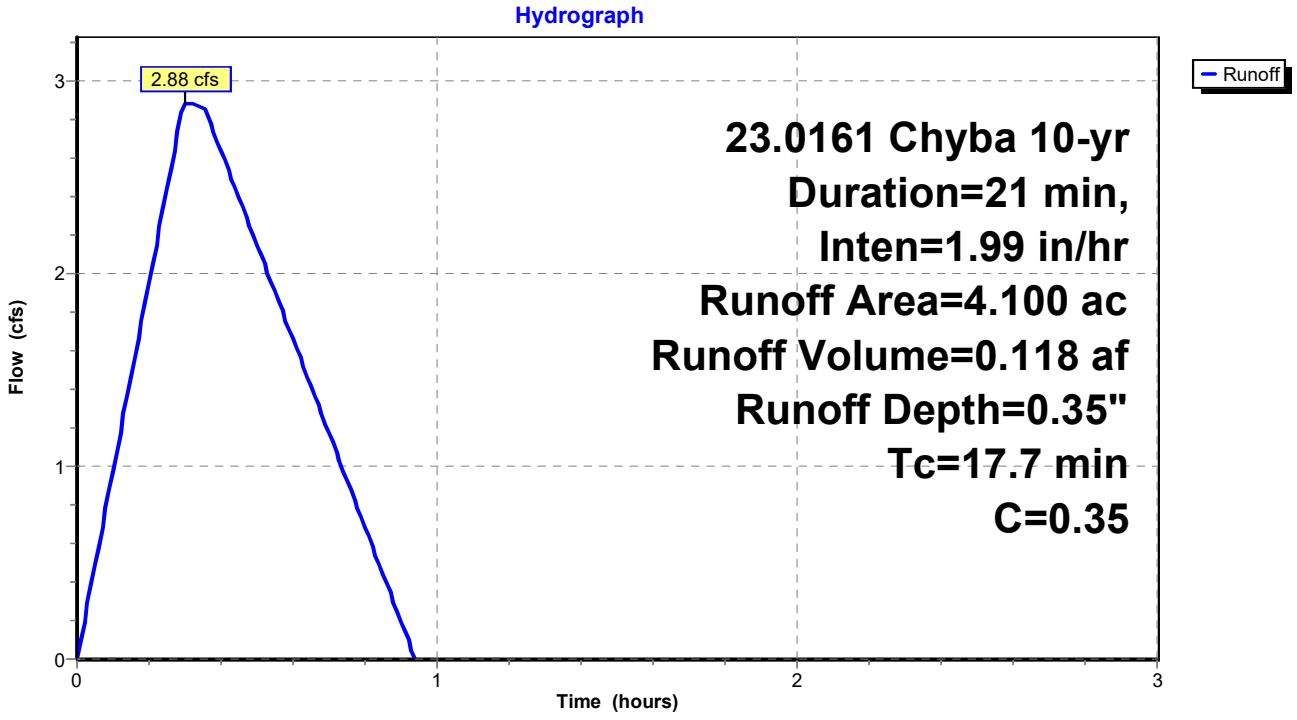
Runoff = 2.88 cfs @ 0.30 hrs, Volume= 0.118 af, Depth= 0.35"
Routed to Link 9L : POST-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 10-yr Duration=21 min, Inten=1.99 in/hr

Area (ac)	C	Description
0.400	0.50	Gravel Area
2.700	0.39	Undeveloped Area
1.000	0.17	Landscaped Area
4.100	0.35	Weighted Average
4.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7					**Direct Entry, TC**

Subcatchment 8S: UNDET1



Summary for Subcatchment 8S: UNDET1

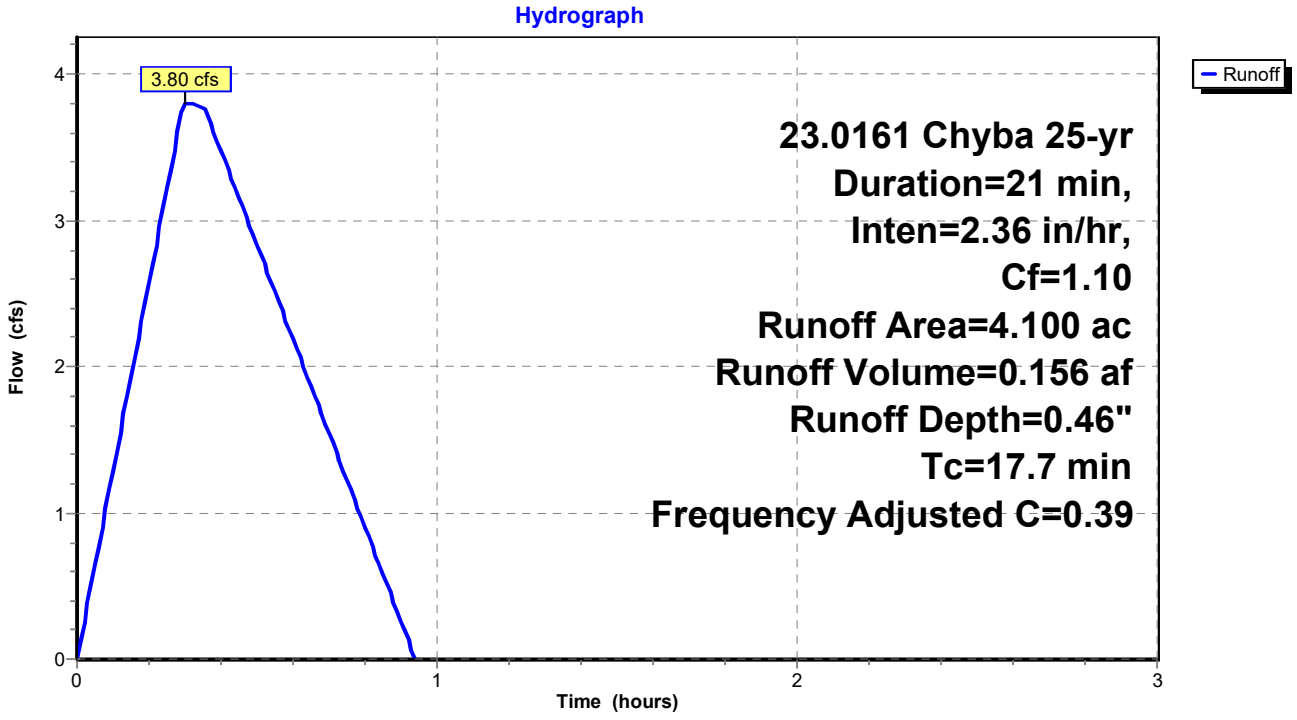
Runoff = 3.80 cfs @ 0.30 hrs, Volume= 0.156 af, Depth= 0.46"
Routed to Link 9L : POST-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 25-yr Duration=21 min, Inten=2.36 in/hr, Cf=1.10

Area (ac)	C	Adj	Description
0.400	0.50		Gravel Area
2.700	0.39		Undeveloped Area
1.000	0.17		Landscaped Area
4.100	0.35	0.39	Weighted Average, Frequency Adjusted
4.100			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7					**Direct Entry, TC**

Subcatchment 8S: UNDET1



Summary for Subcatchment 8S: UNDET1

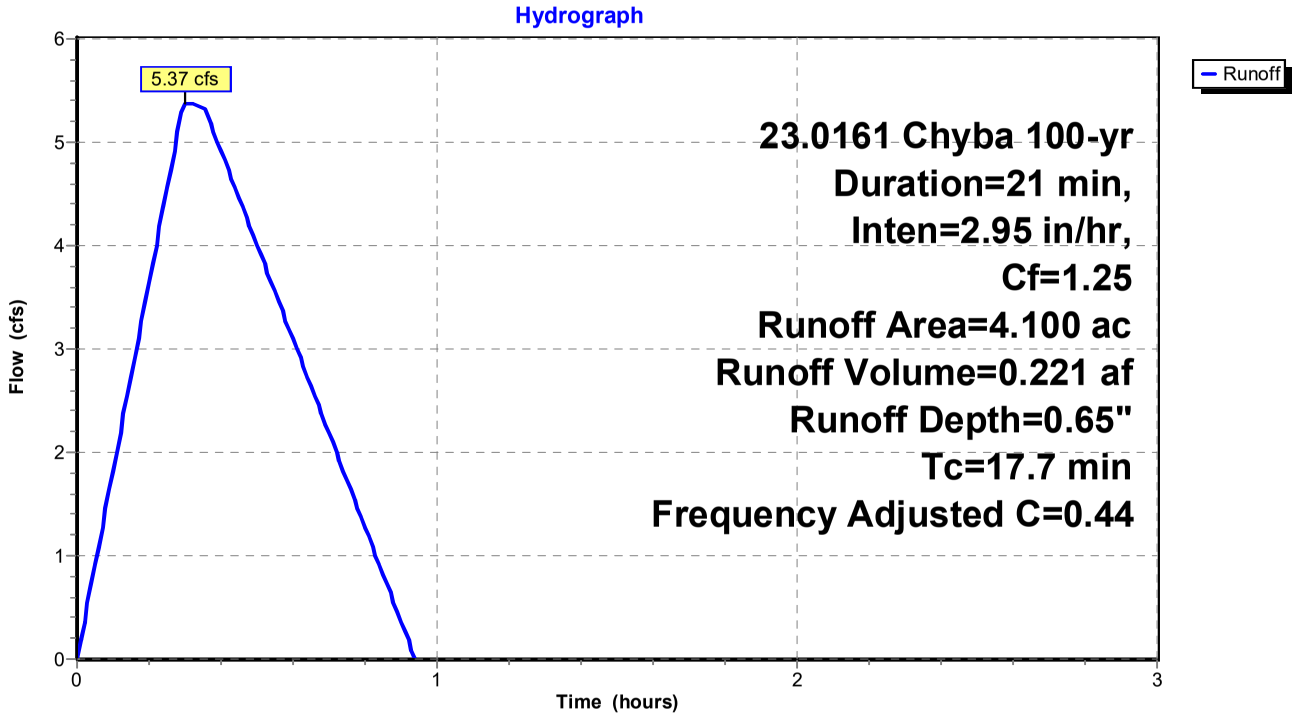
Runoff = 5.37 cfs @ 0.30 hrs, Volume= 0.221 af, Depth= 0.65"
Routed to Link 9L : POST-T

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 100-yr Duration=21 min, Inten=2.95 in/hr, Cf=1.25

Area (ac)	C	Adj	Description
0.400	0.50		Gravel Area
2.700	0.39		Undeveloped Area
1.000	0.17		Landscaped Area
4.100	0.35	0.44	Weighted Average, Frequency Adjusted
4.100			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7					**Direct Entry, TC**

Subcatchment 8S: UNDET1



Subbasin Characteristics Calculations

For Input into HydroCAD
Basin: UNDET2

Calculate Composite Runoff Coefficient:

$$C_{ave} = \frac{A_1*C_1 + A_2*C_2 + A_3*C_3 + A_4*C_4 + A_5*C_5}{A_{Total}}$$

C-values obtained using Table 819.2B (Caltrans Highway Design Manual)

Surface Type	Areas		'C' Value 10-yr x1.00	25-yr x1.10	100-yr x1.25
Gravel Area			0.50		
Road Area	0.4 ac		0.90		
Undeveloped Area	1.0 ac		0.39		
Landscaped Area	0.1 ac		0.17		
Single Family Residential	0.5 ac		0.50		
Total Basin Area =	2.0 ac		0.51	0.56	0.64

Calculate Time of Concentration:

Time of Concentration (Overland) $i = 13.5(Tc)^{-0.61}$ $Tco = (0.66\ L^{0.5}\ n^{0.52}) / (S^{0.31}\ i^{0.38})$

COR Hydro Manual pg. C-14 & C-16

	Estimated	Calculated		
i =	3.14 in/hr	3.14 in/hr	S = 0.090 ft/ft	Average Slope of Flowpath
$Tc_{overland}$ = 10.9 min	Tco_{min} = 5.0 min		n = 0.50	Few trees/natural grass, Table C-9

Time of Concentration (Shallow Concentrated Flow) Tcg = (L / V)

Hydraulic Design Series No. 2 pg. 2-24

$V_{shallow} = \alpha\kappa S^{0.5}$	L = 180 ft	Length of Flowpath
$V_{shallow}$ = 4.2 ft/s	S_{ave} = 0.067 ft/ft	Average Longitudinal Slope
	κ = 0.491	Unpaved
L / (60 V) = $Tc_{Shallow}$ = 0.7 min	α = 33	Unit Conversion (33)

ΣTc = 11.6 min

Summary for Subcatchment 6S: UNDET2

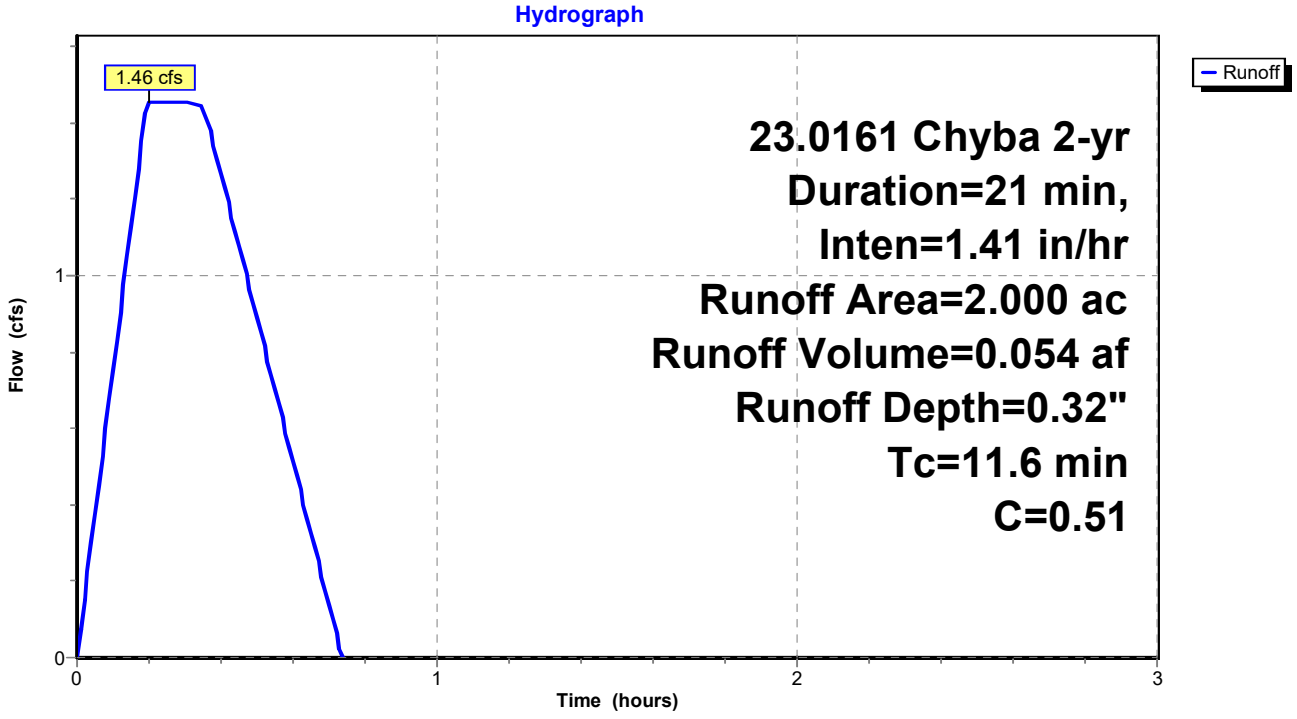
Runoff = 1.46 cfs @ 0.20 hrs, Volume= 0.054 af, Depth= 0.32"
Routed to Link 7L : POST-C

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 2-yr Duration=21 min, Inten=1.41 in/hr

Area (ac)	C	Description
0.400	0.90	Impervious Area
1.000	0.39	Undeveloped Area
0.100	0.17	Landscaped Area
0.500	0.50	Single Family Residential
2.000	0.51	Weighted Average
2.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6					**Direct Entry, TC**

Subcatchment 6S: UNDET2



Summary for Subcatchment 6S: UNDET2

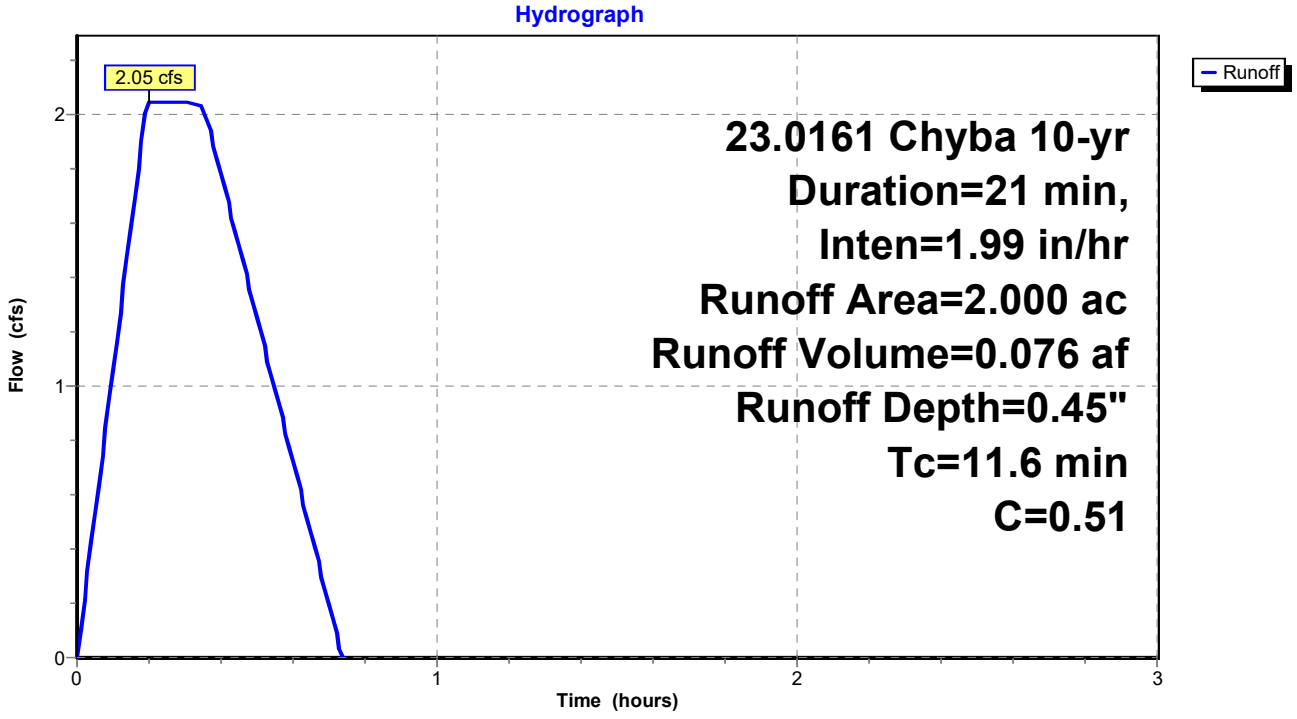
Runoff = 2.05 cfs @ 0.20 hrs, Volume= 0.076 af, Depth= 0.45"
Routed to Link 7L : POST-C

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 10-yr Duration=21 min, Inten=1.99 in/hr

Area (ac)	C	Description
0.400	0.90	Impervious Area
1.000	0.39	Undeveloped Area
0.100	0.17	Landscaped Area
0.500	0.50	Single Family Residential
2.000	0.51	Weighted Average
2.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6					**Direct Entry, TC**

Subcatchment 6S: UNDET2



Summary for Subcatchment 6S: UNDET2

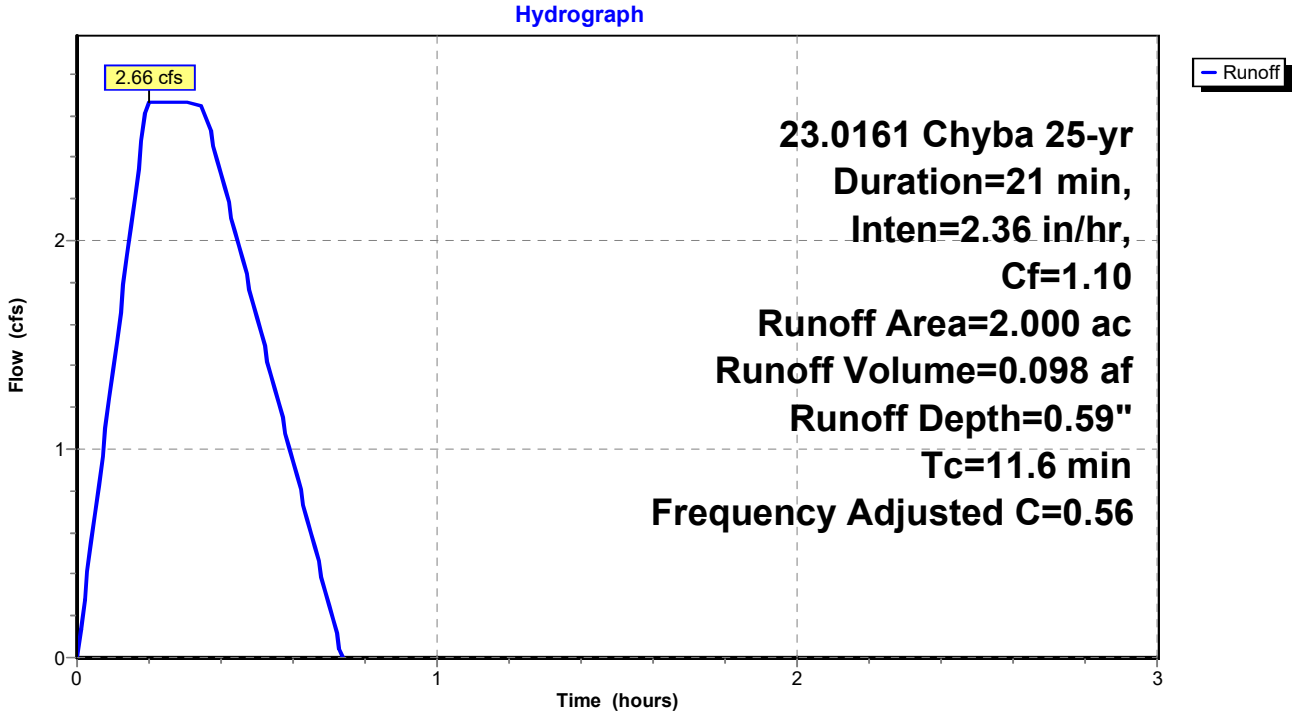
Runoff = 2.66 cfs @ 0.20 hrs, Volume= 0.098 af, Depth= 0.59"
Routed to Link 7L : POST-C

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 25-yr Duration=21 min, Inten=2.36 in/hr, Cf=1.10

Area (ac)	C	Adj	Description
0.400	0.90		Impervious Area
1.000	0.39		Undeveloped Area
0.100	0.17		Landscaped Area
0.500	0.50		Single Family Residential
2.000	0.51	0.56	Weighted Average, Frequency Adjusted
2.000			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6					**Direct Entry, TC**

Subcatchment 6S: UNDET2



Summary for Subcatchment 6S: UNDET2

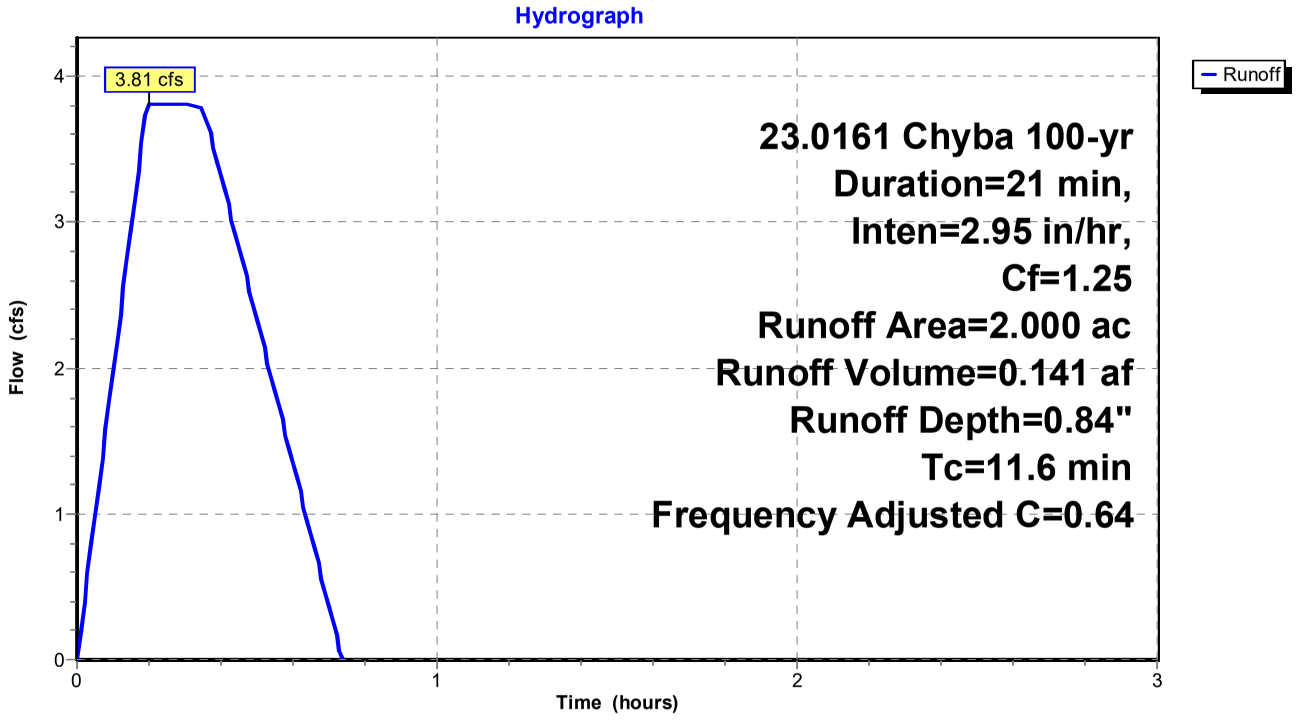
Runoff = 3.81 cfs @ 0.20 hrs, Volume= 0.141 af, Depth= 0.84"
Routed to Link 7L : POST-C

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
23.0161 Chyba 100-yr Duration=21 min, Inten=2.95 in/hr, Cf=1.25

Area (ac)	C	Adj	Description
0.400	0.90		Impervious Area
1.000	0.39		Undeveloped Area
0.100	0.17		Landscaped Area
0.500	0.50		Single Family Residential
2.000	0.51	0.64	Weighted Average, Frequency Adjusted
2.000			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6					**Direct Entry, TC**

Subcatchment 6S: UNDET2



Appendix D

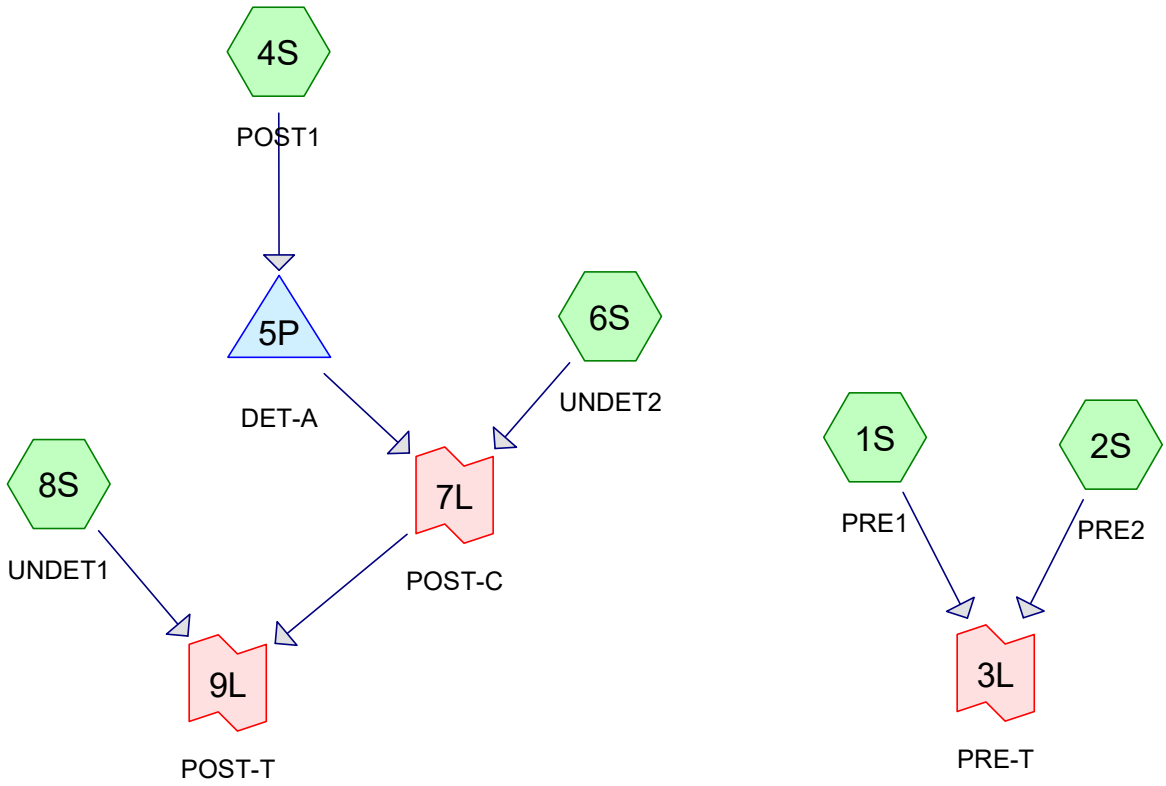
DETENTION CALCULATIONS

Basin Routing Diagram 44
Detention Basin (DET-A) Critical Duration Analysis 45
Stage Discharge Curve 46
Stage Storage Curve 47

Detention Basin Runoff Summary and Results 48-55

POST-C Runoff Summary and Results 56-59

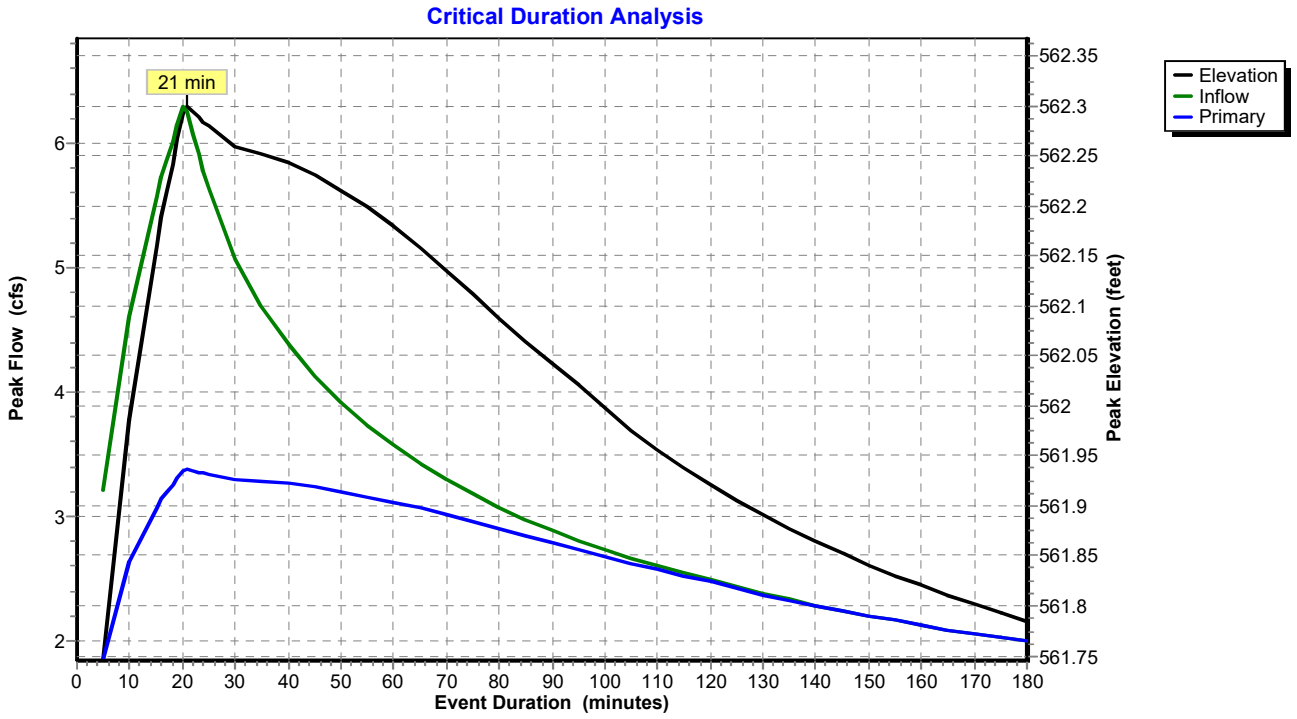
Post Total (POST-T) Runoff Summary and Results 60-63



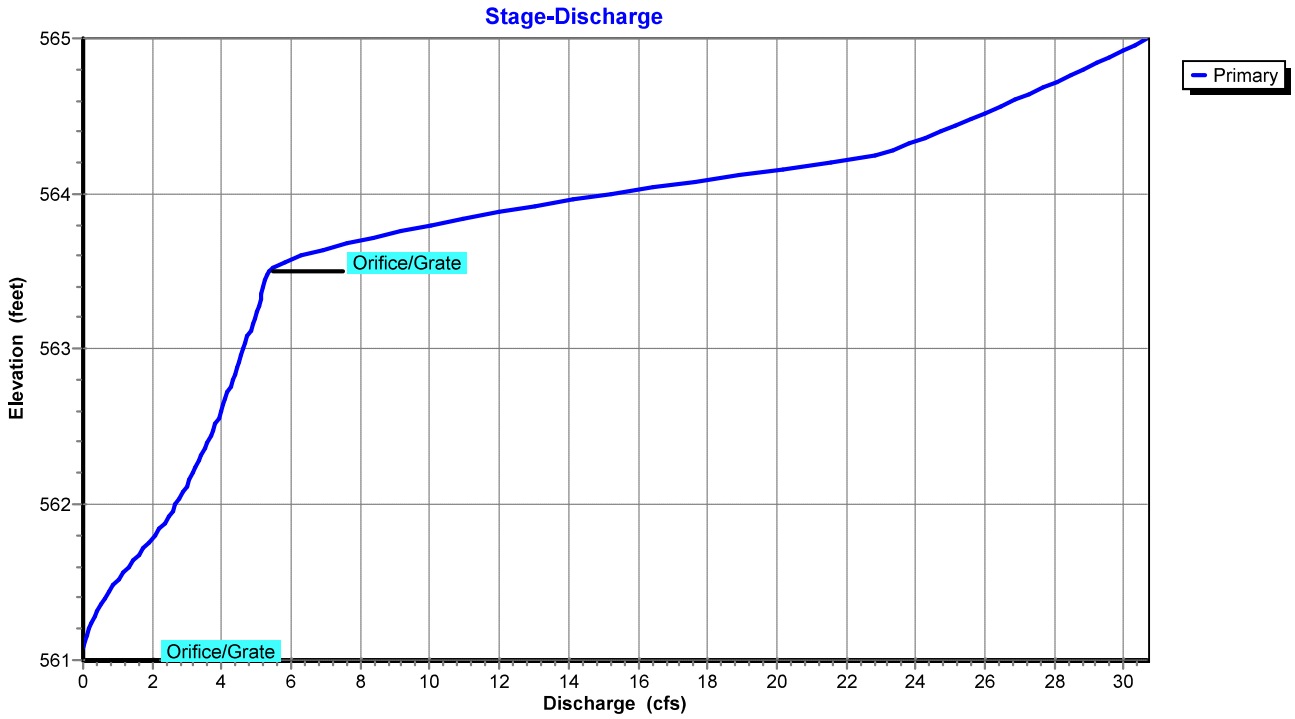
Subcat Reach Pond Link

Routing Diagram for 23161 Chyba
Prepared by Sharrah Dunlap Sawyer, Printed 1/2/2025
HydroCAD® 10.20-4c s/n 13211 © 2024 HydroCAD Software Solutions LLC

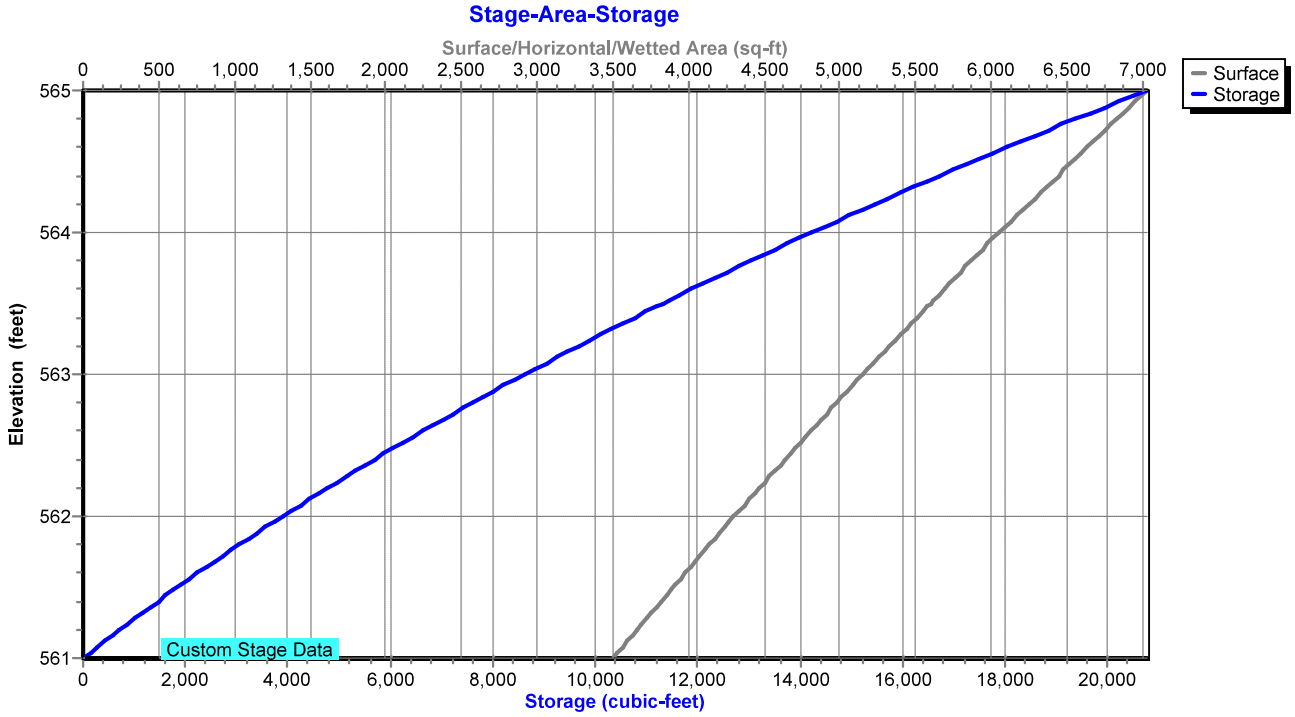
Pond 5P: DET-A


Critical Duration Analysis
21 min
Elevation
Inflow
Primary
Peak Flow (cfs)
Peak Elevation (feet)
Event Duration (minutes)
2
3
4
5
6
561.75
561.8
561.85
561.9
561.95
562
562.05
562.1
562.15
562.2
562.25
562.3
562.35
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180

Pond 5P: DET-A


Stage-Discharge
Elevation (feet)
Discharge (cfs)
Primary
Orifice/Grate
Orifice/Grate
565
564
563
562
561
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30

Pond 5P: DET-A


Stage-Area-Storage
Surface/Horizontal/Wetted Area (sq-ft)
0 500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500 5,000 5,500 6,000 6,500 7,000
Surface
Storage
565
564
563
562
561
Elevation (feet)
Custom Stage Data
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000
Storage (cubic-feet)

Summary for Pond 5P: DET-A

Inflow Area = 7.400 ac, 0.00% Impervious, Inflow Depth = 0.43" for 2-yr event
Inflow = 6.25 cfs @ 0.35 hrs, Volume= 0.268 af
Outflow = 3.38 cfs @ 0.66 hrs, Volume= 0.259 af, Atten= 46%, Lag= 19.0 min
Primary = 3.38 cfs @ 0.66 hrs, Volume= 0.259 af
Routed to Link 7L : POST-C

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 562.30' @ 0.66 hrs Surf.Area= 4,554 sf Storage= 5,221 cf

Plug-Flow detention time= 25.4 min calculated for 0.259 af (97% of inflow)
Center-of-Mass det. time= 24.5 min (51.9 - 27.5)

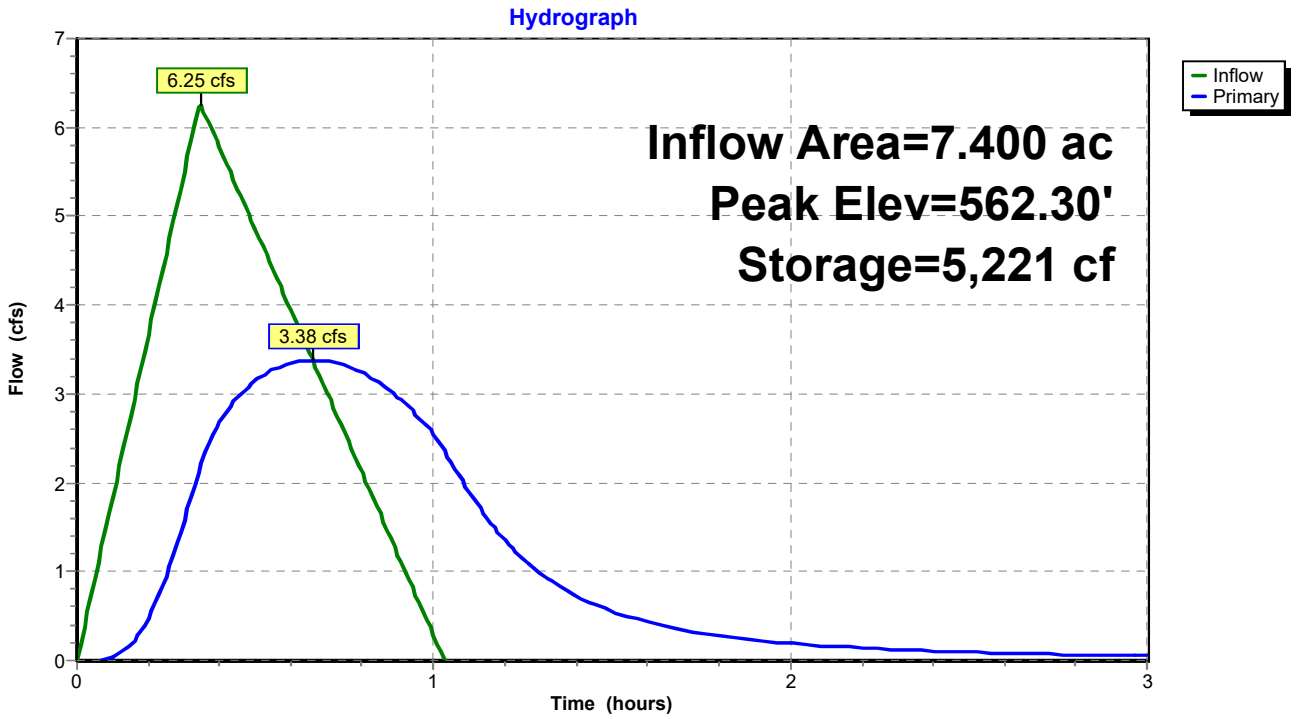
Volume	Invert	Avail.Storage	Storage Description
#1	561.00'	20,765 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
561.00	3,500	0	0
562.00	4,300	3,900	3,900
563.00	5,150	4,725	8,625
564.00	6,050	5,600	14,225
565.00	7,030	6,540	20,765

Device	Routing	Invert	Outlet Devices
#1	Primary	561.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	563.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.38 cfs @ 0.66 hrs HW=562.30' (Free Discharge)
1=Orifice/Grate (Orifice Controls 3.38 cfs @ 4.30 fps)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 5P: DET-A


Hydrograph
Inflow Area=7.400 ac
Peak Elev=562.30'
Storage=5,221 cf
6.25 cfs
3.38 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7

Summary for Pond 5P: DET-A

Inflow Area = 7.400 ac, 0.00% Impervious, Inflow Depth = 0.61" for 10-yr event
Inflow = 8.79 cfs @ 0.35 hrs, Volume= 0.376 af
Outflow = 4.33 cfs @ 0.69 hrs, Volume= 0.366 af, Atten= 51%, Lag= 20.9 min
Primary = 4.33 cfs @ 0.69 hrs, Volume= 0.366 af
Routed to Link 7L : POST-C

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 562.81' @ 0.69 hrs Surf.Area= 4,992 sf Storage= 7,680 cf

Plug-Flow detention time= 26.6 min calculated for 0.366 af (97% of inflow)
Center-of-Mass det. time= 25.8 min (53.3 - 27.5)

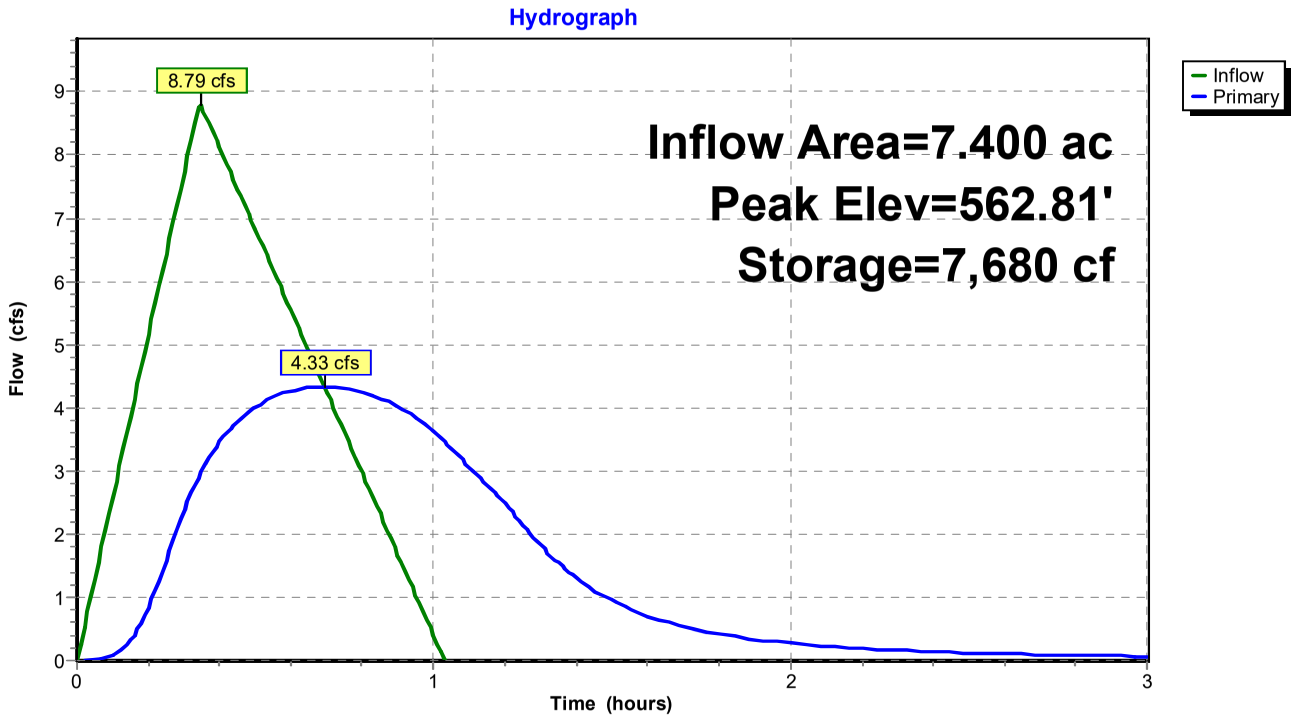
Volume	Invert	Avail.Storage	Storage Description
#1	561.00'	20,765 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
561.00	3,500	0	0
562.00	4,300	3,900	3,900
563.00	5,150	4,725	8,625
564.00	6,050	5,600	14,225
565.00	7,030	6,540	20,765

Device	Routing	Invert	Outlet Devices
#1	Primary	561.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	563.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.33 cfs @ 0.69 hrs HW=562.81' (Free Discharge)
1=Orifice/Grate (Orifice Controls 4.33 cfs @ 5.52 fps)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 5P: DET-A


Hydrograph
8.79 cfs
4.33 cfs
Inflow Area=7.400 ac
Peak Elev=562.81'
Storage=7,680 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0
1
2
3
4
5
6
7
8
9

Summary for Pond 5P: DET-A

Inflow Area = 7.400 ac, 0.00% Impervious, Inflow Depth = 0.80" for 25-yr event
Inflow = 11.47 cfs @ 0.35 hrs, Volume= 0.491 af
Outflow = 5.17 cfs @ 0.72 hrs, Volume= 0.480 af, Atten= 55%, Lag= 22.6 min
Primary = 5.17 cfs @ 0.72 hrs, Volume= 0.480 af
Routed to Link 7L : POST-C

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 563.37' @ 0.72 hrs Surf.Area= 5,483 sf Storage= 10,592 cf

Plug-Flow detention time= 28.5 min calculated for 0.479 af (97% of inflow)
Center-of-Mass det. time= 28.1 min (55.6 - 27.5)

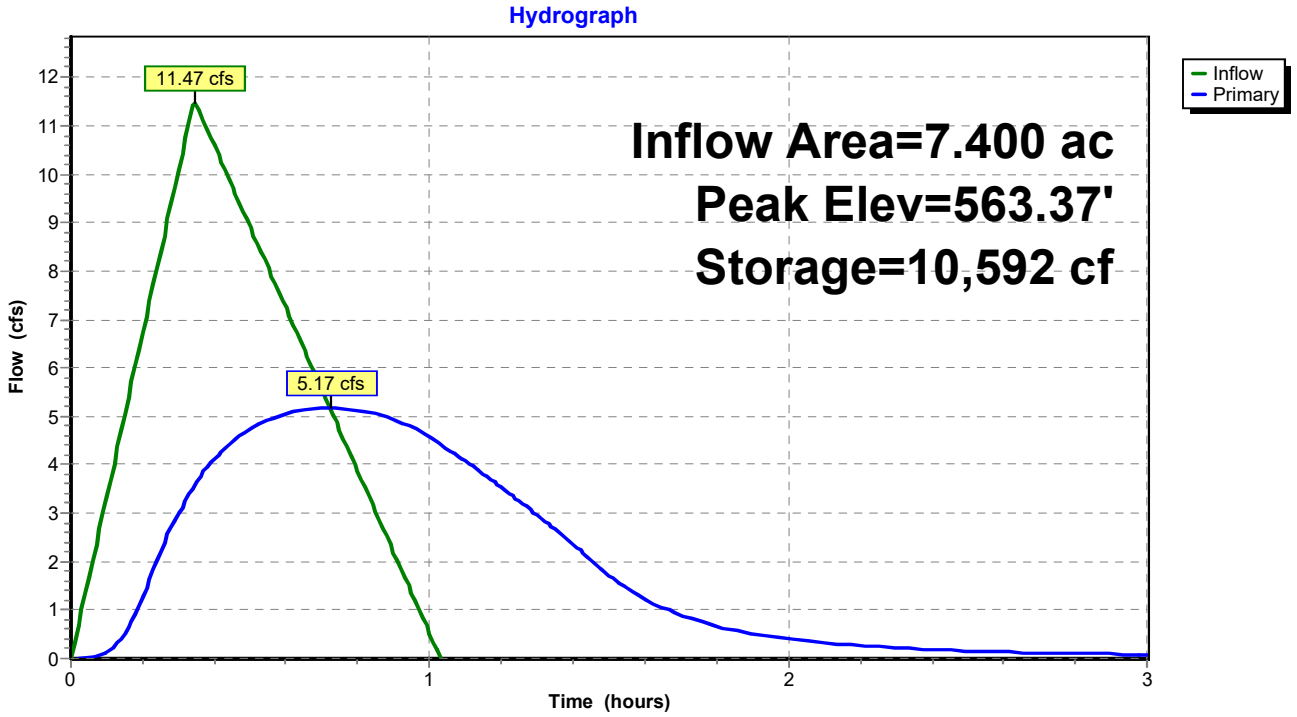
Volume	Invert	Avail.Storage	Storage Description
#1	561.00'	20,765 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
561.00	3,500	0	0
562.00	4,300	3,900	3,900
563.00	5,150	4,725	8,625
564.00	6,050	5,600	14,225
565.00	7,030	6,540	20,765

Device	Routing	Invert	Outlet Devices
#1	Primary	561.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	563.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.17 cfs @ 0.72 hrs HW=563.37' (Free Discharge)
1=Orifice/Grate (Orifice Controls 5.17 cfs @ 6.58 fps)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 5P: DET-A


Hydrograph
Inflow Area=7.400 ac
Peak Elev=563.37'
Storage=10,592 cf
11.47 cfs
5.17 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0
1
2
3
4
5
6
7
8
9
10
11
12

Summary for Pond 5P: DET-A

Inflow Area = 7.400 ac, 0.00% Impervious, Inflow Depth = 1.14" for 100-yr event
Inflow = 16.36 cfs @ 0.35 hrs, Volume= 0.700 af
Outflow = 10.88 cfs @ 0.58 hrs, Volume= 0.689 af, Atten= 34%, Lag= 13.9 min
Primary = 10.88 cfs @ 0.58 hrs, Volume= 0.689 af
Routed to Link 7L : POST-C

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 563.84' @ 0.58 hrs Surf.Area= 5,902 sf Storage= 13,245 cf

Plug-Flow detention time= 25.5 min calculated for 0.686 af (98% of inflow)
Center-of-Mass det. time= 25.3 min (52.8 - 27.5)

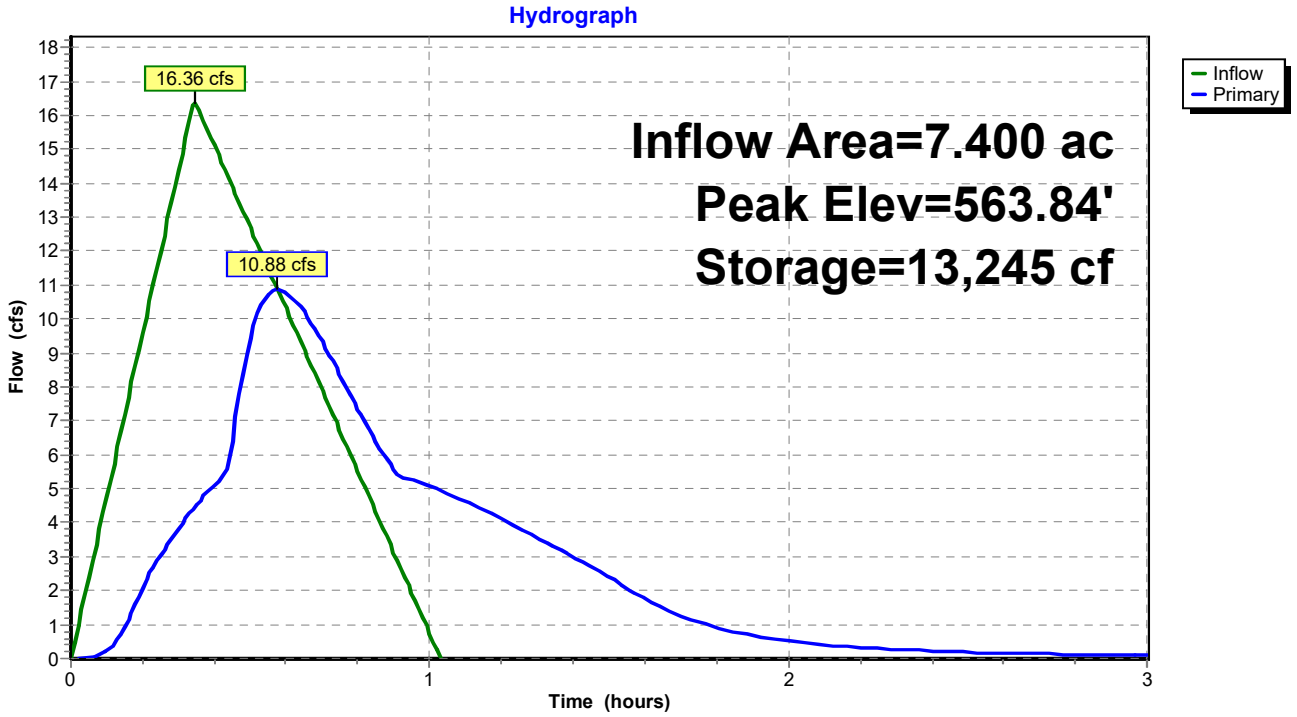
Volume	Invert	Avail.Storage	Storage Description
#1	561.00'	20,765 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
561.00	3,500	0	0
562.00	4,300	3,900	3,900
563.00	5,150	4,725	8,625
564.00	6,050	5,600	14,225
565.00	7,030	6,540	20,765

Device	Routing	Invert	Outlet Devices
#1	Primary	561.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	563.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.87 cfs @ 0.58 hrs HW=563.84' (Free Discharge)
1=Orifice/Grate (Orifice Controls 5.78 cfs @ 7.36 fps)
2=Orifice/Grate (Weir Controls 5.09 cfs @ 1.89 fps)

Pond 5P: DET-A

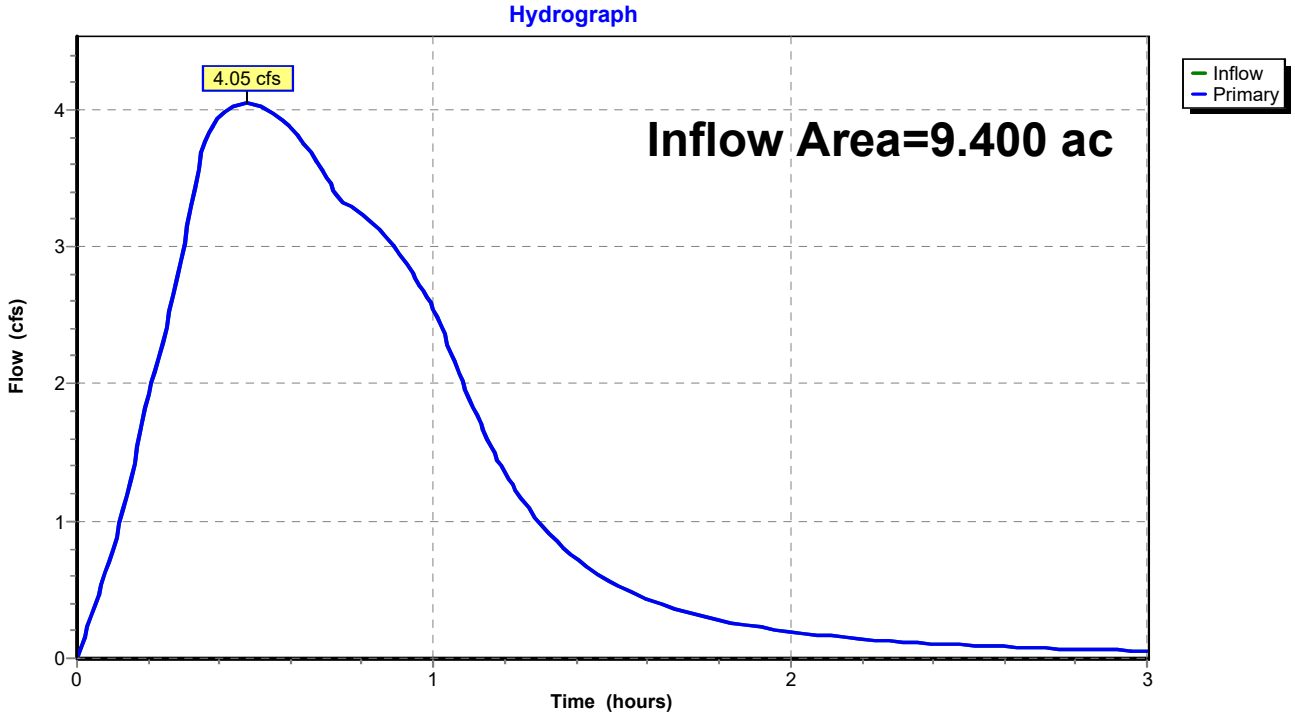

Hydrograph
Inflow Area=7.400 ac
Peak Elev=563.84'
Storage=13,245 cf
16.36 cfs
10.88 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Summary for Link 7L: POST-C

Inflow Area = 9.400 ac, 0.00% Impervious, Inflow Depth > 0.40" for 2-yr event
Inflow = 4.05 cfs @ 0.48 hrs, Volume= 0.312 af
Primary = 4.05 cfs @ 0.48 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min
Routed to Link 9L : POST-T

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 7L: POST-C

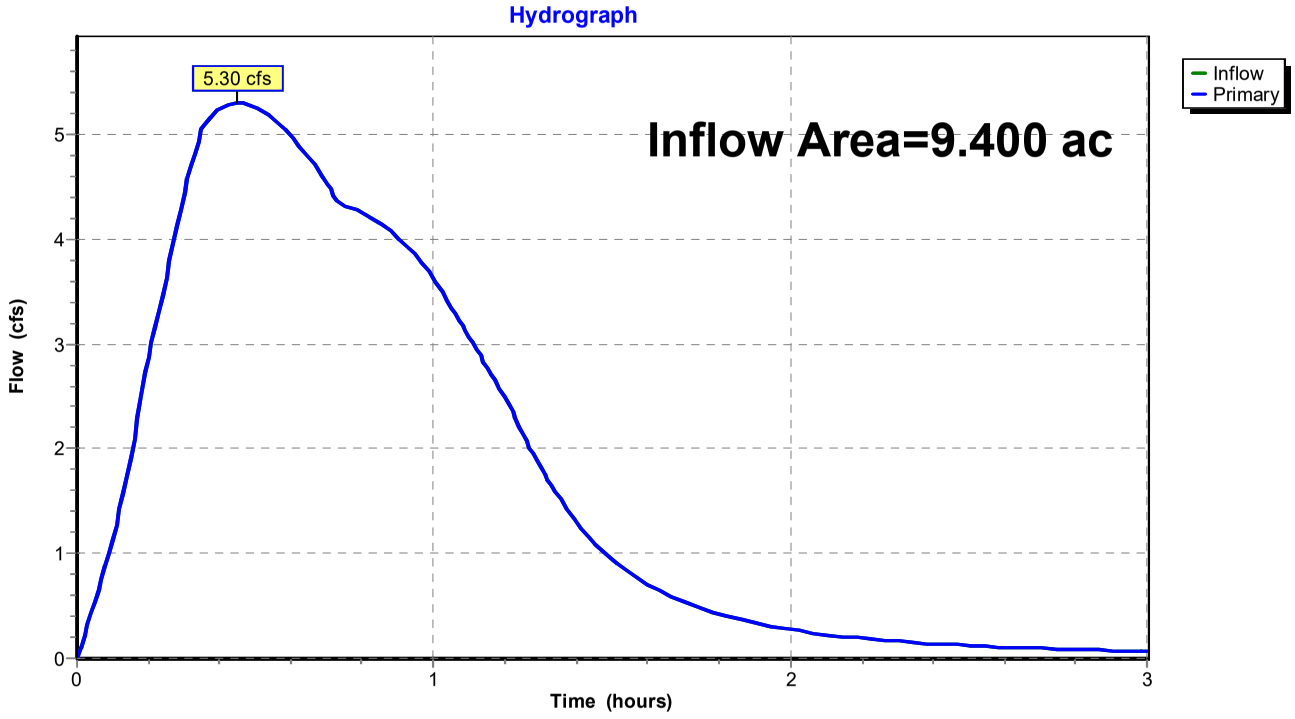


Summary for Link 7L: POST-C

Inflow Area = 9.400 ac, 0.00% Impervious, Inflow Depth > 0.56" for 10-yr event
Inflow = 5.30 cfs @ 0.45 hrs, Volume= 0.442 af
Primary = 5.30 cfs @ 0.45 hrs, Volume= 0.442 af, Atten= 0%, Lag= 0.0 min
Routed to Link 9L : POST-T

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 7L: POST-C

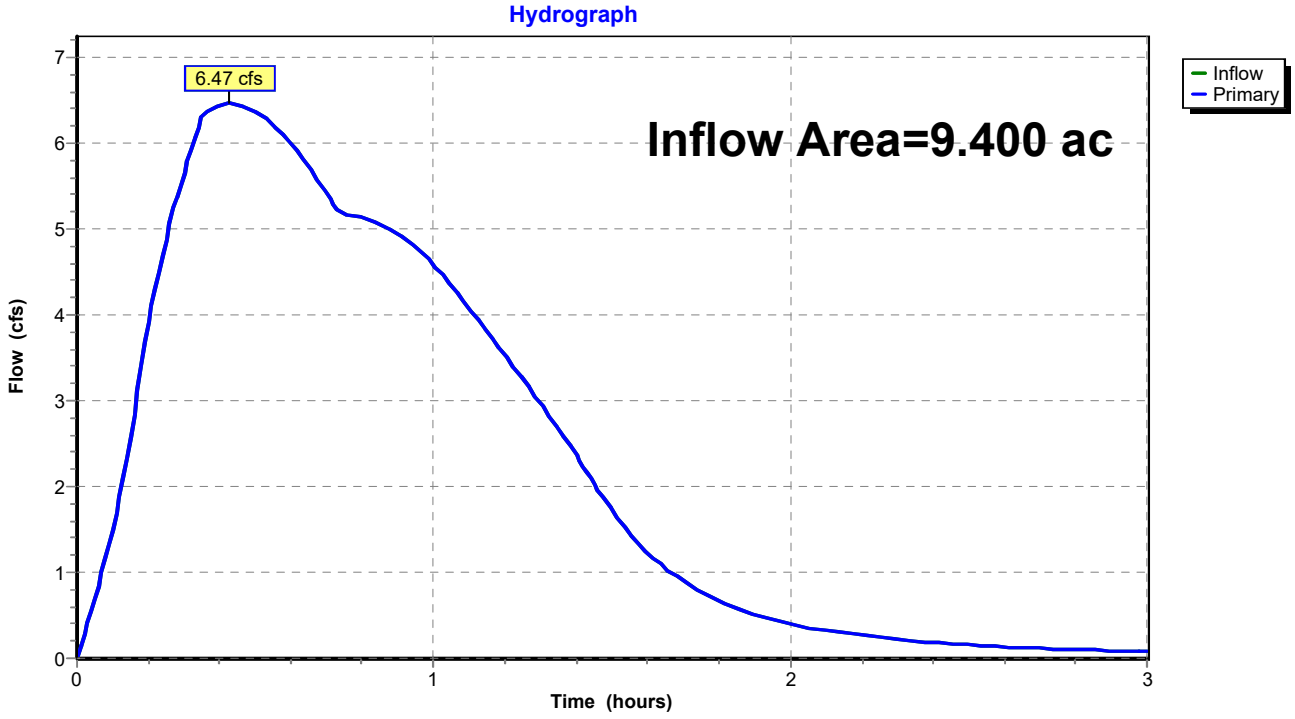


Summary for Link 7L: POST-C

Inflow Area = 9.400 ac, 0.00% Impervious, Inflow Depth > 0.74" for 25-yr event
Inflow = 6.47 cfs @ 0.43 hrs, Volume= 0.578 af
Primary = 6.47 cfs @ 0.43 hrs, Volume= 0.578 af, Atten= 0%, Lag= 0.0 min
Routed to Link 9L : POST-T

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 7L: POST-C

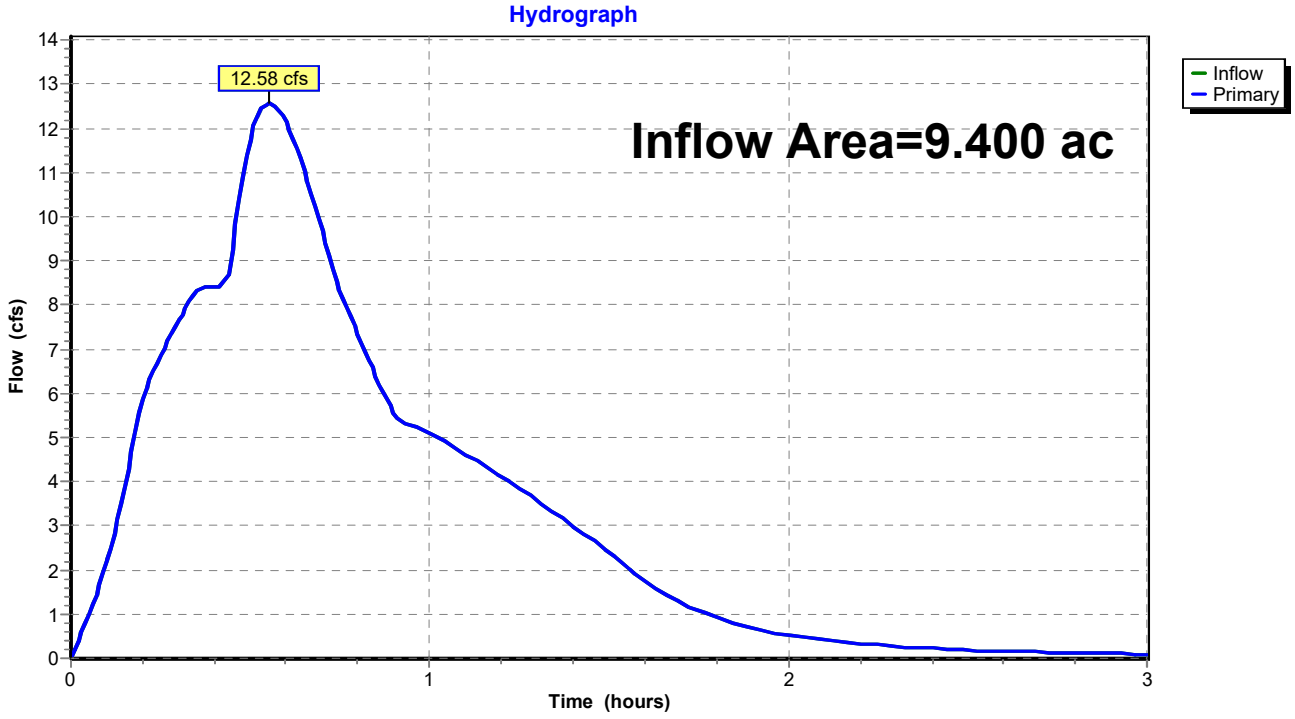


Summary for Link 7L: POST-C

Inflow Area = 9.400 ac, 0.00% Impervious, Inflow Depth > 1.06" for 100-yr event
Inflow = 12.58 cfs @ 0.55 hrs, Volume= 0.829 af
Primary = 12.58 cfs @ 0.55 hrs, Volume= 0.829 af, Atten= 0%, Lag= 0.0 min
Routed to Link 9L : POST-T

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 7L: POST-C

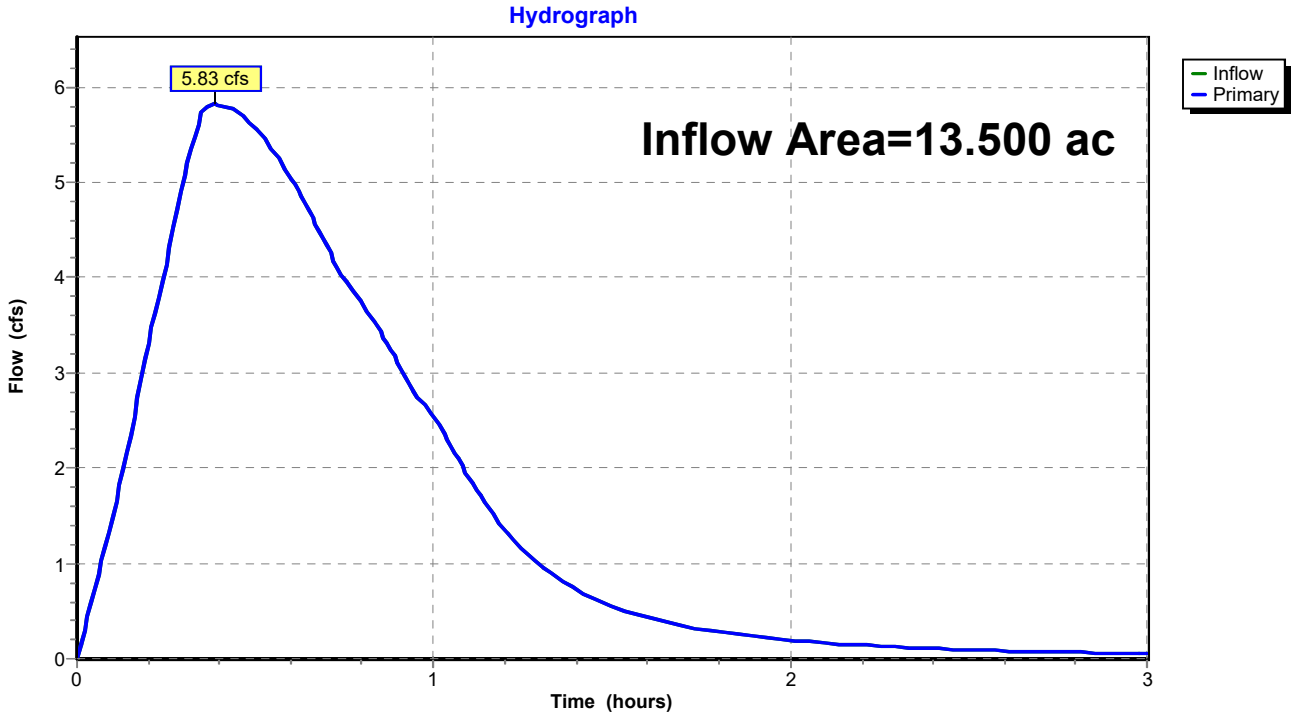


Summary for Link 9L: POST-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth > 0.35" for 2-yr event
Inflow = 5.83 cfs @ 0.39 hrs, Volume= 0.397 af
Primary = 5.83 cfs @ 0.39 hrs, Volume= 0.397 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 9L: POST-T

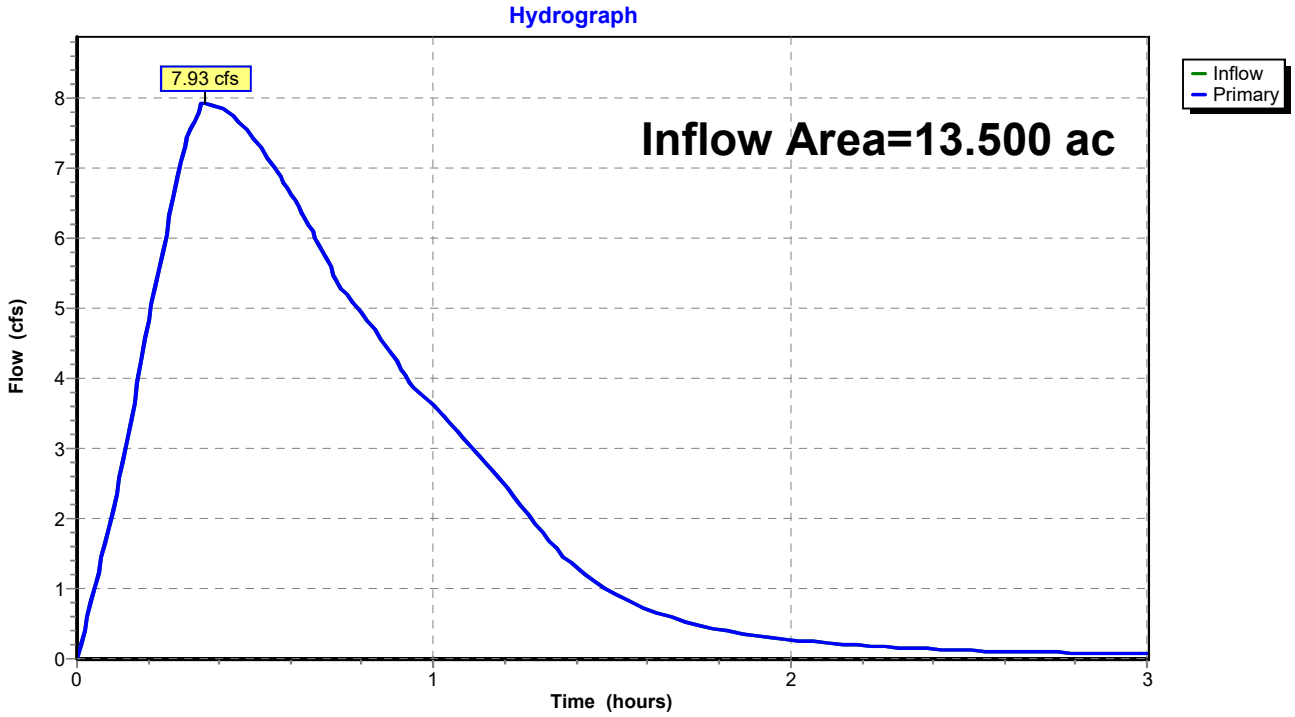


Summary for Link 9L: POST-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth > 0.50" for 10-yr event
Inflow = 7.93 cfs @ 0.36 hrs, Volume= 0.560 af
Primary = 7.93 cfs @ 0.36 hrs, Volume= 0.560 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 9L: POST-T

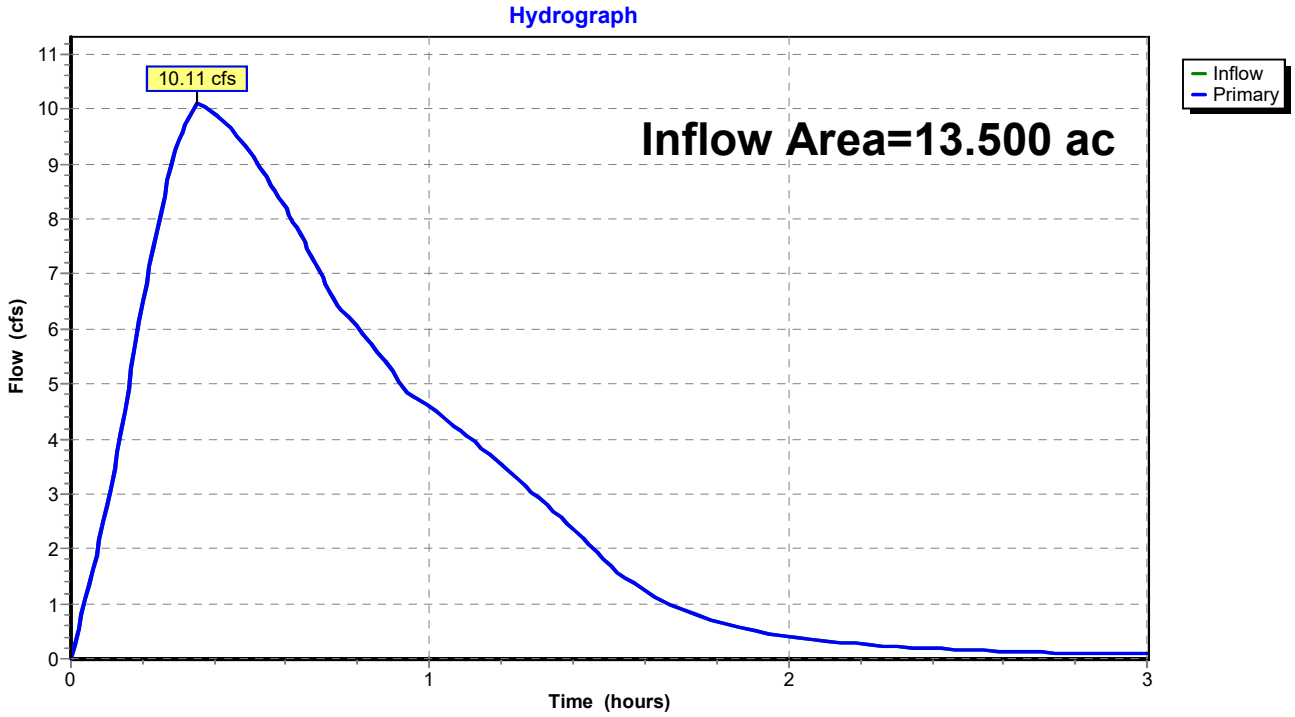


Summary for Link 9L: POST-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth > 0.65" for 25-yr event
Inflow = 10.11 cfs @ 0.35 hrs, Volume= 0.735 af
Primary = 10.11 cfs @ 0.35 hrs, Volume= 0.735 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 9L: POST-T

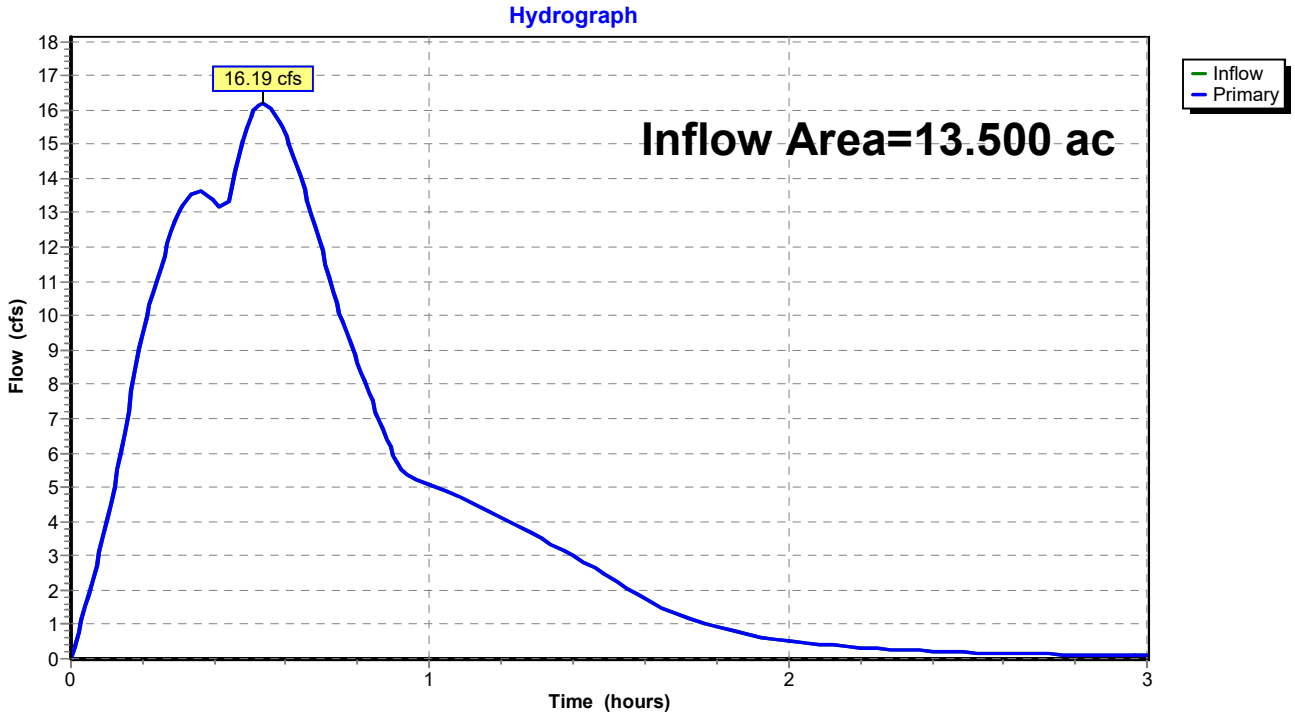


Summary for Link 9L: POST-T

Inflow Area = 13.500 ac, 0.00% Impervious, Inflow Depth > 0.93" for 100-yr event
Inflow = 16.19 cfs @ 0.54 hrs, Volume= 1.050 af
Primary = 16.19 cfs @ 0.54 hrs, Volume= 1.050 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 9L: POST-T



APPENDIX E
REFERENCE MATERIALS

Shallow Concentrated Flow Coefficient Table 65
Mannings 'n' Value Table 66
Overland Flow Coefficient Table 66
Caltrans Figure 819.2A (Undeveloped 'C' Value Table) 67
Caltrans Figure 819.2B (Developed 'C' Value Table) 68

Shallow Concentrated Overland Flow

U DOT: Hydraulic Design Series No. 2, Second Edition pg. 2-24

2.6.2.2 Shallow Concentrated Flow

After short distances, sheet flow tends to concentrate in rills and then gullies of increasing proportions. Such flow is usually referred to as shallow concentrated flow. The velocity of such flow can be estimated using an empirical relationship between the velocity and the slope:

$$V = \alpha \kappa S^{0.5}$$

Where,
V=Velocity (ft/s)
S=slope (ft/ft)
κ=dimensionless function of land cover
α=unit conversion (33)

Table 2.2. Intercept Coefficients for Velocity vs. Slope Relationship (McCuen, 1989)

k	Land Cover/Flow Regime
0.076	Forest with heavy ground litter; hay meadow (overland flow)
0.152	Trash fallow or minimum tillage cultivation; contour or strip cropped; woodland (overland flow)
0.213	Short grass pasture (overland flow)
0.274	Cultivated straight row (overland flow)
0.305	Nearly bare and untilled (overland flow); alluvial fans in western mountain regions
0.457	Grassed waterway (shallow concentrated flow)
0.491	Unpaved (shallow concentrated flow)
0.619	Paved area (shallow concentrated flow); small upland gullies

Manning's n Values	
Ven Te Chow, Ph.D, *Open Channel Hydraulics*, McGraw-Hill Publishing Company. Table 5-6 Values of The Roughness Coefficient	
Surface Description	n
A. Closed Conduits	-
Cast Iron	0.013
HDPE	0.013
Cement	0.013
B. Lined Channels	-
Gravel bottom with rip-rap sides	0.033
Concrete with float finish	0.015
Concrete with gravel bottom	0.017
Asphalt - smooth	0.013
Asphalt - rough	0.016
Vegetal lining	0.030
D. Natural Streams	-
Clean, straight natural stream	0.030
Straight stream w/ stones or weeds	0.035
Clean, winding natural stream	0.040
Winding stream w/ stones or weeds	0.045
Sluggish stream, weedy with pools	0.070
Very weedy with deep pools	0.100
Gravel, cobbles & few boulders	0.040
Cobbles with large boulders	0.050
D-2. Flood plains	-
Pasture, no brush	0.030
Scattered Brush, heavy weeds	0.050
Light brush and trees	0.050
Dense brush	0.070

City of Redding - Hydrology Manual		
Table C-9 Parameters for Overland Flow		
Surface Description	n	dist
Pavement - smooth, Table C-9	0.02	50-200
Pavement - rough, Table C-9	0.05	50-200
Bare soil/newly graded, Table C-9	0.1	100-300
Range - heavily grazed, Table C-9	0.15	100-300
lawns/golf course, Table C-9	0.2	100-300
parks/medians/pasture, Table C-9	0.3	200-500
natural grassland, Table C-9	0.4	200-500
Residential landscaping, Table C-9	0.4	100-300
Few trees/natural grass, Table C-9	0.5	300-600
Scattered trees/shrubs, Table C-9	0.6	300-600
Numerous trees/dense, Table C-9	0.8	300-600

Figure 819.2A

Runoff Coefficients for Undeveloped Areas

Watershed Types

	Extreme	High	Normal	Low
Relief	.28 -.35 Steep, rugged terrain with average slopes above 30%	.20 -.28 Hilly, with average slopes of 10 to 30%	.14 -.20 Rolling, with average slopes of 5 to 10%	.08 -.14 Relatively flat land, with average slopes of 0 to 5%
Soil Infiltration	.12 -.16 No effective soil cover, either rock or thin soil mantle of negligible infiltration capacity	.08 -.12 Slow to take up water, clay or shallow loam soils of low infiltration capacity, imperfectly or poorly drained	.06 -.08 Normal; well drained light or medium textured soils, sandy loams, silt and silt loams	.04 -.06 High; deep sand or other soil that takes up water readily, very light well drained soils
Vegetal Cover	.12 -.16 No effective plant cover, bare or very sparse cover	.08 -.12 Poor to fair; clean cultivation crops, or poor natural cover, less than 20% of drainage area over good cover	.06 -.08 Fair to good; about 50% of area in good grassland or woodland, not more than 50% of area in cultivated crops	.04 -.06 Good to excellent; about 90% of drainage area in good grassland, woodland or equivalent cover
Surface Storage	.10 -.12 Negligible surface depression few and shallow; drainageways steep and small, no marshes	.08 -.10 Low; well defined system of small drainageways; no ponds or marshes	.06 -.08 Normal; considerable surface depression storage; lakes and pond marshes	.04 -.06 High; surface storage, high; drainage system not sharply defined; large floodplain storage or large number of ponds or marshes
Given	An undeveloped watershed consisting of; 1) rolling terrain with average slopes of 5%, 2) clay type soils, 3) good grassland area, and 4) normal surface depressions.		Solution: Relief 0.14 Soil Infiltration 0.08 Vegetal Cover 0.04 Surface Storage 0.06 C = 0.32	
Find	The runoff coefficient, C, for the above watershed.			

Table 819.2B

Runoff Coefficients for Developed Areas (1)

Type of Drainage Area	Runoff Coefficient
Business:	
Downtown areas	0.70 - 0.95
Neighborhood areas	0.50 - 0.70
Residential:	
Single-family areas	0.30 - 0.50
Multi-units, detached	0.40 - 0.60
Multi-units, attached	0.60 - 0.75
Suburban	0.25 - 0.40
Apartment dwelling areas	0.50 - 0.70
Industrial:	
Light areas	0.50 - 0.80
Heavy areas	0.60 - 0.90
Parks, cemeteries:	0.10 - 0.25
Playgrounds:	0.20 - 0.40
Railroad yard areas:	0.20 - 0.40
Unimproved areas:	0.10 - 0.30
Lawns:	
Sandy soil, flat, 2%	0.05 - 0.10
Sandy soil, average, 2-7%	0.10 - 0.15
Sandy soil, steep, 7%	0.15 - 0.20
Heavy soil, flat, 2%	0.13 - 0.17
Heavy soil, average, 2-7%	0.18 - 0.22
Heavy soil, steep, 7%	0.25 - 0.35
Streets:	
Asphaltic	0.70 - 0.95
Concrete	0.80 - 0.95
Brick	0.70 - 0.85
Drives and walks	0.75 - 0.85
Roofs:	0.75 - 0.95

NOTES:
(1) From HDS No. 2.

regression equations are considered the best estimates of flood frequency and are used to reduce the time-sampling error that may occur in a station flood-frequency estimate.

(d) The flood-frequency flows and the maximum peak discharges at several stations in a region should be used whenever possible for comparison with the peak discharge estimated at an ungaged site using a rainfall-runoff approach or regional regression equation. The watershed characteristics at the ungaged and gaged sites should be similar.

(4) National Resources Conservation Service (NRCS) Methods. The Soil Conservation Service's SCS (former title) National Engineering Handbook, 1972, and their 1975, "Urban Hydrology for Small Watersheds", Technical Release 55 (TR-55), present a graphical method for estimating peak discharge. Most NRCS equations and curves provide results in terms of inches of runoff for unit hydrograph development and are not applicable to the estimation of a peak design discharge unless the design hydrograph is first developed in accordance with prescribed NRCS procedures. NRCS methods and procedures are applicable to drainage areas less than 3 square miles (approx. 2,000 acres) and result in a design hydrograph and design discharge that are functionally acceptable to form the basis for the design of highway drainage facilities.

819.3 Statistical Methods

Statistical methods of predicting stream discharge utilize numerical data to describe the process. Statistical methods, in general, do not require as much subjective judgment to apply as the previously described deterministic methods. They are usually well documented mathematical procedures which are applied to measured or observed data. The accuracy of statistical methods can also be measured quantitatively. However, to assure that statistical method results are valid, the method and procedures used should be verified by an experienced engineer with a thorough knowledge of engineering statistics.

Attachment G

Transportation Impact Study for CHYBA, W-Trans, January 10, 2025

Transportation Impact Study for the California Heritage YouthBuild Academy



Prepared for the City of Redding

Submitted by
W-Trans

July 24, 2025

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Table of Contents

Executive Summary 1

Introduction 2

Transportation Setting 4

Project Data 9

Circulation System 12

Vehicle Miles Traveled (VMT) 14

Safety Issues 15

Emergency Access 19

Capacity Analysis 20

Conclusions and Recommendations 28

Study Participants and References 29

Figures

1. Study Area and Existing Lane Configurations 3
2. Site Plan 10
3. Existing Traffic Volumes 22
4. Future Traffic Volumes 24
5. Project Traffic Volumes and Trip Distribution 26

Tables

1. Bicycle Facility Summary 6
2. Transit Routes 7
3. Collision Rates for the Study Intersections 8
4. Trip Generation Summary 9
5. Trip Distribution Assumptions 11
6. 95th Percentile Turn Queues 17
7. Intersection Level of Service Criteria 20
8. Existing Peak Hour Intersection Levels of Service 23
9. Future Peak Hour Intersection Levels of Service 25
10. Existing and Existing plus Project Peak Hour Intersection Levels of Service 25
11. Future and Future plus Project Peak Hour Intersection Levels of Service 27

Plates

1. Vision Triangle Graphic 15

Appendices

A. Collision Rate Calculations
B. On-site Queueing Calculations
C. Intersection Queuing Calculations
D. Level of Service Calculations

Executive Summary

The California Heritage YouthBuild project would be located on the north side of an extension of Industrial Street in the City of Redding and involves the development of a new school campus on a 10-acre site. The proposed project would be expected to generate an average of 334 trips per day, including 32 a.m. and p.m. peak hour trips.

Existing and planned pedestrian, bicycle, and transit facilities serving the proposed project site are adequate and the proposed project would not conflict with any plans or policies for transportation facilities assuming implementation of on-site bicycle parking in accordance with CalGreen building standards and provision of sidewalks on-site.

Based on state guidance provided in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018, the project would be presumed to have a less-than-significant impact on vehicle miles traveled (VMT) as a local-serving public school facility.

Vehicles would access the project site via the north leg of the proposed Industrial Street/Alfreda Way intersection. It is recommended that the design of the project driveway connection to Industrial Street/Alfreda Way result in sight distances of at least 280 feet to the west and 240 feet to the east. Additionally, new signage, monuments, or other structures should be positioned outside of the vision triangles of a driver waiting on the project driveways.

On-site queueing is not expected to be a concern during either the morning drop-off or afternoon pick-up periods. To account for the parents and guardians who arrive early to pick up students, the school should be designed with a loading zone of at least 125 feet. Additionally, 95th-percentile queues at the study intersections are not expected to extend beyond any of the existing storage lengths and the project would not cause any queues to exceed available storage, resulting in a less-than-significant impact on queueing.

Proposed site access and on-site circulation are expected to function acceptably for emergency response vehicles with incorporation of applicable design standards into the site layout. Traffic from the proposed development would be expected to have a less-than-significant impact on emergency response times.

All study intersections are expected to operate acceptably with and without project-generated trips, with the exception of Churn Creek Road/Cypress Avenue. However, overall delay is not expected to increase so the project's effect on operation is considered acceptable.

Introduction

This report presents an analysis of the potential transportation impacts and operational effects that would be associated with development of the proposed California Heritage YouthBuild Academy to be located on the north side of an extension of Industrial Street in the City of Redding. The transportation study was completed in accordance with the criteria established by the City of Redding as outlined in the City's *Traffic Impact Analysis Guidelines*, 2009, reflects a scope of work approved by City staff, and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a transportation impact study (TIS) is to provide City staff and policy makers with data that they can use to make an informed decision regarding the potential transportation impacts of a proposed project, and any associated improvements that would be required to mitigate these impacts to an acceptable level under the California Environmental Quality Act (CEQA), the City's General Plan, or other policies. This report provides an analysis of those items that are identified as areas of environmental concern under CEQA and that, if significant, require an Environmental Impact Report (EIR). Impacts associated with access for pedestrians, bicyclists, and to transit; the vehicle miles traveled (VMT) generated by the project; potential safety concerns; and emergency access are addressed in the context of the CEQA criteria. While no longer a part of the CEQA review process, vehicular traffic service levels at key intersections were evaluated for consistency with General Plan policies by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on anticipated travel patterns specific to the proposed project, then analyzing the effect the new traffic would be expected to have on the study intersections and need for improvements to maintain acceptable operation.

Applied Standards and Criteria

The report is organized to provide background data that supports the various aspects of the analysis, followed by the assessment of CEQA issues and then evaluation of policy-related issues. The CEQA criteria evaluated are as follows.

Would the project:

a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?
b. Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
d. Result in inadequate emergency access?

Project Profile

The California Heritage YouthBuild Academy (CHYBA) project includes the development of a new school campus on a 10-acre site located on the north side of an extension of Industrial Street. CHYBA is a public charter school serving high school students. The school currently enrolls 120 students, with plans to gradually expand to 290 students over the next five to ten years. At full capacity, CHYBA anticipates having no more than 130 students on campus at any given time, with 35 to 40 staff members on-site at various times throughout the school day (Monday to Friday, 8:00 a.m. to 4:00 p.m.). The location of the project site is shown in Figure 1.



red034.ai 12/24

Transportation Impact Study for the California Heritage YouthBuild Academy

Figure 1 – Study Area and Existing Lane Configurations

Transportation Setting

Study Area and Periods

The study area varies depending on the topic. For pedestrian trips it consists of all streets within a half mile of the project site that would lie along primary routes of pedestrian travel, or those leading to nearby generators or attractors. For bicycle trips it consists of all streets within one mile of the project site that would lie along primary routes of bicycle travel. For the safety and operational analyses, the study area consists of the following intersections.

1. Churn Creek Road/Mistletoe Lane
2. Victor Avenue/Mistletoe Lane
3. Churn Creek Road/Industrial Street
4. Industrial Street/Del Monte Street
5. Churn Creek Road/Cypress Avenue
6. Alfreda Way/Cypress Avenue
7. Victor Avenue/Cypress Avenue

Operating conditions during the weekday a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute. Counts were obtained for the study intersections on Wednesday, October 9, 2024, during typical traffic conditions and while local schools were in session.

Study Intersections

Churn Creek Road/Mistletoe Lane is a four-legged signalized intersection with protected left-turn phasing on all approaches. Marked crosswalks and pedestrian phasing exist at all four legs of the intersection. The northbound and southbound right-turn movements are channelized and not controlled by the signal.

Victor Avenue/Mistletoe Lane is a signalized, four-legged intersection with protected left-turn phasing on the northbound and southbound Victor Avenue approaches. Marked crosswalks and pedestrian phasing are available on all legs except the north.

Churn Creek Road/Industrial Street is a four-legged, signalized intersection with protected left-turn phasing on the northbound and southbound Churn Creek Road approaches and split phasing on the eastbound and westbound approaches. Marked crosswalks and pedestrian phasing are provided on all legs.

Industrial Street/Del Monte Street is a three-legged intersection with stop controls on the northbound Industrial Street and southbound Del Monte Street approaches. Marked crosswalks exist on the north and south legs of the intersection. A private driveway for Grocery Outlet connects to the east side of the intersection.

Churn Creek Road/Cypress Avenue is a four-legged signalized intersection with protected left-turn phasing and dual left-turn lanes on all four approaches. The eastbound approach has a channelized right-turn lane separate from the traffic signal. Marked crosswalks and pedestrian phasing exist at all four legs of the intersection.

Alfreda Way/Cypress Avenue is a signalized four-legged intersection. The eastbound and westbound approaches have protected left-turn phasing and the northbound and southbound approaches have split phasing. Marked crosswalks and pedestrian phasing are provided on all four legs of the intersection.

Victor Avenue/Cypress Avenue is a four-legged signalized intersection with protected left-turn phasing on the northbound and southbound approaches and split phasing on the eastbound and westbound approaches. Marked crosswalks and pedestrian phasing exist at the west and south legs of the intersection. The southbound and eastbound right-turn lanes are channelized.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Existing Transportation Facilities

Existing and Planned Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians in the vicinity of the proposed project site.

- **Industrial Street** – Sidewalk coverage is provided on both sides of Industrial Street. Currently, Industrial Street terminates approximately 1,200 feet east of Churn Creek Road. As part of the proposed project and the Center of Hope Apartments, which are currently under construction, Industrial Street would be extended about 1,400 feet east. Lighting is provided by overhead streetlights.

- **Alfreda Way** – Sidewalks are provided on the west side of Alfreda Way to the north of Cypress Avenue. Alfreda Way currently terminates about 800 feet north of Cypress Avenue but as part of the proposed project and the Center of Hope Apartments the street would be extended north to intersect with the extension of Industrial Street. Lighting is provided by overhead streetlights.

- **Churn Creek Road** – Between Presidio Street and South Bonnyview Road continuous sidewalks are provided on the west side of Churn Creek Road and intermittent sidewalk coverage is available on the east side. Curb ramps and crosswalks are present at most side street approaches.

The City of Redding has obtained funding for a future Safe Routes to School Project for Mistletoe Elementary School. This project would include a 10-foot wide pedestrian pathway that would begin north of Cypress Avenue on the east side of Alfreda Way and would continue west along the north side of Industrial Street, north along the west side of the proposed project site, and west across Little Churn Creek River to Del Monte Street.

Existing and Planned Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2020, classifies bikeways into four categories.

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the project area, Class II bike lanes exist on Churn Creek Road, Maraglia Street, Mistletoe Lane, and Hartnell Avenue, and buffered Class II bike lanes exist on Cypress Avenue and Hartnell Avenue east of Churn Creek Road. Portions of Cypress Avenue and Victor Avenue are Class III bike routes. Class I multi-use pathways, Class II bike lanes, and buffered Class II bike lanes are proposed on various streets. Table 1 summarizes the existing and planned bicycle facilities in the project vicinity, as outlined in the *Redding Active Transportation Plan* (ATP).

Table 1 – Bicycle Facility Summary

Status Location	Class	Length (miles)	Begin Point	End Point
Existing				
Churn Creek Rd	II	3.4	Dana Dr	S Bonnyview Rd
Maraglia St	II	0.3	Hilltop Dr	Churn Creek Rd
Mistletoe Ln	II	0.4	Carpenter Ln	Shady Ln
Hartnell Ave	II	0.5	Bechelli Ln	Churn Creek Rd
Hartnell Ave	IIB	1.0	Churn Creek Rd	East Wy
Cypress Ave	IIB	0.3	Churn Creek Rd	Alfreda Wy
Cypress Ave	III	0.9	Hartnell Ave	Churn Creek Rd
Cypress Ave	III	0.8	Alfreda Wy	150' E of Ishi Dr
Victor Ave	III	1.6	Old Alturas Rd	Hartnell Ave
Planned				
River Path	I	2.8	Churn Creek Rd	Cypress Ave
Victor Ave	I	1.7	Old Alturas Rd	Hartnell Ave
Mistletoe Ln	II	0.1	Churn Creek Rd	Carpenter Ln
Mistletoe Ln	II	0.3	Shady Ln	Victor Ave
Cypress Ave	II	0.9	Hartnell Ave	Churn Creek Rd
Cypress Ave	IIB	0.5	Alfreda Wy	Victor Ave
Churn Creek Rd	IIB	3.4	Dana Dr	S Bonnyview Rd
Hartnell Dr	IIB	2.7	Cypress Ave	Shasta View Dr
Victor Ave	IIB	1.7	Old Alturas Rd	Hartnell Ave

Note: IIB = Class II Buffered bike lane
Source: *Redding Active Transportation Plan*, City of Redding, 2018

Existing Transit Facilities

The Redding Area Bus Authority (RABA) provides fixed-route bus service in the City of Redding and surrounding cities including Shasta Lake and Anderson. The bus stops closest to the project site are at Churn Creek Road/Industrial Street, approximately 0.3 miles west of the proposed site and Hilltop Drive/Industrial Street, approximately 0.6 miles west of the site.

Churn Creek Road/Industrial Street serves RABA Route 4, which provides service between the Canby Transfer Center, Loma Vista Drive, and Bechelli Lane/Knollcrest Drive. Hilltop Drive/Industrial Street serves RABA Routes 14 and 15. Route 14 provides loop service between the Canby Transfer Facility, Downtown Redding, and Lake Boulevard/SR 273, while Route 15 provides service between the Canby Transfer Center and Redding Regional Airport.

Existing transit routes and their operation are summarized in Table 2.

Table 2 – Transit Routes					
Transit Agency Route	**Distance to Stop (mi)[1]**	**Service**			**Connection**
		Days of Operation	**Time**	**Frequency**	
Redding Area Bus Authority (RABA)					
Route #4	0.30	Mon – Sat	6:45 a.m. – 6:45 p.m.	1 hour	Canby Transfer Center, Loma Vista Dr, Bechelli Ln/Knollcrest Dr
Route #14	0.57	Mon – Sat	6:20 a.m. – 7:15 p.m.	1 hour	Downtown Passenger Terminal,
Route #15	0.57	Mon – Fri Sat	5:10 a.m. – 8:17 p.m. 7:37 a.m. – 8:17 p.m.	1 – 2.5 hours 1 – 2 hours	Canby Transfer Center to Redding Regional Airport

Note: [1] Defined as the shortest walking distance between the project site and the nearest bus stop
Source: www.rabaride.com

On Sundays, RABA Runabout operates between 8:00 a.m. and 4:00 p.m. This is an on-demand transportation service that provides customized trips within Redding, Shasta Lake, and Anderson. Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. RABA Demand Response (Paratransit) is designed to serve the needs of individuals with disabilities within the greater Redding area. Service hours are generally between 5:35 a.m. to 8:30 p.m. on weekdays and 7:00 a.m. to 8:30 p.m. on Saturdays.

Three bicycles can be carried on all RABA buses. Bike rack space is on a first come, first served basis. All riders are responsible for loading and unloading their bicycles.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol (CHP) as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2018, through December 31, 2022. It should be noted that records for 2023 were also reviewed but found to be incomplete so 2022 was used as the end of the study period.

As presented in Table 3, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2022 Crash Data on California State Highways*, California Department of Transportation (Caltrans). These average rates statewide are for intersections in the same environment (urban, suburban, or rural), with the same number of approaches (three or four), and the same controls (all-way stop, two-way stop, or traffic signal). One of the seven study intersections experienced crashes at a rate above the statewide average, so the records for this location were reviewed further. The collision rate calculations are provided in Appendix A.

Table 3 – Collision Rates for the Study Intersections			
Study Intersection	**Number of Collisions (2018-2022)**	**Calculated Collision Rate (c/mve)**	**Statewide Average Collision Rate (c/mve)**
1. Churn Creek Rd/Mistletoe Ln	8	0.21	0.33
2. Victor Ave/Mistletoe Ln	4	0.12	0.33
3. Churn Creek Rd/Industrial St	3	0.09	0.33
4. Industrial St/Del Monte St	0	0.00	0.20
5. Churn Creek Rd/Cypress Ave	28	**0.53**	0.33
6. Alfreda Wy/Cypress Ave	3	0.15	0.33
7. Victor Ave/Cypress Ave	9	0.29	0.33

Note: c/mve = collisions per million vehicles entering; **Bold** text = rates higher than the statewide average

Of the 28 collisions reported at Churn Creek Road/Cypress Avenue, 13 were broadside collisions, seven were rear-end collisions, four were head-on collisions, two were sideswipes, and the remaining were a hit object and "other" type of collision. Five out of the 13 broadside collisions were due to automobile right-of-way violations and five were due to traffic signal violations. Six out of the seven rear-end collisions were due to unsafe speeds. Churn Creek Road/Cypress Avenue was identified as a priority intersection in the City's *Local Road Safety Plan* (LRSP) and signal hardware countermeasures were recommended along with improvements to the signal timing. Installation of larger lenses and retroreflective backplates combined with a review of the clearance times may improve safety at the intersection.

Pedestrian Safety

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue for pedestrians. During the same five-year study period previously noted, there was one collision involving a pedestrian, which occurred at Churn Creek Road/Mistletoe Lane.

Bicyclist Safety

Collision records for the study area were reviewed to determine if there had been any bicyclist-involved crashes. During the same five-year study period, there were no reported collisions involving a bicyclist at any of the study intersections.

Project Data

The project consists of a public charter school serving high school-aged students. At build-out, up to 290 students are expected. The proposed project site plan is shown in Figure 2. As part of the project, Alfreda Way and Industrial Street would be extended to the site.

Trip Generation

Several potential land uses and standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021 were reviewed in determining the trip generation for the proposed project. Due to the school's alternative education model consisting of on-site and off-site career technical education (CTE) training, personalized learning opportunities, work-based learning, and independent study options, it was determined that application of rates for the "High School", "Private High School", and "Charter School (K-12)" land uses would drastically overestimate the trip generation potential of the proposed project. Considering the unique operational parameters of the CHYBA curriculum in which students and faculty do not visit campus every day or all at the same time, it was determined that rates for the "Junior/Community College" land use (ITE #540) using the number of students as the independent variable are most applicable to the proposed project.

Based on the application of these rates to a maximum of 290 students, the proposed project would be expected to generate an average of 334 trips per day, including 32 trips during the weekday a.m. peak hour and 32 trips during the weekday p.m. peak hour. These results are summarized in Table 4.

Table 4 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Junior/Community College	290 students	1.15	334	0.11	32	26	6	0.11	32	18	14

It should be noted that based on existing commuting patterns, school representatives estimate that of the 290 students, approximately 20 would be expected to drive themselves, up to 30 would be dropped off and picked up, and the majority of students would walk, bicycle, use the school van service, or take public transportation to travel to and from campus. Several students are expected to live in the affordable housing development being constructed on the opposite side of Industrial Street within walking distance of the site. Approximately 20 percent of the enrollment (58 students) would be part of the independent study program so they would not visit campus on a regular basis. The trip estimates as indicated in Table 4 appear to reasonably reflect the anticipated operation.

Trip Distribution

The pattern used to allocate new project trips to the street network was based on a review of turning movement counts, information contained within the SRTA travel demand model, and anticipated origins and destinations for new trips. The applied trip distribution assumptions are shown in Table 5.



Source: Sharrah Dunlap Sawyer, INC. 12/10

red034.ai 12/24

Transportation Impact Study for the California Heritage YouthBuild Academy

Figure 2 – Site Plan

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Table 5 – Trip Distribution Assumptions		
Route	**Percent**	**Daily Trips**
To/from Churn Creek Rd North of Mistletoe Ln	20	67
To/from Victor Ave North of Mistletoe Ln	10	33
To/from Mistletoe Ln West of Churn Creek Rd	10	33
To/from Industrial St West of Churn Creek Rd	5	17
To/from Cypress Ave West of Churn Creek Rd	20	67
To/from Churn Creek Rd South of Cypress Ave	20	67
To/from Alfreda Wy South of Cypress Ave	5	17
To/from Victor Ave South of Cypress Ave	10	33
TOTAL	**100**	**334**

Circulation System

This section addresses the first transportation bullet point on the CEQA checklist, which relates to the potential for a project to conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Pedestrian Facilities

Project Impact on Pedestrian Facilities

Given the proximity of nearby homes and commercial uses surrounding the site, it is reasonable to assume that some students and teachers will want to walk to the project site. According to the site plan, sidewalks would be constructed along the extensions of Alfreda Way and Industrial Street west of Alfreda Way. Crosswalks would be installed on the north, south, and east legs of the Alfreda Way/Industrial Street intersection and ADA compliant curb ramps would be constructed on all four corners. There would be no traffic on the east leg of the intersection so there would be no potential conflicts between vehicles and pedestrians in the uncontrolled crosswalk on Industrial Street. It is understood that as long as the proposed project is constructed and continues to operate, Industrial Street will not be extended further east beyond Alfreda Way so there would be no future conflicts between motorists and pedestrians in the crosswalk either. Sidewalks should be provided on-site and connect to the off-site facilities, consistent with goals set forth in the City's *General Plan* and *Active Transportation Plan*. With the provision of on-site sidewalks, the project would be adequately connected to the surrounding pedestrian network and would therefore comply with City policies related to pedestrians. In addition to benefiting Mistletoe Elementary School, the planned safe routes to school pathway between Cypress Avenue/Alfreda Way and Del Monte Street would also benefit the proposed CHYBA project.

Bicycle Facilities

Project Impacts on Bicycle Facilities

Existing bicycle facilities, including bike lanes on streets such as Churn Creek Road and Mistletoe Lane, together with shared use of minor streets, provide adequate access for bicyclists. Connectivity would be further improved upon the completion of planned facilities outlined in the City's ATP. The project would not conflict with any bicyclist-related policies, but the provision of bicycle parking is not identified on the preliminary site plan. Per City of Redding policy, the project would need to provide student and staff bicycle parking on-site consistent with California Green Building standards.

Transit Facilities

Impact on Transit Facilities

There are multiple existing bus stops within acceptable walking distance of the site. Therefore, transit load factors would be spread out across multiple headways and the volume of transit riders expected to be generated by the project is not anticipated to exceed the carrying capacity of the existing transit services near the project site.

Roadway Facilities

Impact on Roadway Facilities

As part of the project, Industrial Street would be extended east to the project site and Alfreda Way would be extended north to intersect with Industrial Street. It is expected that both street extensions would be designed

and constructed in accordance with applicable City standards. Therefore, the extensions of Industrial Street and Alfreda Way would not conflict with any policies for roadway facilities.

Recommendation – The proposed project should include bicycle parking in accordance with CalGreen building standards and construction of sidewalks on-site to facilitate circulation for pedestrians within the site that connects to the proposed sidewalks and crosswalks at the Industrial Street/Alfreda Way intersection.

Significance Finding – The proposed project would not conflict with any plans or policies for transportation facilities assuming implementation of on-site bicycle parking and provision of sidewalks and other pedestrian facilities on-site. The project would therefore have a less-than-significant impact on these facilities.

Vehicle Miles Traveled (VMT)

The potential for the project to conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b) was evaluated based the project's anticipated Vehicle Miles Traveled (VMT).

Background and Guidance

Senate Bill (SB) 743 established VMT as the metric to be applied for determining transportation impacts associated with development projects. Like many other jurisdictions in California, the City of Redding has not yet adopted a policy or thresholds of significance regarding VMT so the project-related VMT impacts were assessed based on guidance provided by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018, as well as how other agencies have chosen to assess schools. The OPR *Technical Advisory* provides recommended VMT significance thresholds for residential, office, and retail land use categories. OPR does not specifically address schools as a land use type, indicating that lead agencies may develop their own thresholds for other land uses, and also allowing assessment on a case-by-case basis.

Proposed Project VMT Impact

Several jurisdictions have established that certain local-serving public facilities may be presumed to have a less-than-significant VMT impact, applying the same justification as established for local-serving retail uses in the *Technical Advisory*, wherein it may be presumed that such uses typically generate few *new* trips within a region; rather, they tend to redistribute trips that are already occurring. Local-serving community facilities are inherently intended to serve the City's residents, with few trips extending long distances to the broader region, resulting in short trip lengths that do not substantially affect VMT. The County of Sacramento includes public schools in its "local-serving public facilities and services" VMT screening criteria, allowing such uses to be considered to have less-than-significant VMT impacts for CEQA purposes.

The proposed school would not be expected to directly increase the number of high-school and young adult-aged students in the area such as a residential project would, nor would it draw *new* students to Redding. Instead, it would be expected to redistribute where students attend school, resulting in VMT shifts but not necessarily VMT increases. In other words, the number of overall trips being driven to schools in the Redding area would not be expected to change since the number of students in the region is not being changed by the project. This is not to say that local traffic patterns would be unaffected by the proposed school's trips; while the project may not increase the number of school trips made at a regional level, it would alter where the school end of each trip occurs, potentially affecting local traffic conditions. The effects of these added vehicle trips to a localized area are assessed in the traffic operational and safety analyses (site access, queueing, etc.) but do not directly relate to VMT, which is considered at a regional level.

As noted in the Trip Generation section of this report, due to the demographics and unique characteristics of the students that the school services, only approximately 20 of the up to 290 students would be expected to drive themselves to and from school, and 30 would be dropped off and picked up. The majority of students would walk, bicycle, use the school van service, or take public transportation to travel to and from campus. Additionally, several students are expected to live in the affordable housing development being constructed on the opposite side of Industrial Street and within walking distance, and approximately 20 percent of the students would be enrolled in independent study so they would not visit campus on a regular basis. As a result, the proposed project would be expected to have a low dependency on vehicles generating substantially fewer vehicle miles traveled than a traditional high school. Therefore, it is reasonable to consider the proposed school as a local-serving public facility as has been done in other jurisdictions and conclude that the project may generally be presumed to have a less-than-significant transportation-related VMT impact.

Significance Finding – The project would be expected to result in a less-than-significant impact on VMT as a local-serving public school facility.

Safety Issues

The potential for the project to impact safety was evaluated in terms of the adequacy of sight distance and need for turn lanes at the project accesses, the adequacy of stacking space in dedicated turn lanes at the study intersections to accommodate additional queuing due to adding project-generated trips, and need for additional right-of-way controls. This section addresses the third transportation bullet on the CEQA checklist which is whether or not the project would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Site Access

The proposed project would be accessed via the north leg of the proposed Industrial Street/Alfreda Way intersection. As shown on the site plan, the Alfreda Way and school driveway approaches would be stop-controlled and Industrial Street uncontrolled. Industrial Street would terminate just east of the intersection with Alfreda Way.

Sight Distance

At unsignalized intersections, a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Adequate time should be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic to radically alter their speed. Sight distances along Industrial Street at the intersection with Alfreda Way and the project driveway were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distances for minor street approaches at intersections are based on corner sight distance, with approach travel speeds used as the basis for determining the recommended sight distance. Additionally, the stopping sight distance needed for a following driver to stop if there is a vehicle waiting to turn into a side street is evaluated based on stopping sight distance criterion and the approach speed on the major street.

Industrial Street does not have a posted speed limit so a design speed of 25 mph was applied for analysis purposes based on the characteristics of the roadway. For speeds of 25 mph, 240 feet of sight distance is needed for right turns and 280 feet is needed for left turns. While the intersection is not yet constructed so sight lines cannot be field measured, based on the flat and straight proposed alignment indicated on the site plan, it is expected that sight lines would be adequate at the project driveway as long as obstructions are kept out of the sight triangles, which are denoted graphically in Plate 1. The Intersection Sight Distance (ISD) lengths should be 240 feet to the east of the driveway and 280 feet to the west.

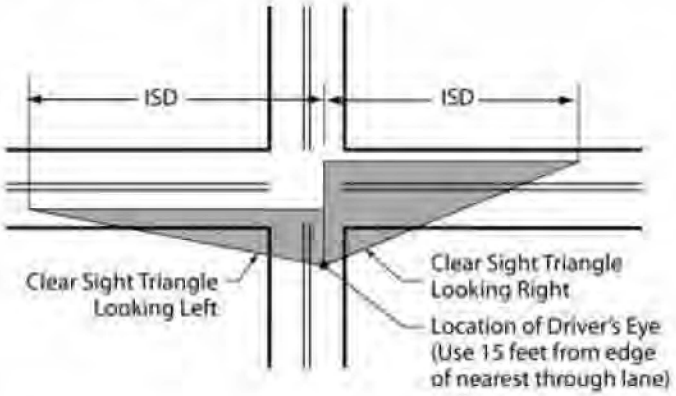


Plate 1 Vision Triangle Graphic

It is noted that Industrial Street would terminate just east of the project driveway so there would be no potential conflicting traffic approaching from the west unless the street is extended east and connected to other streets or uses. It is understood that there are no plans to extend Industrial Street east from Alfreda Way.

Finding – Sight lines at the project driveway, which would be the north leg of the Industrial Street/Alfreda Way intersection, could not be field-measured but will need to be designed to meet applicable design criteria.

Recommendation – The design of the project driveway connection to Industrial Street/Alfreda Way should result in at least 280 feet of sight distance to the west and 240 feet of sight distance to the east. Any new signage, monuments, trees, or structures should be placed outside of the vision triangles of a driver waiting on the driveway approach.

On-site Queuing

To determine the length of the loading zone that would need to be provided to accommodate anticipated queues under typical daily operation, data collected at three schools in the Bay Area, including a private high school, was used to estimate vehicle queuing during the morning drop-off and afternoon pick-up periods.

The number of vehicles that would queue during each period was estimated by applying discharge rates to the arrival rates during pick-up and drop-off. Based on the data collected at the schools in the Bay Area, the average discharge rate observed during the morning drop-off peak hour was 14.4 seconds per vehicle or 4.2 vehicles per minute while the average discharge rate during the afternoon peak hour was 37.1 seconds per vehicle or 1.6 vehicles per minute. However, because these surveyed schools have organized pick-up and drop-off procedures to minimize queuing as part of their Transportation Demand Management (TDM) plans, these average discharge rates were doubled to provide a conservative estimate of potential queuing for the California Heritage YouthBuild Academy. The arrival rates were determined based on the project's trip generation potential outlined in Table 4. The six outbound trips during the a.m. peak hour were considered to be drop-off trips since the inbound trips would include both drop-off trips and trips generated by students and staff who park and stay at school for the day. Similarly, the 18 inbound trips during the p.m. peak hour were assumed to be pick-up trips since the outbound trips would be a combination of pick-up trips and trips by those who stayed at school for the day.

Based on the application of arrival and discharge rates to each interval within the peak hours, it was determined that there would be no queues during either of the peak hours due to the relatively low number of vehicle trips expected for the school. However, it is common for some parents or guardians to arrive at the school early during the afternoon peak hour to wait for students before school dismisses. Therefore, it is recommended that the school site be designed with a loading zone that could accommodate about 25 percent of the anticipated pick-up trips during the afternoon peak hour. This translates to about five vehicles, or 125 feet assuming 25 feet of loading per vehicle. A spreadsheet summarizing the queuing calculations is provided in Appendix B.

Finding – Based on the anticipated vehicle trip generation, queuing is not expected to be a concern during either the morning drop-off or afternoon pick-up periods.

Recommendation – To account for some parents and guardians arriving to the school early to pick up students, the school should be designed with a loading zone of at least 125 feet to accommodate a queue of five vehicles.

Intersection Queuing

The City of Redding does not prescribe thresholds of significance regarding queue lengths. However, an increase in queue length due to project traffic was considered a potentially significant impact if the increase would cause the queue to extend out of a dedicated turn lane into a through traffic lane, or the back of queue into a visually restricted area, such as a blind corner. If queues would already be expected to extend past a dedicated turn lane or into a visually restricted area without project traffic, the addition of project traffic was considered to constitute a potentially adverse effect only if it would cause a new unacceptable conditions; in other words, if the queue were

already beyond the turn lane and the project would cause it to stack into an adjacent intersection or a visually restricted area, and that would not occur without the project, that would be considered an impact.

Under each scenario, the projected 95th-percentile queues were obtained from Synchro queueing reports. These results are summarized in Table 6 and copies of the queueing reports are contained in Appendix C. Queues are projected to remain within available storage at all study intersections without and with project trips.

Table 6 – 95th Percentile Turn Queues

Study Intersection Turn Lane	Available Storage	95th Percentile Queues							
		AM Peak Hour				PM Peak Hour			
		E	E+P	F	F+P	E	E+P	F	F+P
1. Churn Creek Rd/Mistletoe Ln									
Northbound Left	140[1]	30	31	33	35	82	83	88	90
Southbound Left	210	36	36	39	39	100	100	109	109
Eastbound Left	150	40	40	44	44	109	109	118	118
2. Victor Ave/Mistletoe Ln									
Northbound Left	195	68	68	73	73	59	59	64	64
Southbound Left	100	21	21	22	22	10	10	10	10
Southbound Right	110	39	39	41	41	44	44	57	57
3. Churn Creek Rd/Industrial St									
Northbound Left	155	28	28	31	31	50	50	53	53
Southbound Left	170[1]	91	103	110	123	149	155	161	168
5. Churn Creek Rd/Cypress Ave									
Northbound Left	235[2]	113	113	123	123	112	112	123	123
Northbound Right	155	33	35	40	42	49	49	50	50
Southbound Left	190[2]	38	38	41	41	87	87	95	95
Southbound Right	165	25	25	34	34	63	63	64	64
Eastbound Left	245[2]	101	101	110	111	142	143	155	155
Westbound Left	235[2]	76	76	82	82	77	77	84	85
6. Alfreda Way/Cypress Ave									
Southbound Left	160	47	49	53	54	84	85	95	96
Eastbound Left	150[1]	43	47	49	53	41	44	46	50
Westbound Left	190[1]	15	15	17	17	18	19	20	20
Westbound Right	185	13	15	16	18	17	19	21	22
7. Victor Way/Cypress Ave									
Northbound Right	50	0	0	0	0	0	0	0	0
Southbound Left	165	63	63	69	69	63	63	70	71
Westbound Right	150	31	31	43	43	0	0	0	0

Notes: 95th percentile queues are reported from Synchro; all distances are measured in feet; E = existing conditions; E+P = existing plus project conditions; F = future conditions; F+P = future plus project conditions; [1]Queue pocket connects to a two-way left-turn lane; [2]Two left-turn lanes are provided

Although the project's impact would be considered less than significant, the City may wish to consider modifying the striping on the northbound approach at Churn Creek Road/Mistletoe Lane to eliminate the bay taper stripe separating the left-turn lane from the preceding two-way left-turn lane (TWLTL). The elimination of the taper stripe would allow motorists to queue in the TWLTL, if needed, rather than the through travel lane.

Finding – The project would not cause any queues to exceed available storage, so the impact is considered less-than-significant.

Recommendations –

- The design of the project driveway connection to Industrial Street/Alfreda Way should result in at least 280 feet of sight distance to the west and 240 feet of sight distance to the east. Any new signage, monuments, trees, or structures should be placed outside of the vision triangles of a driver waiting on the driveway approach.
- To account for some parents and guardians arriving to the school early to pick up students, the school should be designed with a loading zone of at least 125 feet to accommodate a queue of five vehicles.

Significance Finding – The proposed project would not result in any hazardous conditions assuming the project driveway is constructed in accordance with applicable design standards as sight distance is expected to be adequate and the project would not cause any queues to exceed storage. The project's impact on safety is therefore considered less than significant.

Emergency Access

The final transportation bullet on the CEQA checklist requires an evaluation as to whether the project would result in inadequate emergency access or not.

Adequacy of Site Access

The proposed project site would be accessed via extensions of Industrial Street and Alfreda Way. While the site plan is still preliminary, it is anticipated that all aspects of the site, including driveway widths and turning radii, would be designed in accordance with applicable standards; therefore, access would be expected to function acceptably for emergency response vehicles.

Off-Site Impacts

While the project would be expected to result in slight increases in delay at the study intersections, emergency response vehicles can claim the right-of-way by using their lights and sirens; therefore, the project would be expected to have a nominal effect on emergency response times.

Finding – Emergency access and circulation are anticipated to function acceptably with incorporation of applicable design standards into the site layout and traffic from the proposed development would be expected to have a less-than-significant impact on emergency response times.

Significance Finding – The project would be expected to have a less-than-significant impact on emergency access.

Capacity Analysis

While no longer relevant to CEQA, in keeping with General Plan policies, the potential for the project to affect traffic operation was evaluated.

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 6th Edition. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

Industrial Street/Del Monte Street is unsignalized and has two approaches stop controlled, so was analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a Level of Service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The remaining study intersections are currently controlled by traffic signals so were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. Delays were calculated using signal timing obtained from City of Redding staff.

The ranges of delay associated with the various levels of service are indicated in Table 7.

Table 7 – Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	Signalized
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual*, Transportation Research Board, 6th Edition

Traffic Operation Standards

Per the City of Redding's *General Plan 2045*, the City strives to maintain LOS C operation for most arterials and their intersections, except within the Downtown area where LOS D is considered acceptable. Additionally, LOS D is considered acceptable for streets and intersections on the state highway network and river-crossing street corridors where capacity is affected by adjacent intersections. This applies to the overall operation of the intersection at signalized locations and to the worst-case movement on the stop-controlled approach(es) at unsignalized locations. A project would have an adverse effect on the surrounding transportation system if it would cause any study intersection to exceed the acceptable threshold for the facility. Based on the City of Redding's General Plan and TIA Guidelines, a standard of LOS C was applied to all study intersections. The following thresholds were used to determine if an effect would be considered adverse.

Signalized intersections: The project is considered to have an adverse effect if:

- The project causes an acceptable LOS to decline to an unacceptable LOS; or
- The project increases the overall average delay by more than 5 seconds per vehicle at an intersection having an unacceptable LOS without project traffic.

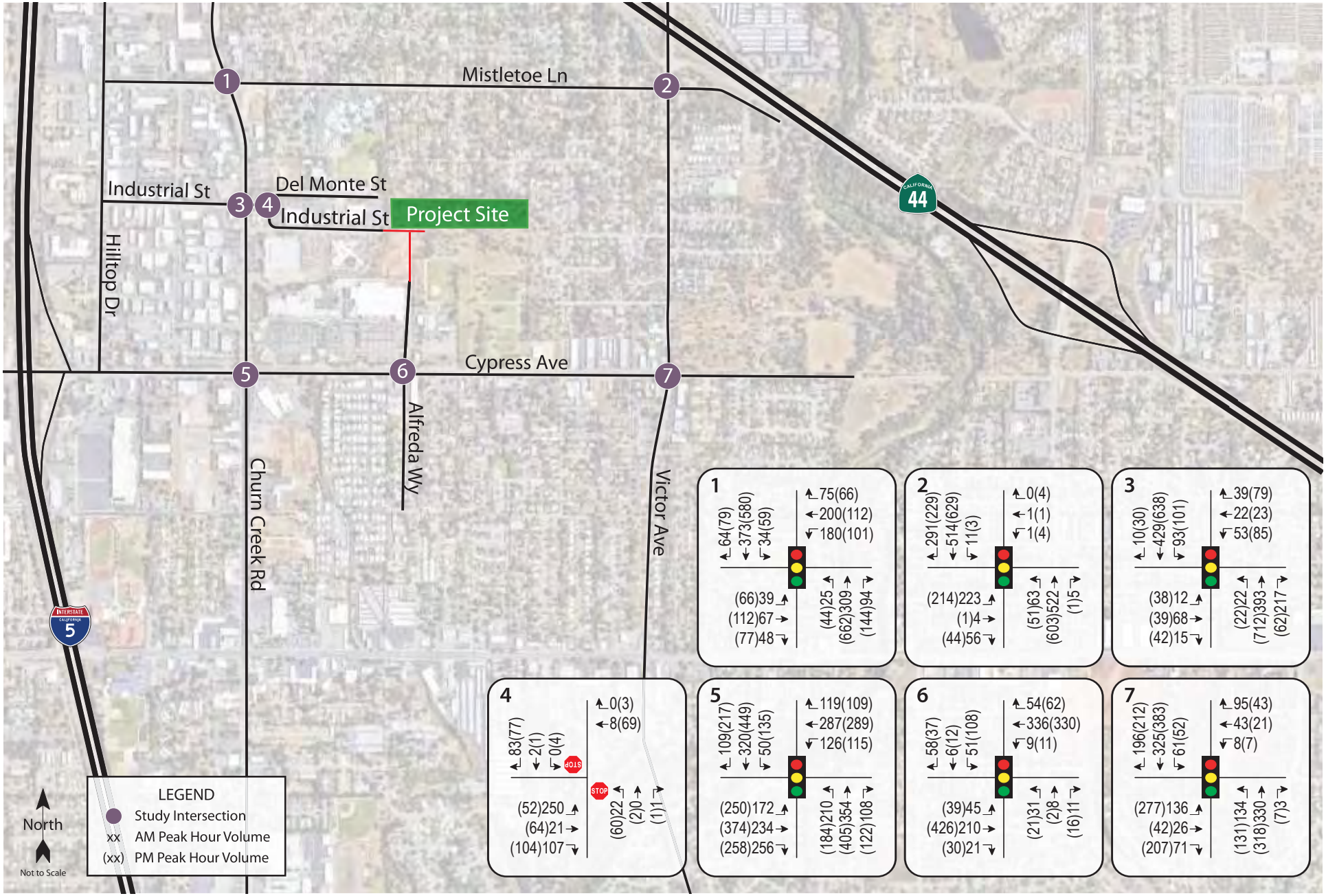
Unsignalized Intersections: The project is considered to have an adverse effect if:

- The LOS declines to an unacceptable LOS; and
- The volume to capacity ratio exceeds 0.75; and
- The 95th percentile queue exceeds 75 feet (3 vehicles); or
- The project causes the worst-case movement's acceptable LOS to decline to an unacceptable LOS and the peak hour volume signal warrant is met; or
- The project increases the average delay for the worst-case movement by more than 5 seconds per vehicle at an intersection that has an unacceptable LOS without the project and the intersection also meets the peak hour volume signal warrant.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the weekday a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected on October 9, 2024, while local schools were in session.

Under Existing Conditions, all study intersections are operating acceptably, with the exception of Churn Creek Road/Cypress Avenue, which operates at LOS D during both peak hours. The existing traffic volumes are shown in Figure 3. A summary of the intersection Level of Service calculations is contained in Table 8, and copies of the calculations for all evaluated scenarios are provided in Appendix D.



red034.ai 12/24

Transportation Impact Study for the California Heritage YouthBuild Academy

Figure 3 – Existing Traffic Volumes

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Table 8 – Existing Peak Hour Intersection Levels of Service				
Study Intersection ***Approach***	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Churn Creek Rd/Mistletoe Ln	14.2	B	25.9	C
2. Victor Ave/Mistletoe Ln	25.4	C	25.2	C
3. Churn Creek Rd/Industrial St	11.6	B	20.5	C
4. Industrial St/Del Monte St	6.4	A	4.6	A
Northbound (Industrial St) Approach	*20.0*	*C*	*13.5*	*B*
Southbound (Del Monte St) Approach	*9.0*	*A*	*9.4*	*A*
5. Churn Creek Rd/Cypress Ave	**38.0**	**D**	**41.0**	**D**
6. Alfreda Wy/Cypress Ave	13.5	B	13.2	B
7. Victor Ave/Cypress Ave	17.2	B	19.5	B

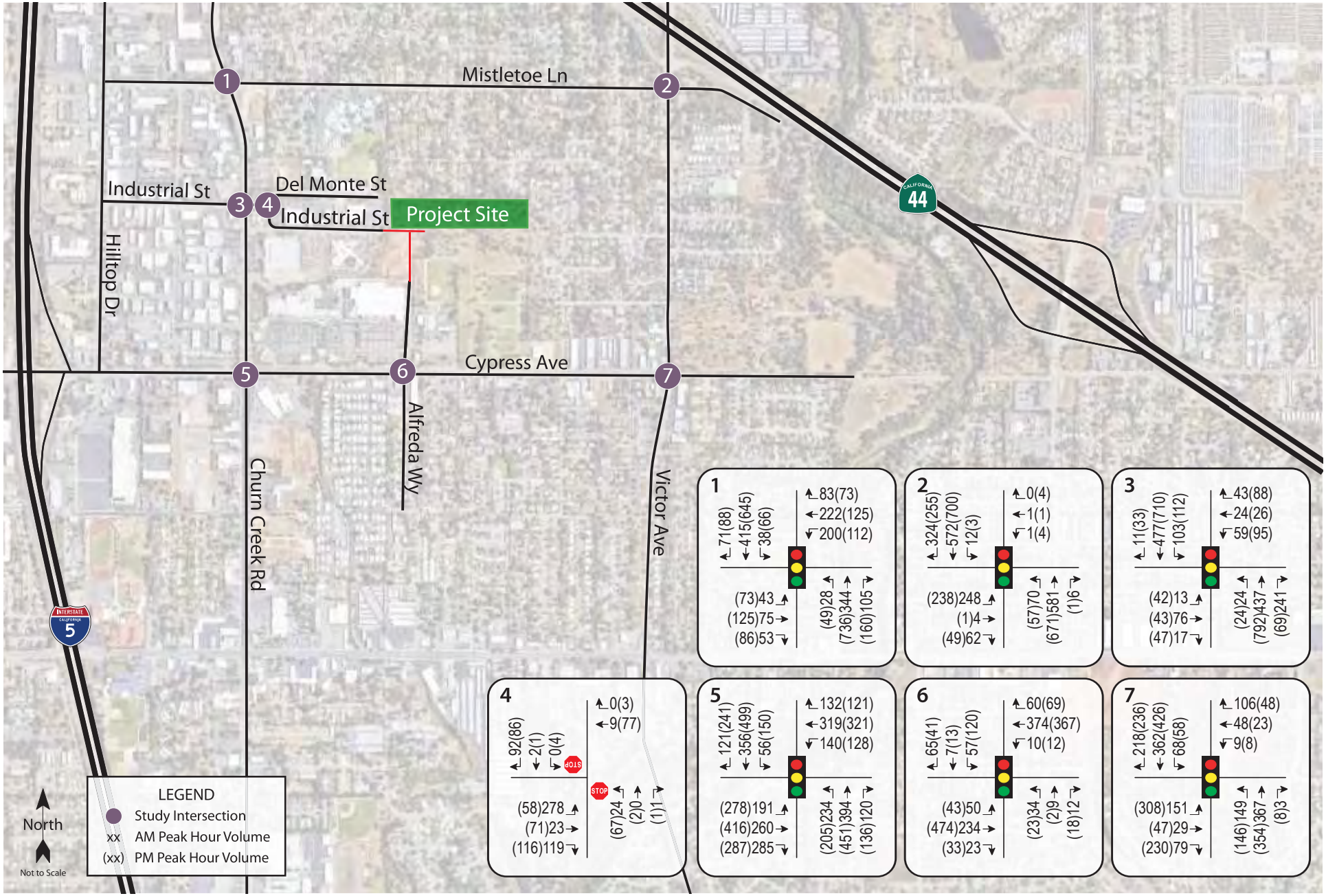
Note: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = deficient operation

Future Conditions

Segment volumes for the horizon year of 2040 were obtained from the Shasta Regional Transportation Agency (SRTA) travel demand model and translated to turning movement volumes at select study intersections using a combination of the "Furness" method and factoring, depending on how the model was configured at each intersection. The Furness method is an iterative process that employs existing turn movement data, existing link volumes, and future link volumes to project likely turning future movement volumes at intersections. A computer application of the Furness procedure was used to produce the future intersection turning movement volumes.

At Victor Avenue/Mistletoe Lane, Industrial Street/Del Monte Street, and Alfreda Way/Cypress Avenue, the SRTA travel demand model was missing one or more legs. Therefore, future volumes were calculated based on the average a.m. and p.m. growth rates between existing and future volumes developed using the Furness method for the other four study intersections.

Under the anticipated Future volumes, and with no changes to the existing configurations and controls other than routine signal timing adjustments that would be expected to occur over time, the study intersections are expected to operate acceptably at LOS C or better during both peak hours, with the exception of Churn Creek Road/Cypress Avenue, which would continue to operate at LOS D during both peak hours. Future volumes are shown in Figure 4 and operating conditions are summarized in Table 9.



red034.ai 12/24

Transportation Impact Study for the California Heritage YouthBuild Academy

Figure 4 – Future Traffic Volumes

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Table 9 – Future Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	Churn Creek Rd/Mistletoe Ln	14.8	B	26.9	C
2.	Victor Ave/Mistletoe Ln	26.0	C	25.8	C
3.	Churn Creek Rd/Industrial St	12.2	B	21.5	C
4.	Industrial St/Del Monte St	6.6	A	4.8	A
	Northbound (Industrial St) Approach	*23.2*	*C*	*14.7*	*B*
	Southbound (Del Monte St) Approach	*9.1*	*A*	*9.5*	*A*
5.	Churn Creek Rd/Cypress Ave	**38.2**	**D**	**41.2**	**D**
6.	Alfreda Wy/Cypress Ave	14.1	B	13.7	B
7.	Victor Ave/Cypress Ave	19.3	B	22.8	C

Note: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = deficient operation

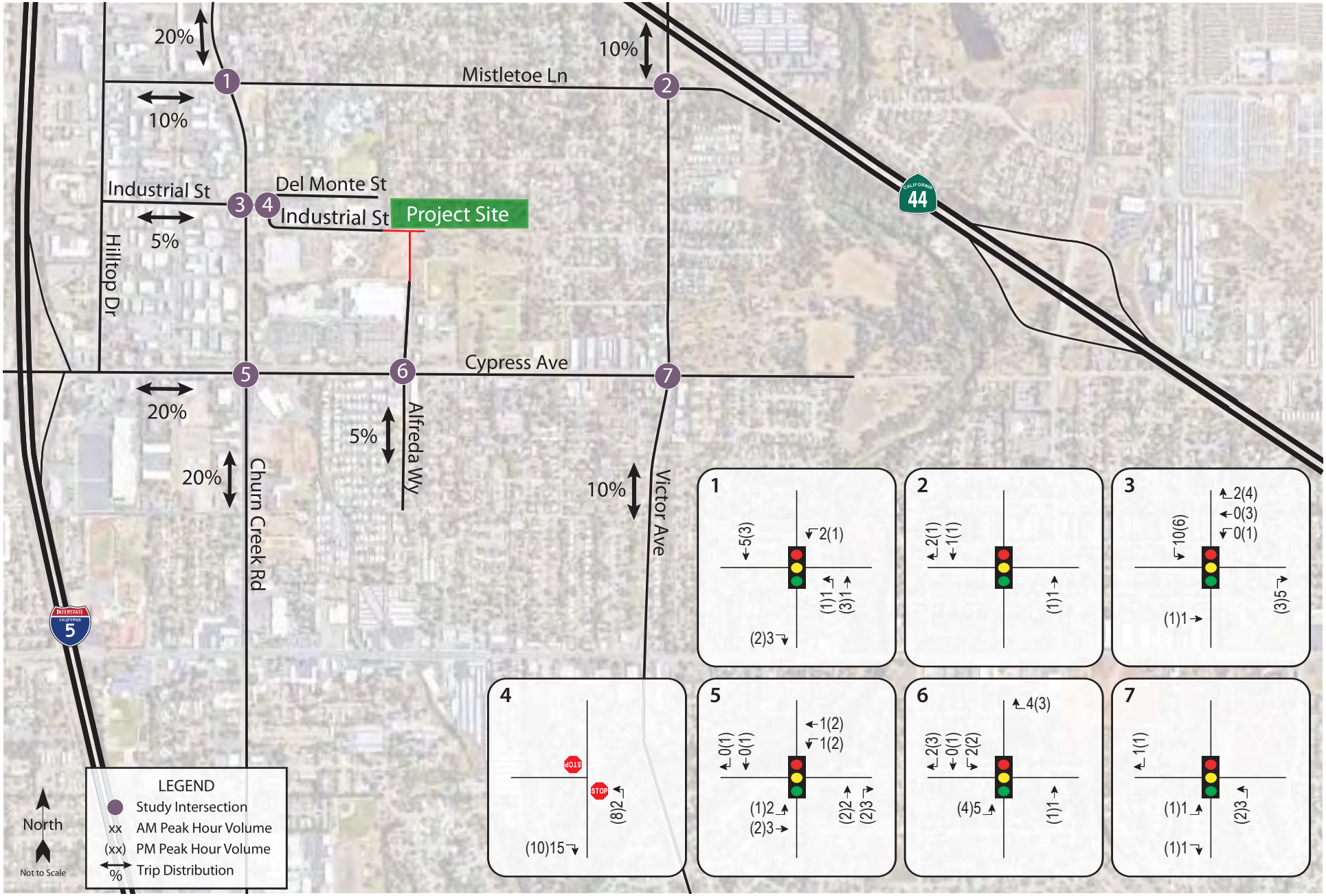
Project Conditions

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating acceptably at the same Levels of Service as without project volumes, besides Churn Creek Road/Cypress Avenue, which would continue operating unacceptably at LOS D during both peak hours with no change in delay. As the addition of project trips does not lead to an increase in overall average delay of five seconds per vehicle or more, the project's effect on operation is acceptable per City policy. These results are summarized in Table 10 and project traffic volumes are shown in Figure 5.

Table 10 – Existing and Existing plus Project Peak Hour Intersection Levels of Service									
Study Intersection ***Approach***		**Existing Conditions**				**Existing plus Project**			
		AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1.	Churn Creek Rd/Mistletoe Ln	14.2	B	25.9	C	14.3	B	26.0	C
2.	Victor Ave/Mistletoe Ln	25.4	C	25.2	C	25.4	C	25.2	C
3.	Churn Creek Rd/Industrial St	11.6	B	20.5	C	11.8	B	21.0	C
4.	Industrial St/Del Monte St	6.4	A	4.6	A	6.3	A	4.7	A
	NB (Industrial St) Approach	*20.0*	*C*	*13.5*	*B*	*20.4*	*C*	*13.8*	*B*
	SB (Del Monte St) Approach	*9.0*	*A*	*9.4*	*A*	*9.0*	*A*	*9.4*	*A*
5.	Churn Creek Rd/Cypress Ave	**38.0**	**D**	**41.0**	**D**	**38.0**	**D**	**41.0**	**D**
6.	Alfreda Wy/Cypress Ave	13.5	B	13.2	B	13.8	B	13.4	B
7.	Victor Ave/Cypress Ave	17.2	B	19.5	B	17.3	B	19.6	B

Note: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; NB = northbound; SB = southbound; **Bold** text = deficient operation



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Transportation Impact Study for the California Heritage YouthBuild Academy

Figure 5 – Project Traffic Volumes and Trip Distribution

W-Trans

It is noted that with the addition of project-related traffic to the existing volumes, average total delay at Industrial Street/Del Monte Street decreases slightly during the a.m. peak hour. While this is counter-intuitive, this condition occurs when a project adds trips to movements that are currently underutilized or have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. The project adds traffic predominantly to the eastbound approach, which is uncontrolled and has an average delay that is lower than the average for the intersection as a whole, resulting in a slight reduction in the overall average delay. The conclusion could incorrectly be drawn that the project actually improves operation based on this data alone; however, it is more appropriate to conclude that the project trips are expected to make use of excess capacity, so drivers will experience little, if any, change in conditions as a result of the project.

Finding – The study intersections are expected to continue operating at the same Levels of Service upon adding project-generated traffic to the existing volumes. While Churn Creek Road/Cypress Avenue would continue to operate unacceptably at LOS D, the project would add fewer than five seconds of delay to the intersection so its effect on operation is considered acceptable.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated future volumes, the study intersections are expected to continue operating acceptably at the same Levels of Service as without project trips. Again, while Churn Creek Road/Cypress Avenue would operate unacceptably at LOS D the project would add fewer than five seconds of additional delay so the effect is considered acceptable. Future plus Project operating conditions are summarized in Table 11.

Table 11 – Future and Future plus Project Peak Hour Intersection Levels of Service

	Study Intersection ***Approach***	**Future Conditions**				**Future plus Project**			
		AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1.	Churn Creek Rd/Mistletoe Ln	14.8	B	26.9	C	14.9	B	27.1	C
2.	Victor Ave/Mistletoe Ln	26.0	C	25.8	C	26.0	C	25.8	C
3.	Churn Creek Rd/Industrial St	12.2	B	21.5	C	12.4	B	22.0	C
4.	Industrial St/Del Monte St	6.6	A	4.8	A	6.5	A	4.9	A
	NB (Industrial St) Approach	*23.2*	*C*	*14.7*	*B*	*23.8*	*C*	*15.1*	*C*
	SB (Del Monte St) Approach	*9.1*	*A*	*9.5*	*A*	*9.1*	*A*	*9.5*	*A*
5.	Churn Creek Rd/Cypress Ave	**38.2**	**D**	**41.2**	**D**	**38.2**	**D**	**41.2**	**D**
6.	Alfreda Wy/Cypress Ave	14.1	B	13.7	B	14.4	B	13.9	B
7.	Victor Ave/Cypress Ave	19.3	B	22.8	C	19.5	B	23.1	C

Note: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* NB = northbound; SB = southbound; **Bold** text = deficient operation

Finding – All but one of the study intersections are expected to continue operating acceptably with project traffic added to the future volumes, at the same Levels of Service as without project trips. While Churn Creek Road/Cypress Avenue would continue to operate deficiently at LOS D, the overall delay is not expected to increase so the project's effect on operation is considered acceptable.

Conclusions and Recommendations

Conclusions

- The proposed project would be expected to generate an average of 334 daily trips, including 32 trips during both the weekday a.m. and p.m. peak hours.
- The proposed project would not conflict with any plans or policies for transportation facilities assuming implementation of on-site bicycle parking and provision of sidewalks and other pedestrian facilities on-site. The project would therefore have a less-than-significant impact on these facilities.
- The project would be expected to result in a less-than-significant impact on VMT as a local-serving public school facility.
- The proposed project would not result in any hazardous conditions assuming the project driveway is constructed in accordance with applicable design standards as sight distance is expected to be adequate and the project would not cause any queues to exceed available storage at the study intersections. The project's impact on safety is therefore considered less-than-significant.
- Emergency access and circulation are anticipated to function acceptably and traffic from the proposed development would be expected to have a less-than-significant impact on emergency response times.
- The study intersections operate acceptably under existing and future volumes, with the exception of Churn Creek Road/Cypress Avenue, which operates unacceptably at LOS D during both peak hours.
- With the addition of project-generated trips, the study intersections would continue to operate at the same Levels of Service as without the project. Overall delay at Churn Creek Road/Cypress Avenue would increase by less than five seconds, so the project's effect on operations is considered acceptable.

Recommendations

- The proposed project should include on-site bicycle parking per CalGreen requirements and construction of sidewalks on-site that connect to the proposed sidewalks and crosswalks at the Industrial Street/Alfreda Way intersection.
- The design of the project driveway connection to Industrial Street/Alfreda Way should result in at least 280 feet of sight distance to the west and 240 feet of sight distance to the east. Any new signage, monuments, trees, or structures should be placed outside of the vision triangles of a driver waiting on the driveway approach.
- On-site queuing is not expected to be a concern during either the morning pick-up or afternoon drop-off period due to the proposed educational curriculum where vehicle strips are spread throughout the day and several students do not attend school every day. However, to account for some parents and guardians arriving at the school early to pick up students, a loading zone of at least 125 feet should be provided to accommodate a queue of five vehicles.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE (Civil, Traffic), PTOE
Transportation Engineer	Cameron Nye, PE (Traffic)
Assistant Engineer	Valerie Haines, EIT
Graphics	Jessica Bender
Editing/Formatting	Rebecca Mansour, Erika Totanes
Quality Control	Dalene J. Whitlock, PE (Civil, Traffic), PTOE

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Appendix A

Collision Rate Calculations

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Intersection Collision Rate Worksheet

TIS for the California Heritage YouthBuild Academy

Intersection # 1: Churn Creek Rd & Mistletoe Ln
Date of Count: Wednesday, October 9, 2024

Number of Collisions: 8
Number of Injuries: 4
Number of Fatalities: 0
Average Daily Traffic (ADT): 21000
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{8 \times 1{,}000{,}000}{21{,}000 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.21 c/mve**	**0.0%**	**50.0%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2021 Collision Data on California State Highways, Caltrans

Intersection # 2: Victor Ave & Mistletoe Ln
Date of Count: Wednesday, October 9, 2024

Number of Collisions: 4
Number of Injuries: 1
Number of Fatalities: 0
Average Daily Traffic (ADT): 17800
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{4 \times 1{,}000{,}000}{17{,}800 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.12 c/mve**	**0.0%**	**25.0%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2021 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

TIS for the California Heritage YouthBuild Academy

Intersection # 3: Churn Creek Rd & Industrial St

Date of Count: Saturday, January 0, 1900

Number of Collisions: 3
Number of Injuries: 1
Number of Fatalities: 0
Average Daily Traffic (ADT): 18700
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{3 \times 1{,}000{,}000}{18{,}700 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.09 c/mve**	**0.0%**	**33.3%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2021 Collision Data on California State Highways, Caltrans

Intersection # 4: Industrial St & Del Monte St

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 4400
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Stop & Yield Controls
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{4{,}400 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.20 c/mve**	**1.1%**	**47.5%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2021 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

TIS for the California Heritage YouthBuild Academy

Intersection # 5: Cypress Ave & Churn Creek Rd
Date of Count: Wednesday, October 9, 2024

Number of Collisions: 28
Number of Injuries: 19
Number of Fatalities: 0
Average Daily Traffic (ADT): 29100
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{28 \times 1{,}000{,}000}{29{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.53 c/mve**	**0.0%**	**67.9%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2021 Collision Data on California State Highways, Caltrans

Intersection # 6: Cypress Ave & Alfreda Way
Date of Count: Wednesday, October 9, 2024

Number of Collisions: 3
Number of Injuries: 2
Number of Fatalities: 0
Average Daily Traffic (ADT): 10900
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{3 \times 1{,}000{,}000}{10{,}900 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.15 c/mve**	**0.0%**	**66.7%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2021 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

TIS for the California Heritage YouthBuild Academy

Intersection # 7: Cypress Ave & Victor Ave

Date of Count: Wednesday, October 9, 2024

Number of Collisions: 9
Number of Injuries: 5
Number of Fatalities: 0
Average Daily Traffic (ADT): 17000
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{9 \times 1{,}000{,}000}{17{,}000 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.29 c/mve**	**0.0%**	**55.6%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2021 Collision Data on California State Highways, Caltrans

Appendix B

On-site Queueing Calculations

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Project Name: TIS for the California Heritage YouthBuild Academy
Analyst Name: W-Trans

Date: 12/13/2024
Scenario: Morning Peak Hour

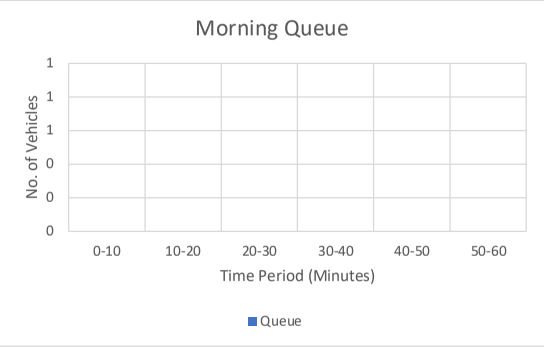
Morning Drop-Off	6	veh/hr	Initial Queue (# veh):	0	
10-Minute Intervals	**Arrival**	**Discharge**	**Balance**	**Unserved**	**Queue**
0-10	1	21	-20	0	0
10-20	0	21	-21	0	0
20-30	1	21	-20	0	0
30-40	1	21	-20	0	0
40-50	2	21	-19	0	0
50-60	1	21	-20	0	0

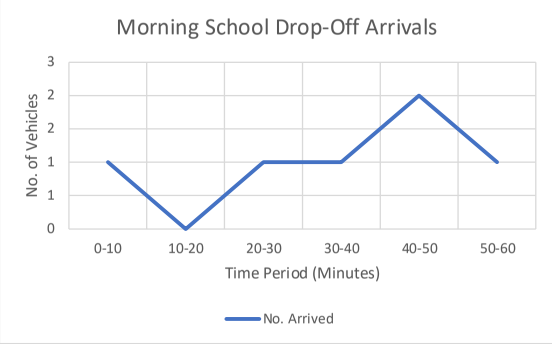
Cumulative		
10-Minute Intervals	**No. Arrived**	**No. Served**
0-10	1	1
10-20	1	1
20-30	2	2
30-40	3	3
40-50	5	5
50-60	6	6

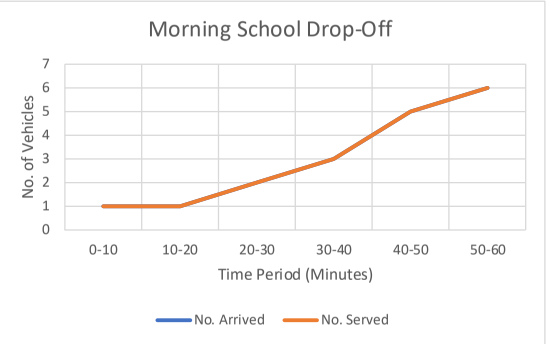
Discharge Rate:		
Seconds per vehicle:	28	
Discharge rate:	2.1	veh/minute
	21.4	veh/10-minutes
	128.6	veh/hr

0.624
0.612
0.708
1.284
1.62
1.152

Queue Results:	
Max Number (No.):	0
Length of Car (ft):	25
Max Length (ft):	0
95th Percentile (No.)	0.0
95th-%-tile Length (ft):	0







Project Name: TIS for the California Heritage YouthBuild Academy
Analyst Name: W-Trans

Date: 12/13/2024
Scenario: Afternoon Peak Hour

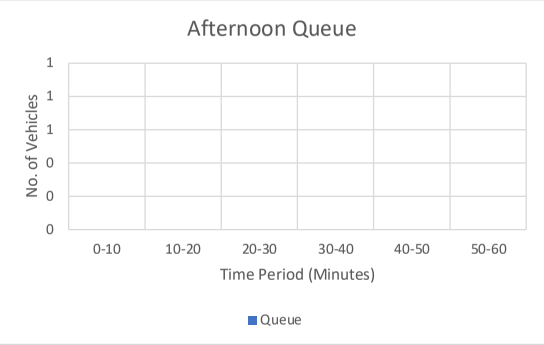
Afternoon Pick-Up	18	veh/hr	Initial Queue (# veh):		5
10-Minute Intervals	Arrival	Discharge	Balance	Unserved	Queue
0-10	1	8	-7	0	0
10-20	3	8	-5	0	0
20-30	3	8	-5	0	0
30-40	5	8	-3	0	0
40-50	4	8	-4	0	0
50-60	2	8	-6	0	0

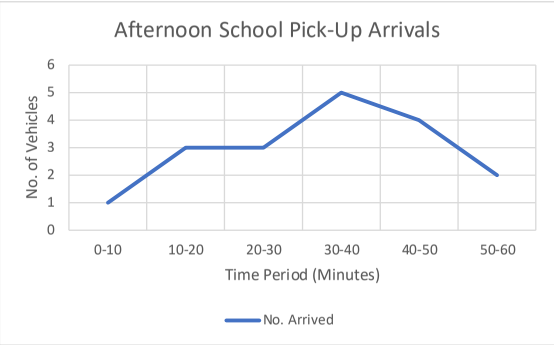
Cumulative		
10-Minute Intervals	No. Arrived	No. Served
0-10	1	6
10-20	4	9
20-30	7	12
30-40	12	17
40-50	16	21
50-60	18	23

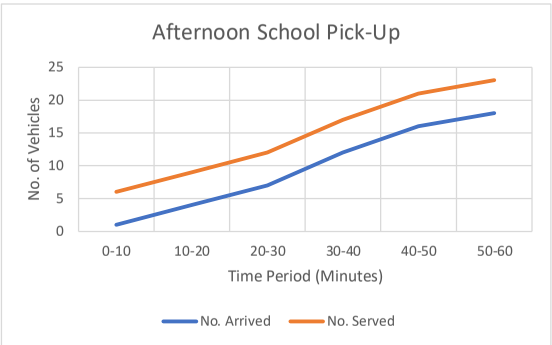
Discharge Rate:		
Seconds per vehicle:	74	
Discharge rate:	0.8	veh/minute
	8.1	veh/10-minutes
	48.6	veh/hr

1.299
3.155
3.155
4.825
4.082
1.485

Queue Results:	
Max Number (No.):	0
Length of Car (ft):	25
Max Length (ft):	0
95th Percentile (No.)	0.0
95th-%-tile Length (ft):	0







Appendix C

Intersection Queuing Calculations

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Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	L	T	T
Maximum Queue (ft)	64	95	46	154	99	126	66	125	145	56	146	118
Average Queue (ft)	25	37	18	80	43	66	23	58	67	19	66	47
95th Queue (ft)	54	73	39	132	82	108	55	107	123	45	116	93
Link Distance (ft)		1075	1075	4050	4050	4050		732	732		1160	1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			210		
Storage Blk Time (%)		0						0	0			0
Queuing Penalty (veh)		0						0	0			0

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	309	23	116	153	173	172	62	201	181	125
Average Queue (ft)	158	1	52	48	61	62	9	103	57	50
95th Queue (ft)	254	11	97	110	127	133	37	179	137	91
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)								7	0	0
Queuing Penalty (veh)								1	1	0

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	95	50	104	65	55	150	244	99	85	105
Average Queue (ft)	48	15	45	24	17	49	96	44	29	41
95th Queue (ft)	83	48	83	54	44	108	184	81	63	83
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			0							
Queuing Penalty (veh)			0							
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	28	2				0				
Queuing Penalty (veh)	4	1				0				

Intersection: 4: Industrial St & Del Monte St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	64	60	62
Average Queue (ft)	5	20	33
95th Queue (ft)	31	49	54
Link Distance (ft)	126	449	533
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	TR	L	L
Maximum Queue (ft)	137	158	121	109	46	118	123	96	104	149	183	217
Average Queue (ft)	51	93	59	37	2	43	54	42	45	70	58	122
95th Queue (ft)	119	153	106	83	30	90	97	80	85	126	150	189
Link Distance (ft)			1168	1168	1168			1074	1074	1074		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245				235	235				235	235
Storage Blk Time (%)											0	0
Queuing Penalty (veh)											0	0

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	189	207	155	55	90	195	202	172
Average Queue (ft)	103	107	42	15	34	108	111	49
95th Queue (ft)	164	175	92	43	71	167	175	109
Link Distance (ft)	820	820				1464	1464	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			155	190	190			165
Storage Blk Time (%)	0	2	0			0	2	0
Queuing Penalty (veh)	0	2	0			0	2	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	73	82	124	31	109	122	68	75	68	64
Average Queue (ft)	30	25	43	8	45	56	18	34	29	25
95th Queue (ft)	60	64	92	26	90	104	49	66	56	50
Link Distance (ft)		261	261		2384	2384		753		807
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			190			185		160	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	150	73	89	80	177	232	47	160	258	45
Average Queue (ft)	75	21	36	38	79	95	3	50	115	1
95th Queue (ft)	124	57	72	65	144	176	20	107	211	26
Link Distance (ft)	2384	2384	1206		716	716			786	786
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				150			50	165		
Storage Blk Time (%)						18	0		2	
Queuing Penalty (veh)						1	0		2	

Network Summary

Network wide Queuing Penalty: 15

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	R	L	T
Maximum Queue (ft)	168	233	57	195	119	168	152	307	301	193	128	223
Average Queue (ft)	64	101	24	92	49	88	54	97	102	17	47	106
95th Queue (ft)	128	185	46	164	98	144	116	219	221	105	97	188
Link Distance (ft)		1075	1075	4050	4050	4050		732	732			1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			170	210	
Storage Blk Time (%)	0	4					0	4	2	0		0
Queuing Penalty (veh)	0	3					0	2	4	0		0

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	214	87
Average Queue (ft)	89	4
95th Queue (ft)	168	45
Link Distance (ft)	1160	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		120
Storage Blk Time (%)	3	0
Queuing Penalty (veh)	2	0

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	315	35	104	198	197	204	19	201	192	111
Average Queue (ft)	158	6	42	56	71	71	2	101	59	39
95th Queue (ft)	273	25	84	137	150	156	9	179	137	77
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)				0				7	1	0
Queuing Penalty (veh)				0				0	1	0

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	202	53	140	91	143	294	322	182	204	202
Average Queue (ft)	88	35	95	38	25	101	123	88	62	75
95th Queue (ft)	163	67	150	70	82	235	261	156	138	151
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			7	0						
Queuing Penalty (veh)			8	0						
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	60	5				4		1	0	
Queuing Penalty (veh)	27	5				1		4	0	

Intersection: 4: Industrial St & Del Monte St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	64	50	69	70
Average Queue (ft)	10	4	33	35
95th Queue (ft)	44	28	57	60
Link Distance (ft)	126	184	449	533
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	TR	L	L
Maximum Queue (ft)	198	215	173	169	78	100	109	117	121	156	179	219
Average Queue (ft)	92	130	94	87	5	42	58	53	56	77	61	121
95th Queue (ft)	170	190	154	149	48	84	95	93	98	137	158	192
Link Distance (ft)			1168	1168	1168			1074	1074	1074		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245				235	235				235	235
Storage Blk Time (%)	0	0									0	0
Queuing Penalty (veh)	0	0									0	0

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	242	252	168	114	213	297	340	190
Average Queue (ft)	137	124	53	48	83	147	157	98
95th Queue (ft)	210	206	121	95	162	242	269	205
Link Distance (ft)	820	820				1464	1464	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			155	190	190			165
Storage Blk Time (%)	0	4	0		0	4	9	0
Queuing Penalty (veh)	1	5	0		0	5	20	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	77	126	164	39	106	116	63	68	107	49
Average Queue (ft)	28	44	67	9	42	54	22	28	48	20
95th Queue (ft)	60	97	128	30	85	100	52	58	86	42
Link Distance (ft)		261	261		2384	2384		753		807
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			190			185		160	
Storage Blk Time (%)		0							0	
Queuing Penalty (veh)		0							0	

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	254	84	59	64	55	155	202	44	181	286	13
Average Queue (ft)	122	25	3	22	25	71	91	5	47	138	0
95th Queue (ft)	203	64	40	54	49	126	168	27	110	244	13
Link Distance (ft)	2384	2384		1206		716	716			786	786
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			145		150			50	165		
Storage Blk Time (%)			0				19	0		5	
Queuing Penalty (veh)			0				2	0		3	

Network Summary

Network wide Queuing Penalty: 95

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	L	T	T
Maximum Queue (ft)	76	81	56	188	96	121	91	120	133	58	122	107
Average Queue (ft)	27	35	20	96	43	67	39	57	67	17	67	48
95th Queue (ft)	59	66	43	161	81	108	76	104	116	43	108	90
Link Distance (ft)		1075	1075	4050	4050	4050		732	732		1160	1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			210		
Storage Blk Time (%)								0	0			0
Queuing Penalty (veh)								0	0			0

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	SB
Directions Served	R
Maximum Queue (ft)	9
Average Queue (ft)	0
95th Queue (ft)	9
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	120
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	288	18	115	153	171	168	99	211	173	125
Average Queue (ft)	166	1	55	46	62	66	12	109	66	56
95th Queue (ft)	253	10	101	107	125	130	53	184	145	101
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)				0				8	1	0
Queuing Penalty (veh)				0				1	3	1

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	109	50	106	65	40	185	274	114	101	124
Average Queue (ft)	48	15	52	31	15	73	135	51	33	50
95th Queue (ft)	89	48	88	56	38	147	232	94	75	103
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			0							
Queuing Penalty (veh)			0							
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	30	2				0				
Queuing Penalty (veh)	5	2				0				

Intersection: 4: Industrial St & Del Monte St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	55	48	61
Average Queue (ft)	6	19	34
95th Queue (ft)	31	46	54
Link Distance (ft)	126	449	533
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	TR	L	L	T
Maximum Queue (ft)	177	197	137	116	97	110	104	109	157	172	201	182
Average Queue (ft)	81	118	60	42	41	53	45	51	75	55	122	102
95th Queue (ft)	161	182	111	89	83	94	86	95	136	145	187	169
Link Distance (ft)			1168	1168			1074	1074	1074			820
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245			235	235				235	235	
Storage Blk Time (%)										0	0	
Queuing Penalty (veh)										0	0	

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	215	167	52	92	187	199	165
Average Queue (ft)	111	44	14	35	108	112	58
95th Queue (ft)	186	100	41	72	166	170	117
Link Distance (ft)	820				1464	1464	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155	190	190			165
Storage Blk Time (%)	3	0			0	1	0
Queuing Penalty (veh)	3	0			0	2	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	79	97	114	41	104	135	56	97	79	69
Average Queue (ft)	32	31	44	8	48	63	22	38	33	27
95th Queue (ft)	65	74	92	29	92	111	51	74	65	54
Link Distance (ft)		261	261		2384	2384		753		807
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			190			185		160	
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	184	59	85	73	201	228	36	180	281	35
Average Queue (ft)	92	19	37	39	92	99	2	53	123	1
95th Queue (ft)	154	51	72	64	167	177	18	119	222	25
Link Distance (ft)	2384	2384	1206		716	716			786	786
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				150			50	165		
Storage Blk Time (%)						21	0		3	
Queuing Penalty (veh)						1	0		2	

Network Summary

Network wide Queuing Penalty: 19

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	R	L	T
Maximum Queue (ft)	151	206	66	190	119	158	162	242	261	194	116	202
Average Queue (ft)	64	98	24	85	46	84	81	85	99	20	45	101
95th Queue (ft)	128	170	51	159	96	138	145	196	206	117	95	172
Link Distance (ft)		1075	1075	4050	4050	4050		732	732			1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			170	210	
Storage Blk Time (%)	0	3					3	4	2	0		0
Queuing Penalty (veh)	0	2					9	3	3	0		0

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	193	101
Average Queue (ft)	79	4
95th Queue (ft)	151	43
Link Distance (ft)	1160	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		120
Storage Blk Time (%)	2	0
Queuing Penalty (veh)	2	0

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	304	41	103	152	172	186	15	208	178	112
Average Queue (ft)	146	6	42	55	68	71	1	99	54	38
95th Queue (ft)	256	27	86	128	142	151	8	176	133	73
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)				0				6	1	0
Queuing Penalty (veh)				0				0	1	0

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	178	54	141	103	161	302	335	162	152	160
Average Queue (ft)	82	33	103	47	27	97	120	81	55	68
95th Queue (ft)	155	66	150	83	88	237	270	142	115	134
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			8	0						
Queuing Penalty (veh)			9	0						
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	58	5				5		1	0	
Queuing Penalty (veh)	24	4				1		2	0	

Intersection: 4: Industrial St & Del Monte St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	75	71	73	94
Average Queue (ft)	8	5	34	34
95th Queue (ft)	41	32	60	65
Link Distance (ft)	126	184	449	533
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	TR	L	L
Maximum Queue (ft)	182	201	163	153	11	99	103	106	113	156	186	216
Average Queue (ft)	87	126	89	78	1	42	55	48	53	73	59	120
95th Queue (ft)	157	181	144	136	14	82	92	89	96	134	154	192
Link Distance (ft)			1168	1168	1168			1074	1074	1074		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245				235	235				235	235
Storage Blk Time (%)		0	0								0	0
Queuing Penalty (veh)		0	0								0	0

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	252	253	174	122	196	279	319	190
Average Queue (ft)	144	129	54	45	72	130	136	83
95th Queue (ft)	221	216	127	94	141	216	234	176
Link Distance (ft)	820	820				1464	1464	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			155	190	190			165
Storage Blk Time (%)	0	5	0	0	0	2	5	0
Queuing Penalty (veh)	0	6	0	0	0	2	12	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	67	135	167	39	106	108	68	74	108	64
Average Queue (ft)	26	50	73	8	45	52	23	30	47	21
95th Queue (ft)	55	109	134	29	90	97	55	61	85	48
Link Distance (ft)		261	261		2384	2384		753		807
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			190			185		160	
Storage Blk Time (%)		0							0	
Queuing Penalty (veh)		0							0	

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T
Maximum Queue (ft)	245	66	30	66	60	165	198	53	146	282
Average Queue (ft)	121	24	1	20	25	79	89	4	41	128
95th Queue (ft)	201	56	21	50	51	137	161	27	101	227
Link Distance (ft)	2384	2384		1206		716	716			786
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			145		150			50	165	
Storage Blk Time (%)			0				17	0		3
Queuing Penalty (veh)			0				1	0		2

Network Summary

Network wide Queuing Penalty: 87

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	R	L	T
Maximum Queue (ft)	63	94	61	168	99	125	76	120	143	20	59	134
Average Queue (ft)	25	37	18	80	43	67	24	55	64	1	17	67
95th Queue (ft)	54	75	41	138	80	107	59	104	114	19	44	113
Link Distance (ft)		1075	1075	4050	4050	4050		732	732			1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			170	210	
Storage Blk Time (%)								0	0			
Queuing Penalty (veh)								0	0			

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	105	14
Average Queue (ft)	45	1
95th Queue (ft)	86	16
Link Distance (ft)	1160	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		120
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	298	24	125	156	168	180	80	198	160	117
Average Queue (ft)	161	1	52	50	63	64	9	104	56	48
95th Queue (ft)	256	12	100	114	126	136	41	179	129	86
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)				0				7	0	0
Queuing Penalty (veh)				0				1	1	0

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	104	50	93	52	61	150	245	109	79	113
Average Queue (ft)	47	16	44	24	15	47	100	46	29	44
95th Queue (ft)	86	49	79	49	45	112	189	86	63	93
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			0							
Queuing Penalty (veh)			0							
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	28	2				0				
Queuing Penalty (veh)	4	1				0				

Intersection: 4: Industrial St & Del Monte St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	55	51	65
Average Queue (ft)	5	20	32
95th Queue (ft)	30	48	53
Link Distance (ft)	126	449	533
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	TR	L	L
Maximum Queue (ft)	142	161	140	113	16	97	114	96	105	144	166	202
Average Queue (ft)	48	91	60	38	1	43	55	44	49	72	57	120
95th Queue (ft)	115	146	113	88	15	81	96	83	90	128	148	190
Link Distance (ft)			1168	1168	1168			1074	1074	1074		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245				235	235				235	235
Storage Blk Time (%)												0
Queuing Penalty (veh)												0

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	198	228	159	66	93	193	212	187
Average Queue (ft)	100	110	45	17	34	108	115	52
95th Queue (ft)	169	188	105	48	72	171	186	124
Link Distance (ft)	820	820				1464	1464	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			155	190	190			165
Storage Blk Time (%)		2	0			1	2	0
Queuing Penalty (veh)		3	0			0	3	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	77	83	101	38	128	129	70	80	70	65
Average Queue (ft)	32	26	42	8	50	59	21	35	30	28
95th Queue (ft)	64	65	87	28	101	108	53	68	59	51
Link Distance (ft)		261	261		2384	2384		753		807
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			190			185		160	
Storage Blk Time (%)					0					
Queuing Penalty (veh)					0					

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	153	63	97	85	159	201	35	170	278	18
Average Queue (ft)	76	21	38	38	73	93	3	52	118	1
95th Queue (ft)	133	54	76	67	128	169	20	116	227	17
Link Distance (ft)	2384	2384	1206		716	716			786	786
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				150			50	165		
Storage Blk Time (%)			0			17	0		3	
Queuing Penalty (veh)			0			1	0		2	

Network Summary

Network wide Queuing Penalty: 16

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	R	L	T
Maximum Queue (ft)	166	215	68	193	129	174	144	223	248	136	118	210
Average Queue (ft)	61	101	27	91	51	91	53	87	96	12	53	102
95th Queue (ft)	123	182	53	162	103	154	113	184	196	87	104	183
Link Distance (ft)		1075	1075	4050	4050	4050		732	732			1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			170	210	
Storage Blk Time (%)	0	3					0	4	2	0		0
Queuing Penalty (veh)	1	3					2	2	3	0		0

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	214	129
Average Queue (ft)	86	7
95th Queue (ft)	171	57
Link Distance (ft)	1160	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		120
Storage Blk Time (%)	3	0
Queuing Penalty (veh)	3	0

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	314	40	109	174	186	193	16	189	156	116
Average Queue (ft)	154	7	43	53	66	65	1	104	56	41
95th Queue (ft)	266	29	85	124	141	141	8	177	124	80
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)				0				7	0	0
Queuing Penalty (veh)				0				0	1	0

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	208	52	140	88	101	340	356	173	161	162
Average Queue (ft)	94	33	98	38	23	102	128	91	57	70
95th Queue (ft)	174	65	153	68	69	239	270	159	125	140
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			10	0					0	
Queuing Penalty (veh)			13	0					0	
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	59	5				4		1	0	
Queuing Penalty (veh)	27	4				1		4	0	

Intersection: 4: Industrial St & Del Monte St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	85	56	89	88
Average Queue (ft)	13	4	37	36
95th Queue (ft)	55	28	66	69
Link Distance (ft)	126	184	449	533
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	TR	L	L
Maximum Queue (ft)	194	208	176	157	83	106	116	108	110	148	174	234
Average Queue (ft)	92	128	93	82	5	45	56	55	55	75	53	118
95th Queue (ft)	173	188	151	140	48	91	99	94	95	129	144	190
Link Distance (ft)			1168	1168	1168			1074	1074	1074		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245				235	235				235	235
Storage Blk Time (%)		0										0
Queuing Penalty (veh)		0										0

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	249	259	180	123	196	282	308	190
Average Queue (ft)	136	125	57	47	75	142	149	96
95th Queue (ft)	215	214	134	95	142	234	254	198
Link Distance (ft)	820	820				1464	1464	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			155	190	190			165
Storage Blk Time (%)	1	5	0		0	4	8	0
Queuing Penalty (veh)	1	6	0		0	5	19	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	71	149	158	28	110	113	66	68	105	80
Average Queue (ft)	27	49	68	7	44	55	24	30	50	22
95th Queue (ft)	57	109	131	25	87	97	54	60	88	56
Link Distance (ft)		261	261		2384	2384		753		807
Upstream Blk Time (%)		0	0							
Queuing Penalty (veh)		0	0							
Storage Bay Dist (ft)	150			190			185		160	
Storage Blk Time (%)		0							0	
Queuing Penalty (veh)		0							0	

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	241	67	69	67	62	175	213	44	158	275	3
Average Queue (ft)	122	22	3	24	26	76	95	5	49	135	0
95th Queue (ft)	204	55	34	55	52	143	176	29	121	240	3
Link Distance (ft)	2384	2384		1206		716	716			786	786
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			145		150			50	165		
Storage Blk Time (%)			0				20	0	0	5	
Queuing Penalty (veh)			0				2	0	0	3	

Network Summary

Network wide Queuing Penalty: 100

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	L	T	T
Maximum Queue (ft)	57	80	50	164	96	122	85	116	130	56	126	121
Average Queue (ft)	23	32	18	84	43	63	38	52	64	16	63	45
95th Queue (ft)	49	64	38	140	79	102	75	96	111	40	109	90
Link Distance (ft)		1075	1075	4050	4050	4050		732	732		1160	1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			210		
Storage Blk Time (%)								0				0
Queuing Penalty (veh)								0				0

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	SB
Directions Served	R
Maximum Queue (ft)	14
Average Queue (ft)	0
95th Queue (ft)	14
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	120
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	267	27	132	156	178	170	52	177	163	117
Average Queue (ft)	148	2	50	45	57	57	8	92	51	45
95th Queue (ft)	229	15	97	110	125	125	31	158	122	85
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)				0				5	0	0
Queuing Penalty (veh)				0				1	1	0

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	98	50	110	70	68	179	244	107	92	117
Average Queue (ft)	46	15	55	30	17	64	121	48	31	44
95th Queue (ft)	82	48	93	57	50	135	213	90	69	90
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			0							
Queuing Penalty (veh)			0							
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	27	2				0				
Queuing Penalty (veh)	4	2				0				

Intersection: 4: Industrial St & Del Monte St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	61	56	64
Average Queue (ft)	5	20	33
95th Queue (ft)	30	48	53
Link Distance (ft)	126	449	533
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	TR	L	L	T
Maximum Queue (ft)	165	197	136	114	102	107	96	124	177	185	210	194
Average Queue (ft)	68	106	59	40	40	54	43	50	74	54	115	101
95th Queue (ft)	142	166	111	90	82	92	81	99	143	144	183	169
Link Distance (ft)			1168	1168			1074	1074	1074			820
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245			235	235				235	235	
Storage Blk Time (%)		0								0	0	0
Queuing Penalty (veh)		0								0	0	0

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	196	124	58	75	178	209	173
Average Queue (ft)	104	39	15	31	101	104	55
95th Queue (ft)	172	85	44	64	161	170	115
Link Distance (ft)	820				1464	1464	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155	190	190			165
Storage Blk Time (%)	2	0			0	1	0
Queuing Penalty (veh)	2	0			0	2	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	82	85	102	34	106	120	53	78	66	57
Average Queue (ft)	30	25	39	6	40	54	18	34	28	24
95th Queue (ft)	65	65	81	25	82	101	47	65	55	48
Link Distance (ft)		261	261		2384	2384		753		807
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			190			185		160	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	LT	R	L	T	R	L	T
Maximum Queue (ft)	157	67	80	78	135	179	37	161	221
Average Queue (ft)	77	21	33	37	69	81	2	45	103
95th Queue (ft)	131	53	67	64	120	149	18	99	190
Link Distance (ft)	2384	2384	1206		716	716			786
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				150			50	165	
Storage Blk Time (%)						15	0		2
Queuing Penalty (veh)						0	0		1

Network Summary

Network wide Queuing Penalty: 13

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	R	L	T
Maximum Queue (ft)	164	207	69	172	103	152	157	241	254	134	116	192
Average Queue (ft)	66	97	27	84	44	80	83	87	99	11	44	97
95th Queue (ft)	131	174	52	145	91	129	145	192	203	87	95	172
Link Distance (ft)		1075	1075	4050	4050	4050		732	732			1160
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150						140			170	210	
Storage Blk Time (%)	1	3					3	3	2	0		0
Queuing Penalty (veh)	1	2					9	3	3	0		0

Intersection: 1: Churn Creek Rd & Mistletoe Ln

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	192	101
Average Queue (ft)	83	4
95th Queue (ft)	159	45
Link Distance (ft)	1160	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		120
Storage Blk Time (%)	2	0
Queuing Penalty (veh)	3	0

Intersection: 2: Victor Ave & Mistletoe Ln

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	294	32	124	190	199	201	19	219	187	100
Average Queue (ft)	142	5	44	59	72	77	2	96	54	37
95th Queue (ft)	248	23	93	139	155	162	11	174	128	72
Link Distance (ft)	4050	370		1768	1768	1768		654	654	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			195				100			110
Storage Blk Time (%)				0				6	1	0
Queuing Penalty (veh)				0				0	1	0

Intersection: 3: Churn Creek Rd & Industrial St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	192	57	140	107	130	311	333	181	173	158
Average Queue (ft)	81	33	105	49	22	99	123	91	57	66
95th Queue (ft)	159	66	154	86	71	242	275	160	124	132
Link Distance (ft)	748		126	126		1464	1464		289	289
Upstream Blk Time (%)			9	0						
Queuing Penalty (veh)			10	0						
Storage Bay Dist (ft)		25			155			170		
Storage Blk Time (%)	55	6				5		2	0	
Queuing Penalty (veh)	23	5				1		5	0	

Intersection: 4: Industrial St & Del Monte St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	74	44	80	78
Average Queue (ft)	8	5	35	34
95th Queue (ft)	40	28	60	61
Link Distance (ft)	126	184	449	533
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	TR	L	L
Maximum Queue (ft)	176	200	162	164	39	97	108	99	113	154	189	228
Average Queue (ft)	84	124	89	79	2	44	58	49	53	72	64	125
95th Queue (ft)	157	180	145	140	25	84	98	87	98	130	158	194
Link Distance (ft)			1168	1168	1168			1074	1074	1074		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245	245				235	235				235	235
Storage Blk Time (%)		0										0
Queuing Penalty (veh)		0										0

Intersection: 5: Churn Creek Rd & Cypress Ave

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	242	250	180	114	214	286	304	190
Average Queue (ft)	138	133	59	47	72	133	137	82
95th Queue (ft)	209	218	140	97	138	219	231	175
Link Distance (ft)	820	820				1464	1464	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			155	190	190			165
Storage Blk Time (%)	0	6	0		0	2	6	0
Queuing Penalty (veh)	0	7	0		0	3	13	0

Intersection: 6: Alfreda Way & Cypress Ave

Movement	EB	EB	EB	B19	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	T	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	87	137	160	3	35	101	111	62	64	107	68
Average Queue (ft)	29	50	69	0	9	43	51	23	27	49	22
95th Queue (ft)	64	113	130	3	30	85	94	52	56	90	49
Link Distance (ft)		261	261	1074		2384	2384		753		807
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150				190			185		160	
Storage Blk Time (%)	0	0									
Queuing Penalty (veh)	0	0									

Intersection: 7: Victor Ave & Cypress Ave

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T
Maximum Queue (ft)	250	81	39	59	65	166	190	52	149	272
Average Queue (ft)	119	24	1	22	25	74	84	4	44	123
95th Queue (ft)	204	59	23	51	53	135	150	26	104	216
Link Distance (ft)	2384	2384		1206		716	716			786
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			145		150			50	165	
Storage Blk Time (%)			0				18	0		3
Queuing Penalty (veh)			0				1	0		1

Network Summary

Network wide Queuing Penalty: 94

Appendix D

Level of Service Calculations

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HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	67	48	180	200	75	25	309	94	34	373	64
Future Volume (veh/h)	39	67	48	180	200	75	25	309	94	34	373	64
Initial Q (Qb), veh	0	0	0	1	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	73	17	196	217	39	27	336	0	37	405	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	67	124	105	403	771	136	46	731		121	879	
Arrive On Green	0.04	0.07	0.07	0.23	0.25	0.25	0.03	0.21	0.00	0.07	0.25	0.00
Sat Flow, veh/h	1781	1870	1580	1781	3016	533	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	42	73	17	196	126	130	27	336	0	37	405	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1580	1781	1777	1772	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.9	1.5	0.4	3.7	2.2	2.3	0.6	3.2	0.0	0.8	3.8	0.0
Cycle Q Clear(g_c), s	0.9	1.5	0.4	3.7	2.2	2.3	0.6	3.2	0.0	0.8	3.8	0.0
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	67	124	105	403	454	453	46	731		121	879	
V/C Ratio(X)	0.63	0.59	0.16	0.49	0.28	0.29	0.58	0.46		0.31	0.46	
Avail Cap(c_a), veh/h	412	1008	852	503	1049	1047	274	2017		412	2290	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.5	17.7	17.2	13.1	11.6	11.7	18.8	13.6	0.0	17.3	12.5	0.0
Incr Delay (d2), s/veh	3.6	1.6	0.3	0.9	0.1	0.1	4.2	0.6	0.0	1.1	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.6	0.1	1.3	0.7	0.7	0.3	1.1	0.0	0.3	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.1	19.3	17.4	14.1	11.8	11.8	23.0	14.2	0.0	18.4	13.0	0.0
LnGrp LOS	C	B	B	B	B	B	C	B		B	B	
Approach Vol, veh/h		132			452			363	A		442	A
Approach Delay, s/veh		19.9			12.8			14.9			13.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	13.3	12.3	7.2	4.5	14.9	5.0	14.5
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6
Max Green Setting (Gmax), s	9.0	22.1	11.0	21.0	6.0	25.1	9.0	23.0
Max Q Clear Time (g_c+I1), s	2.8	5.2	5.7	3.5	2.6	5.8	2.9	4.3
Green Ext Time (p_c), s	0.0	2.6	0.2	0.2	0.0	3.3	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	223	4	56	1	1	0	63	522	5	11	514	291
Future Volume (veh/h)	223	4	56	1	1	0	63	522	5	11	514	291
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	262	5	46	1	1	0	74	614	6	13	605	258
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	361	38	49	246	226	0	97	1906	19	22	1151	506
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.00	0.05	0.37	0.37	0.01	0.32	0.32
Sat Flow, veh/h	1210	23	212	756	947	0	1781	5214	51	1781	3554	1564
Grp Volume(v), veh/h	313	0	0	2	0	0	74	401	219	13	605	258
Grp Sat Flow(s),veh/h/ln	1446	0	0	1702	0	0	1781	1702	1861	1781	1777	1564
Q Serve(g_s), s	16.6	0.0	0.0	0.0	0.0	0.0	3.3	6.8	6.8	0.6	11.1	10.7
Cycle Q Clear(g_c), s	16.7	0.0	0.0	0.1	0.0	0.0	3.3	6.8	6.8	0.6	11.1	10.7
Prop In Lane	0.84		0.15	0.50		0.00	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	448	0	0	472	0	0	97	1244	680	22	1151	506
V/C Ratio(X)	0.70	0.00	0.00	0.00	0.00	0.00	0.77	0.32	0.32	0.58	0.53	0.51
Avail Cap(c_a), veh/h	533	0	0	589	0	0	390	1244	680	390	1151	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	0.0	22.6	0.0	0.0	37.3	18.3	18.3	39.3	22.0	21.9
Incr Delay (d2), s/veh	3.2	0.0	0.0	0.0	0.0	0.0	11.8	0.1	0.3	21.7	1.7	3.6
Initial Q Delay(d3),s/veh	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	0.0	0.0	0.0	0.0	1.7	2.5	2.7	0.4	4.5	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.2	0.0	0.0	22.6	0.0	0.0	49.1	18.4	18.5	61.0	23.8	25.5
LnGrp LOS	D	A	A	C	A	A	D	B	B	E	C	C
Approach Vol, veh/h		313			2			694			876	
Approach Delay, s/veh		35.2			22.6			21.7			24.8	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	33.8		23.7	7.8	30.5		23.7
Change Period (Y+Rc), s	3.5	4.6		4.1	3.5	* 4.6		4.1
Max Green Setting (Gmax), s	17.5	25.4		24.9	17.5	* 26		24.9
Max Q Clear Time (g_c+I1), s	2.0	8.8		18.7	5.3	13.1		2.1
Green Ext Time (p_c), s	0.0	3.4		0.9	0.1	3.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Churn Creek Rd & Industrial St

11/14/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	68	15	53	22	39	22	393	217	93	429	10
Future Volume (veh/h)	12	68	15	53	22	39	22	393	217	93	429	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	70	5	55	23	27	23	405	202	96	442	8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	102	102	95	40	116	41	792	389	122	1398	25
Arrive On Green	0.06	0.06	0.06	0.07	0.07	0.07	0.02	0.35	0.35	0.07	0.39	0.39
Sat Flow, veh/h	272	1585	1585	1274	533	1559	1781	2287	1125	1781	3569	65
Grp Volume(v), veh/h	82	0	5	78	0	27	23	313	294	96	220	230
Grp Sat Flow(s),veh/h/ln	1857	0	1585	1807	0	1559	1781	1777	1635	1781	1777	1857
Q Serve(g_s), s	1.6	0.0	0.1	1.5	0.0	0.6	0.5	5.1	5.2	1.9	3.1	3.1
Cycle Q Clear(g_c), s	1.6	0.0	0.1	1.5	0.0	0.6	0.5	5.1	5.2	1.9	3.1	3.1
Prop In Lane	0.15		1.00	0.71		1.00	1.00		0.69	1.00		0.03
Lane Grp Cap(c), veh/h	120	0	102	135	0	116	41	615	566	122	696	727
V/C Ratio(X)	0.69	0.00	0.05	0.58	0.00	0.23	0.57	0.51	0.52	0.79	0.32	0.32
Avail Cap(c_a), veh/h	1269	0	1084	1235	0	1066	295	1367	1258	309	1381	1444
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	15.9	16.2	0.0	15.8	17.5	9.4	9.5	16.6	7.7	7.7
Incr Delay (d2), s/veh	2.6	0.0	0.1	1.5	0.0	0.4	4.5	0.9	1.1	4.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.6	0.0	0.2	0.2	1.6	1.5	0.8	0.8	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.2	0.0	16.0	17.7	0.0	16.2	22.1	10.3	10.5	20.9	8.0	8.0
LnGrp LOS	B	A	B	B	A	B	C	B	B	C	A	A
Approach Vol, veh/h		87			105			630			546	
Approach Delay, s/veh		19.0			17.3			10.8			10.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	17.9		6.0	4.3	19.5		6.4
Change Period (Y+Rc), s	3.5	5.3		3.7	3.5	5.3		3.7
Max Green Setting (Gmax), s	6.3	27.9		24.8	6.0	28.2		24.8
Max Q Clear Time (g_c+I1), s	3.6	7.2		3.6	2.5	5.1		3.5
Green Ext Time (p_c), s	0.0	5.3		0.2	0.0	3.7		0.2

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Notes

User approved changes to right turn type.

HCM 6th TWSC
4: Industrial St & Del Monte St

11/14/2024

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	250	21	107	0	8	0	22	0	1	0	2	83
Future Vol, veh/h	250	21	107	0	8	0	22	0	1	0	2	83
Conflicting Peds, #/hr	1	0	1	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	291	24	124	0	9	0	26	0	1	0	2	97

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	10	0	0	149	0	0	729	679	87	679	741	11
Stage 1	-	-	-	-	-	-	669	669	-	10	10	-
Stage 2	-	-	-	-	-	-	60	10	-	669	731	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1610	-	-	1432	-	-	338	374	971	366	344	1070
Stage 1	-	-	-	-	-	-	447	456	-	1011	887	-
Stage 2	-	-	-	-	-	-	951	887	-	447	427	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1608	-	-	1431	-	-	258	298	970	309	275	1068
Mov Cap-2 Maneuver	-	-	-	-	-	-	258	298	-	309	275	-
Stage 1	-	-	-	-	-	-	357	364	-	808	886	-
Stage 2	-	-	-	-	-	-	862	886	-	357	341	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.1	0	20	9
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	267	1608	-	-	1431	-	-	1000
HCM Lane V/C Ratio	0.1	0.181	-	-	-	-	-	0.099
HCM Control Delay (s)	20	7.7	0	-	0	-	-	9
HCM Lane LOS	C	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0.7	-	-	0	-	-	0.3

HCM 6th Signalized Intersection Summary
5: Churn Creek Rd & Cypress Ave

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	234	256	126	287	119	210	354	108	50	320	109
Future Volume (veh/h)	172	234	256	126	287	119	210	354	108	50	320	109
Initial Q (Qb), veh	2	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	181	246	0	133	302	63	221	373	67	53	337	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	946	1866		278	1358	272	287	623	275	227	503	220
Arrive On Green	0.27	0.53	0.00	0.08	0.32	0.32	0.08	0.18	0.18	0.07	0.14	0.14
Sat Flow, veh/h	3456	3554	1585	3456	4256	852	3456	3554	1571	3456	3554	1554
Grp Volume(v), veh/h	181	246	0	133	239	126	221	373	67	53	337	47
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1704	1728	1777	1571	1728	1777	1554
Q Serve(g_s), s	4.4	3.9	0.0	4.0	5.7	6.0	6.9	10.6	4.0	1.6	9.9	2.9
Cycle Q Clear(g_c), s	4.4	3.9	0.0	4.0	5.7	6.0	6.9	10.6	4.0	1.6	9.9	2.9
Prop In Lane	1.00		1.00	1.00		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	946	1866		278	1086	544	287	623	275	227	503	220
V/C Ratio(X)	0.19	0.13		0.48	0.22	0.23	0.77	0.60	0.24	0.23	0.67	0.21
Avail Cap(c_a), veh/h	946	1866		518	1086	544	393	1186	524	330	1121	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98
Uniform Delay (d), s/veh	30.7	13.3	0.0	48.4	27.4	27.5	49.4	41.8	39.1	48.8	44.8	41.8
Incr Delay (d2), s/veh	0.1	0.1	0.0	1.3	0.5	1.0	6.3	0.9	0.5	0.5	1.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.6	0.0	1.8	2.3	2.6	3.2	4.7	1.6	0.7	4.4	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	13.5	0.0	49.6	27.9	28.5	55.7	42.7	39.5	49.3	46.3	42.3
LnGrp LOS	C	B		D	C	C	E	D	D	D	D	D
Approach Vol, veh/h		427	A		498			661			437	
Approach Delay, s/veh		20.8			33.9			46.7			46.2	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	24.6	12.3	62.4	14.4	20.9	34.7	40.0
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	5.3	* 5.3	4.6	* 4.9
Max Green Setting (Gmax), s	10.5	36.7	16.5	29.4	12.5	* 35	10.5	* 35
Max Q Clear Time (g_c+I1), s	3.6	12.6	6.0	5.9	8.9	11.9	6.4	8.0
Green Ext Time (p_c), s	0.0	2.7	0.3	1.5	0.2	2.2	0.2	2.3

Intersection Summary	
HCM 6th Ctrl Delay	38.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	210	21	9	336	54	31	8	11	51	6	58
Future Volume (veh/h)	45	210	21	9	336	54	31	8	11	51	6	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	247	18	11	395	33	36	9	8	60	7	41
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	973	70	41	792	353	108	27	24	258	34	201
Arrive On Green	0.09	0.29	0.29	0.02	0.22	0.22	0.09	0.09	0.09	0.15	0.15	0.15
Sat Flow, veh/h	1781	3360	243	1781	3554	1585	1197	299	266	1781	236	1383
Grp Volume(v), veh/h	53	130	135	11	395	33	53	0	0	60	0	48
Grp Sat Flow(s),veh/h/ln	1781	1777	1826	1781	1777	1585	1763	0	0	1781	0	1619
Q Serve(g_s), s	1.1	2.2	2.2	0.2	3.8	0.6	1.1	0.0	0.0	1.2	0.0	1.0
Cycle Q Clear(g_c), s	1.1	2.2	2.2	0.2	3.8	0.6	1.1	0.0	0.0	1.2	0.0	1.0
Prop In Lane	1.00		0.13	1.00		1.00	0.68		0.15	1.00		0.85
Lane Grp Cap(c), veh/h	160	515	529	41	792	353	158	0	0	258	0	235
V/C Ratio(X)	0.33	0.25	0.26	0.27	0.50	0.09	0.33	0.00	0.00	0.23	0.00	0.20
Avail Cap(c_a), veh/h	437	1355	1393	414	2664	1188	1230	0	0	1243	0	1130
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	10.5	10.5	18.6	13.1	11.9	16.5	0.0	0.0	14.6	0.0	14.6
Incr Delay (d2), s/veh	1.2	0.3	0.3	3.4	0.5	0.1	1.2	0.0	0.0	0.5	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.7	0.8	0.1	1.3	0.2	0.4	0.0	0.0	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	10.8	10.8	22.0	13.6	12.0	17.8	0.0	0.0	15.1	0.0	15.0
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		318			439			53			108	
Approach Delay, s/veh		11.9			13.7			17.8			15.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.4	16.2		10.1	7.0	13.6		8.0
Change Period (Y+Rc), s	3.5	5.0		4.5	3.5	5.0		4.5
Max Green Setting (Gmax), s	9.6	29.5		27.0	9.5	29.0		27.0
Max Q Clear Time (g_c+I1), s	2.2	4.2		3.2	3.1	5.8		3.1
Green Ext Time (p_c), s	0.0	1.6		0.4	0.0	2.9		0.2

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	26	71	8	43	95	134	330	3	61	325	196
Future Volume (veh/h)	136	26	71	8	43	95	134	330	3	61	325	196
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	160	31	0	9	51	40	158	388	4	72	382	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	246	259		18	104	104	216	645	546	97	520	
Arrive On Green	0.14	0.14	0.00	0.07	0.07	0.07	0.12	0.34	0.34	0.05	0.28	0.00
Sat Flow, veh/h	1781	1870	1585	278	1578	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	160	31	0	60	0	40	158	388	4	72	382	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1856	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.5	0.6	0.0	1.3	0.0	1.0	3.6	7.1	0.1	1.7	7.7	0.0
Cycle Q Clear(g_c), s	3.5	0.6	0.0	1.3	0.0	1.0	3.6	7.1	0.1	1.7	7.7	0.0
Prop In Lane	1.00		1.00	0.15		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	246	259		122	0	104	216	645	546	97	520	
V/C Ratio(X)	0.65	0.12		0.49	0.00	0.38	0.73	0.60	0.01	0.74	0.73	
Avail Cap(c_a), veh/h	1370	1439		179	0	152	321	1201	1017	266	1124	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.0	15.7	0.0	18.8	0.0	18.6	17.6	11.3	9.0	19.4	13.6	0.0
Incr Delay (d2), s/veh	2.9	0.2	0.0	3.0	0.0	2.3	4.8	0.9	0.0	10.7	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.2	0.0	0.6	0.0	0.4	1.5	2.2	0.0	0.9	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	15.9	0.0	21.8	0.0	20.9	22.4	12.2	9.0	30.1	15.7	0.0
LnGrp LOS	B	B		C	A	C	C	B	A	C	B	
Approach Vol, veh/h		191	A		100			550			454	A
Approach Delay, s/veh		19.2			21.4			15.1			17.9	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	19.3		10.3	8.5	16.6		6.2
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5
Max Green Setting (Gmax), s	6.2	* 27		32.0	7.5	25.0		4.0
Max Q Clear Time (g_c+I1), s	3.5	9.1		5.5	5.6	9.7		3.3
Green Ext Time (p_c), s	0.0	2.0		0.6	0.1	1.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	112	77	101	112	66	44	662	144	59	580	79
Future Volume (veh/h)	66	112	77	101	112	66	44	662	144	59	580	79
Initial Q (Qb), veh	0	1	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	124	26	112	124	35	49	736	0	66	644	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	157	130	138	301	82	63	2319		100	2392	
Arrive On Green	0.05	0.08	0.08	0.08	0.11	0.11	0.04	0.65	0.00	0.06	0.67	0.00
Sat Flow, veh/h	1781	1870	1553	1781	2749	748	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	73	124	26	112	78	81	49	736	0	66	644	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1553	1781	1777	1719	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.3	8.5	2.0	8.0	5.4	5.7	3.5	11.7	0.0	4.7	9.4	0.0
Cycle Q Clear(g_c), s	5.3	8.5	2.0	8.0	5.4	5.7	3.5	11.7	0.0	4.7	9.4	0.0
Prop In Lane	1.00		1.00	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	93	157	130	138	194	188	63	2319		100	2392	
V/C Ratio(X)	0.78	0.79	0.20	0.81	0.40	0.43	0.78	0.32		0.66	0.27	
Avail Cap(c_a), veh/h	308	308	256	377	361	349	103	2326		158	2398	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.9	58.6	55.5	59.0	54.0	54.1	62.2	9.9	0.0	60.2	8.5	0.0
Incr Delay (d2), s/veh	5.4	3.3	0.3	10.3	0.5	0.6	7.4	0.4	0.0	5.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.3	0.8	4.0	2.4	2.5	1.7	4.6	0.0	2.3	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.2	63.3	55.8	69.3	54.4	54.7	69.6	10.3	0.0	65.7	8.8	0.0
LnGrp LOS	E	E	E	E	D	D	E	B		E	A	
Approach Vol, veh/h		223			271			785	A		710	A
Approach Delay, s/veh		63.4			60.7			14.0			14.1	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	90.4	13.6	15.3	8.1	93.0	10.3	18.6
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6
Max Green Setting (Gmax), s	11.5	52.7	27.5	21.4	7.5	56.7	22.5	26.4
Max Q Clear Time (g_c+I1), s	6.7	13.7	10.0	10.5	5.5	11.4	7.3	7.7
Green Ext Time (p_c), s	0.0	8.7	0.2	0.2	0.0	7.2	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	1	44	4	1	4	51	603	1	3	629	229
Future Volume (veh/h)	214	1	44	4	1	4	51	603	1	3	629	229
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	240	1	33	4	1	2	57	678	1	3	707	208
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	30	36	259	71	103	74	1905	3	6	1151	513
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.04	0.36	0.36	0.00	0.32	0.32
Sat Flow, veh/h	1260	5	173	882	329	484	1781	5265	8	1781	3554	1584
Grp Volume(v), veh/h	274	0	0	7	0	0	57	438	241	3	707	208
Grp Sat Flow(s),veh/h/ln	1439	0	0	1695	0	0	1781	1702	1869	1781	1777	1584
Q Serve(g_s), s	14.4	0.0	0.0	0.0	0.0	0.0	2.5	7.5	7.5	0.1	13.4	8.2
Cycle Q Clear(g_c), s	14.7	0.0	0.0	0.2	0.0	0.0	2.5	7.5	7.5	0.1	13.4	8.2
Prop In Lane	0.88		0.12	0.57		0.29	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	0	433	0	0	74	1232	676	6	1151	513
V/C Ratio(X)	0.66	0.00	0.00	0.02	0.00	0.00	0.77	0.36	0.36	0.52	0.61	0.41
Avail Cap(c_a), veh/h	532	0	0	579	0	0	390	1232	676	390	1151	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.0	0.0	0.0	24.1	0.0	0.0	38.0	18.7	18.7	39.8	22.8	21.1
Incr Delay (d2), s/veh	1.9	0.0	0.0	0.0	0.0	0.0	15.6	0.2	0.3	58.2	2.5	2.4
Initial Q Delay(d3),s/veh	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.0	0.0	0.1	0.0	0.0	1.4	2.8	3.1	0.1	5.5	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.0	0.0	0.0	24.2	0.0	0.0	53.6	18.9	19.0	98.0	25.3	23.4
LnGrp LOS	D	A	A	C	A	A	D	B	B	F	C	C
Approach Vol, veh/h		274			7			736			918	
Approach Delay, s/veh		35.0			24.2			21.6			25.1	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.8	33.6		21.7	6.8	30.5		21.7				
Change Period (Y+Rc), s	3.5	4.6		4.1	3.5	* 4.6		4.1				
Max Green Setting (Gmax), s	17.5	25.4		24.9	17.5	* 26		24.9				
Max Q Clear Time (g_c+I1), s	12.1	9.5		16.7	4.5	15.4		2.2				
Green Ext Time (p_c), s	0.0	3.6		0.9	0.1	3.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Churn Creek Rd & Industrial St

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	39	42	85	23	79	22	712	62	101	638	30
Future Volume (veh/h)	38	39	42	85	23	79	22	712	62	101	638	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	42	25	91	25	58	24	766	62	109	686	26
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	54	56	94	116	32	130	32	2190	177	133	2498	95
Arrive On Green	0.06	0.06	0.06	0.08	0.08	0.08	0.02	0.66	0.66	0.07	0.72	0.72
Sat Flow, veh/h	902	924	1560	1412	388	1579	1781	3322	269	1781	3488	132
Grp Volume(v), veh/h	83	0	25	116	0	58	24	410	418	109	349	363
Grp Sat Flow(s),veh/h/ln	1825	0	1560	1800	0	1579	1781	1777	1814	1781	1777	1843
Q Serve(g_s), s	5.9	0.0	2.0	8.3	0.0	4.6	1.8	13.4	13.4	7.9	9.1	9.1
Cycle Q Clear(g_c), s	5.9	0.0	2.0	8.3	0.0	4.6	1.8	13.4	13.4	7.9	9.1	9.1
Prop In Lane	0.49		1.00	0.78		1.00	1.00		0.15	1.00		0.07
Lane Grp Cap(c), veh/h	110	0	94	148	0	130	32	1171	1196	133	1272	1320
V/C Ratio(X)	0.75	0.00	0.27	0.78	0.00	0.45	0.76	0.35	0.35	0.82	0.27	0.27
Avail Cap(c_a), veh/h	293	0	250	289	0	253	88	1171	1196	279	1272	1320
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	0.0	58.8	59.0	0.0	57.3	64.1	9.9	9.9	59.7	6.6	6.6
Incr Delay (d2), s/veh	3.9	0.0	0.6	3.4	0.0	0.9	9.8	0.6	0.6	4.7	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.8	4.0	0.0	1.9	0.9	5.3	5.4	3.7	3.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.5	0.0	59.3	62.4	0.0	58.2	73.8	10.5	10.5	64.4	7.1	7.1
LnGrp LOS	E	A	E	E	A	E	E	B	B	E	A	A
Approach Vol, veh/h		108			174			852			821	
Approach Delay, s/veh		63.3			61.0			12.3			14.7	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.3	91.7		11.6	5.8	99.1		14.5				
Change Period (Y+Rc), s	3.5	5.3		3.7	3.5	5.3		3.7				
Max Green Setting (Gmax), s	20.5	52.7		21.0	6.5	66.7		21.0				
Max Q Clear Time (g_c+I1), s	10.3	15.4		7.9	3.8	11.1		10.3				
Green Ext Time (p_c), s	0.1	9.2		0.2	0.0	7.5		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	20.5
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	52	64	104	0	69	3	60	2	1	4	1	77
Future Vol, veh/h	52	64	104	0	69	3	60	2	1	4	1	77
Conflicting Peds, #/hr	4	0	2	0	0	0	2	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	61	75	122	0	81	4	71	2	1	5	1	91

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	89	0	0	199	0	0	393	349	138	347	408	91
Stage 1	-	-	-	-	-	-	260	260	-	87	87	-
Stage 2	-	-	-	-	-	-	133	89	-	260	321	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1506	-	-	1373	-	-	566	575	910	607	533	967
Stage 1	-	-	-	-	-	-	745	693	-	921	823	-
Stage 2	-	-	-	-	-	-	870	821	-	745	652	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1500	-	-	1370	-	-	491	545	908	581	505	960
Mov Cap-2 Maneuver	-	-	-	-	-	-	491	545	-	581	505	-
Stage 1	-	-	-	-	-	-	709	660	-	875	820	-
Stage 2	-	-	-	-	-	-	784	818	-	707	621	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	13.5	9.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	496	1500	-	-	1370	-	-	921
HCM Lane V/C Ratio	0.149	0.041	-	-	-	-	-	0.105
HCM Control Delay (s)	13.5	7.5	0	-	0	-	-	9.4
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	374	258	115	289	109	184	405	122	135	449	217
Future Volume (veh/h)	250	374	258	115	289	109	184	405	122	135	449	217
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	1	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	266	398	0	122	307	42	196	431	83	144	478	142
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	1874		255	2301	307	259	644	280	257	642	286
Arrive On Green	0.10	0.53	0.00	0.07	0.51	0.51	0.07	0.18	0.18	0.07	0.18	0.18
Sat Flow, veh/h	3456	3554	1585	3456	4557	608	3456	3554	1547	3456	3554	1580
Grp Volume(v), veh/h	266	398	0	122	227	122	196	431	83	144	478	142
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1760	1728	1777	1547	1728	1777	1580
Q Serve(g_s), s	9.0	7.1	0.0	4.1	4.2	4.4	6.7	13.6	5.6	4.8	15.3	9.7
Cycle Q Clear(g_c), s	9.0	7.1	0.0	4.1	4.2	4.4	6.7	13.6	5.6	4.8	15.3	9.7
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	1874		255	1719	889	259	644	280	257	642	286
V/C Ratio(X)	0.80	0.21		0.48	0.13	0.14	0.76	0.67	0.30	0.56	0.74	0.50
Avail Cap(c_a), veh/h	504	1877		504	1722	890	418	1057	460	418	1057	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97
Uniform Delay (d), s/veh	53.1	15.1	0.0	53.4	15.8	15.8	54.4	45.8	42.5	53.6	46.6	44.3
Incr Delay (d2), s/veh	5.3	0.3	0.0	1.4	0.2	0.3	4.5	1.2	0.6	1.9	1.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
%ile BackOfQ(50%),veh/ln	4.2	3.0	0.0	1.8	1.7	1.8	3.1	6.1	2.2	2.2	6.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.5	15.4	0.0	54.8	15.9	16.1	58.9	47.0	43.1	55.5	48.3	45.6
LnGrp LOS	E	B		D	B	B	E	D	D	E	D	D
Approach Vol, veh/h		664	A		471			710			764	
Approach Delay, s/veh		32.6			26.0			49.8			49.2	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	27.0	12.3	68.3	12.5	26.9	15.0	65.6
Change Period (Y+Rc), s	3.5	5.3	3.5	* 4.9	3.5	5.3	3.5	4.9
Max Green Setting (Gmax), s	14.5	35.7	17.5	* 35	14.5	35.7	17.5	35.1
Max Q Clear Time (g_c+I1), s	6.8	15.6	6.1	9.1	8.7	17.3	11.0	6.4
Green Ext Time (p_c), s	0.2	3.1	0.2	2.7	0.3	3.4	0.5	2.2

Intersection Summary		
HCM 6th Ctrl Delay	41.0	
HCM 6th LOS	D	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/14/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	426	30	11	330	62	21	2	16	108	12	37
Future Volume (veh/h)	39	426	30	11	330	62	21	2	16	108	12	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	458	19	12	355	47	23	2	8	116	13	17
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	135	951	39	45	792	342	75	6	26	312	127	166
Arrive On Green	0.08	0.27	0.27	0.03	0.22	0.22	0.06	0.06	0.06	0.18	0.18	0.18
Sat Flow, veh/h	1781	3477	144	1781	3554	1534	1204	105	419	1781	727	951
Grp Volume(v), veh/h	42	234	243	12	355	47	33	0	0	116	0	30
Grp Sat Flow(s),veh/h/ln	1781	1777	1844	1781	1777	1534	1728	0	0	1781	0	1678
Q Serve(g_s), s	0.8	4.1	4.2	0.2	3.2	0.9	0.7	0.0	0.0	2.2	0.0	0.6
Cycle Q Clear(g_c), s	0.8	4.1	4.2	0.2	3.2	0.9	0.7	0.0	0.0	2.2	0.0	0.6
Prop In Lane	1.00		0.08	1.00		1.00	0.70		0.24	1.00		0.57
Lane Grp Cap(c), veh/h	135	486	504	45	792	342	107	0	0	312	0	294
V/C Ratio(X)	0.31	0.48	0.48	0.27	0.45	0.14	0.31	0.00	0.00	0.37	0.00	0.10
Avail Cap(c_a), veh/h	449	1368	1419	426	2688	1161	1238	0	0	1300	0	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	11.4	11.5	18.0	12.6	11.7	16.9	0.0	0.0	13.7	0.0	13.1
Incr Delay (d2), s/veh	1.3	0.7	0.7	3.2	0.4	0.2	1.6	0.0	0.0	0.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.4	1.5	0.1	1.1	0.3	0.3	0.0	0.0	0.8	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	12.2	12.2	21.2	13.0	11.9	18.5	0.0	0.0	14.5	0.0	13.2
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		519			414			33			146	
Approach Delay, s/veh		12.6			13.1			18.5			14.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.4	15.3		11.1	6.3	13.4		6.8
Change Period (Y+Rc), s	3.5	5.0		4.5	3.5	5.0		4.5
Max Green Setting (Gmax), s	9.6	29.0		27.5	9.5	28.5		27.0
Max Q Clear Time (g_c+I1), s	2.2	6.2		4.2	2.8	5.2		2.7
Green Ext Time (p_c), s	0.0	3.0		0.5	0.0	2.6		0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave

11/14/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	277	42	207	7	21	43	131	318	7	52	383	212
Future Volume (veh/h)	277	42	207	7	21	43	131	318	7	52	383	212
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	3	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	304	46	0	8	23	7	144	349	8	57	421	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	404	424		16	45	52	189	669	567	79	554	
Arrive On Green	0.23	0.23	0.00	0.03	0.03	0.03	0.11	0.35	0.35	0.04	0.29	0.00
Sat Flow, veh/h	1781	1870	1585	477	1370	1562	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	304	46	0	31	0	7	144	349	8	57	421	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1847	0	1562	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	7.7	0.9	0.0	0.8	0.0	0.2	3.8	7.2	0.2	1.5	9.9	0.0
Cycle Q Clear(g_c), s	7.7	0.9	0.0	0.8	0.0	0.2	3.8	7.2	0.2	1.5	9.9	0.0
Prop In Lane	1.00		1.00	0.26		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	424		61	0	52	189	669	567	79	554	
V/C Ratio(X)	0.75	0.11		0.51	0.00	0.14	0.76	0.52	0.01	0.73	0.76	
Avail Cap(c_a), veh/h	1179	1238		153	0	129	276	1002	849	258	968	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.6	15.0	0.0	23.3	0.0	23.0	21.3	12.4	10.1	23.1	15.8	0.0
Incr Delay (d2), s/veh	2.9	0.1	0.0	6.4	0.0	1.2	7.1	0.6	0.0	11.9	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.4	0.0	0.4	0.0	0.1	1.7	2.4	0.0	0.8	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	15.1	0.0	29.7	0.0	24.2	28.4	13.0	10.1	35.0	18.8	0.0
LnGrp LOS	C	B		C	A	C	C	B	B	D	B	
Approach Vol, veh/h		350	A		38			501			478	A
Approach Delay, s/veh		19.8			28.7			17.4			20.8	
Approach LOS		B			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	22.1		15.5	8.6	19.1		5.1
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5
Max Green Setting (Gmax), s	7.6	* 26		32.0	7.5	25.0		4.0
Max Q Clear Time (g_c+I1), s	3.5	9.2		9.7	5.8	11.9		2.8
Green Ext Time (p_c), s	0.0	1.8		1.1	0.1	2.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.5
HCM 6th LOS	B

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	67	49	223	200	75	54	332	105	34	376	64
Future Volume (veh/h)	39	67	49	223	200	75	54	332	105	34	376	64
Initial Q (Qb), veh	0	0	0	1	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	73	18	242	217	39	59	361	0	37	409	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	66	123	104	413	786	139	85	768		120	837	
Arrive On Green	0.04	0.07	0.07	0.23	0.26	0.26	0.05	0.22	0.00	0.07	0.24	0.00
Sat Flow, veh/h	1781	1870	1580	1781	3016	533	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	42	73	18	242	126	130	59	361	0	37	409	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1580	1781	1777	1772	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.9	1.5	0.4	4.9	2.3	2.4	1.3	3.6	0.0	0.8	4.0	0.0
Cycle Q Clear(g_c), s	0.9	1.5	0.4	4.9	2.3	2.4	1.3	3.6	0.0	0.8	4.0	0.0
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	66	123	104	413	463	462	85	768		120	837	
V/C Ratio(X)	0.63	0.59	0.17	0.59	0.27	0.28	0.69	0.47		0.31	0.49	
Avail Cap(c_a), veh/h	397	974	823	486	1013	1011	305	1947		397	2132	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.2	18.3	17.8	13.8	11.9	11.9	18.9	13.8	0.0	17.9	13.3	0.0
Incr Delay (d2), s/veh	3.7	1.7	0.3	1.3	0.1	0.1	3.7	0.6	0.0	1.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.6	0.1	1.7	0.7	0.7	0.6	1.3	0.0	0.3	1.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	20.0	18.1	15.2	12.0	12.0	22.6	14.4	0.0	19.0	14.0	0.0
LnGrp LOS	C	B	B	B	B	B	C	B		B	B	
Approach Vol, veh/h		133			498			420	A		446	A
Approach Delay, s/veh		20.6			13.6			15.6			14.4	
Approach LOS		C			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	14.0	12.8	7.3	5.4	14.8	5.0	15.1				
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6				
Max Green Setting (Gmax), s	9.0	22.1	11.0	21.0	6.9	24.2	9.0	23.0				
Max Q Clear Time (g_c+I1), s	2.8	5.6	6.9	3.5	3.3	6.0	2.9	4.4				
Green Ext Time (p_c), s	0.0	2.8	0.3	0.2	0.0	3.3	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			15.0									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	243	4	61	1	1	0	69	569	5	12	560	317
Future Volume (veh/h)	243	4	61	1	1	0	69	569	5	12	560	317
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	286	5	52	1	1	0	81	669	6	14	659	289
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	380	41	54	260	240	0	106	1930	17	24	1151	506
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.00	0.06	0.37	0.37	0.01	0.32	0.32
Sat Flow, veh/h	1205	21	219	761	938	0	1781	5219	47	1781	3554	1564
Grp Volume(v), veh/h	343	0	0	2	0	0	81	436	239	14	659	289
Grp Sat Flow(s),veh/h/ln	1446	0	0	1699	0	0	1781	1702	1862	1781	1777	1564
Q Serve(g_s), s	18.3	0.0	0.0	0.0	0.0	0.0	3.6	7.4	7.4	0.6	12.3	12.3
Cycle Q Clear(g_c), s	18.3	0.0	0.0	0.1	0.0	0.0	3.6	7.4	7.4	0.6	12.3	12.3
Prop In Lane	0.83		0.15	0.50		0.00	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	475	0	0	500	0	0	106	1259	689	24	1151	506
V/C Ratio(X)	0.72	0.00	0.00	0.00	0.00	0.00	0.76	0.35	0.35	0.59	0.57	0.57
Avail Cap(c_a), veh/h	532	0	0	590	0	0	390	1259	689	390	1151	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	0.0	21.5	0.0	0.0	37.1	18.2	18.2	39.2	22.5	22.4
Incr Delay (d2), s/veh	4.1	0.0	0.0	0.0	0.0	0.0	10.8	0.2	0.3	20.9	2.1	4.6
Initial Q Delay(d3),s/veh	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	0.0	0.0	0.0	0.0	1.8	2.7	3.0	0.4	5.1	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	0.0	0.0	21.5	0.0	0.0	47.9	18.4	18.5	60.2	24.5	27.1
LnGrp LOS	D	A	A	C	A	A	D	B	B	E	C	C
Approach Vol, veh/h		343			2			756			962	
Approach Delay, s/veh		35.4			21.5			21.6			25.8	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	34.2		25.2	8.3	30.5		25.2				
Change Period (Y+Rc), s	3.5	4.6		4.1	3.5	* 4.6		4.1				
Max Green Setting (Gmax), s	7.5	25.4		24.9	17.5	* 26		24.9				
Max Q Clear Time (g_c+I1), s	2.6	9.4		20.3	5.6	14.3		2.1				
Green Ext Time (p_c), s	0.0	3.6		0.8	0.1	4.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			25.9									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Churn Creek Rd & Industrial St

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	73	15	87	22	65	22	424	280	116	441	10
Future Volume (veh/h)	12	73	15	87	22	65	22	424	280	116	441	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	75	5	90	23	54	23	437	267	120	455	8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	104	103	149	38	162	40	688	417	153	1393	24
Arrive On Green	0.06	0.06	0.06	0.10	0.10	0.10	0.02	0.33	0.33	0.09	0.39	0.39
Sat Flow, veh/h	256	1601	1585	1433	366	1558	1781	2106	1275	1781	3571	63
Grp Volume(v), veh/h	87	0	5	113	0	54	23	368	336	120	226	237
Grp Sat Flow(s),veh/h/ln	1858	0	1585	1799	0	1558	1781	1777	1604	1781	1777	1857
Q Serve(g_s), s	1.8	0.0	0.1	2.3	0.0	1.2	0.5	6.8	6.9	2.6	3.4	3.5
Cycle Q Clear(g_c), s	1.8	0.0	0.1	2.3	0.0	1.2	0.5	6.8	6.9	2.6	3.4	3.5
Prop In Lane	0.14		1.00	0.80		1.00	1.00		0.79	1.00		0.03
Lane Grp Cap(c), veh/h	121	0	103	187	0	162	40	581	524	153	693	724
V/C Ratio(X)	0.72	0.00	0.05	0.60	0.00	0.33	0.57	0.63	0.64	0.79	0.33	0.33
Avail Cap(c_a), veh/h	1190	0	1015	1152	0	998	276	798	721	313	835	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	17.0	16.6	0.0	16.1	18.7	11.1	11.1	17.4	8.3	8.3
Incr Delay (d2), s/veh	3.0	0.0	0.1	1.2	0.0	0.4	4.6	1.6	1.9	3.3	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.9	0.0	0.4	0.2	2.3	2.1	1.0	1.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	17.1	17.7	0.0	16.5	23.4	12.7	13.0	20.7	8.6	8.6
LnGrp LOS	C	A	B	B	A	B	C	B	B	C	A	A
Approach Vol, veh/h		92			167			727			583	
Approach Delay, s/veh		20.6			17.4			13.2			11.1	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.8	18.0		6.2	4.4	20.4		7.7
Change Period (Y+Rc), s	3.5	5.3		3.7	3.5	5.3		3.7
Max Green Setting (Gmax), s	8.3	17.4		24.8	6.0	18.2		24.8
Max Q Clear Time (g_c+I1), s	4.6	8.9		3.8	2.5	5.5		4.3
Green Ext Time (p_c), s	0.0	3.7		0.2	0.0	2.9		0.4

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

User approved changes to right turn type.

HCM 6th TWSC
4: Industrial St & Del Monte St

11/22/2024

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	272	23	117	0	9	0	24	0	1	0	2	90
Future Vol, veh/h	272	23	117	0	9	0	24	0	1	0	2	90
Conflicting Peds, #/hr	1	0	1	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	316	27	136	0	10	0	28	0	1	0	2	105

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	11	0	0	164	0	0	793	739	96	739	807	12
Stage 1	-	-	-	-	-	-	728	728	-	11	11	-
Stage 2	-	-	-	-	-	-	65	11	-	728	796	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1608	-	-	1414	-	-	306	345	960	333	315	1069
Stage 1	-	-	-	-	-	-	415	429	-	1010	886	-
Stage 2	-	-	-	-	-	-	946	886	-	415	399	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1606	-	-	1413	-	-	227	268	959	276	245	1067
Mov Cap-2 Maneuver	-	-	-	-	-	-	227	268	-	276	245	-
Stage 1	-	-	-	-	-	-	323	334	-	787	885	-
Stage 2	-	-	-	-	-	-	850	885	-	323	311	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.1	0	22.6	9.1
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	234	1606	-	-	1413	-	-	994
HCM Lane V/C Ratio	0.124	0.197	-	-	-	-	-	0.108
HCM Control Delay (s)	22.6	7.8	0	-	0	-	-	9.1
HCM Lane LOS	C	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.7	-	-	0	-	-	0.4

HCM 6th Signalized Intersection Summary
5: Churn Creek Rd & Cypress Ave

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	234	256	126	293	143	210	355	108	53	327	157
Future Volume (veh/h)	220	234	256	126	293	143	210	355	108	53	327	157
Initial Q (Qb), veh	2	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	232	246	0	133	308	89	221	374	67	56	344	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	934	1854		278	1268	347	287	629	278	232	515	225
Arrive On Green	0.27	0.52	0.00	0.08	0.32	0.32	0.08	0.18	0.18	0.07	0.14	0.14
Sat Flow, veh/h	3456	3554	1585	3456	3973	1089	3456	3554	1572	3456	3554	1555
Grp Volume(v), veh/h	232	246	0	133	261	136	221	374	67	56	344	97
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1658	1728	1777	1572	1728	1777	1555
Q Serve(g_s), s	5.8	3.9	0.0	4.0	6.2	6.7	6.9	10.6	4.0	1.7	10.1	6.3
Cycle Q Clear(g_c), s	5.8	3.9	0.0	4.0	6.2	6.7	6.9	10.6	4.0	1.7	10.1	6.3
Prop In Lane	1.00		1.00	1.00		0.66	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	934	1854		278	1086	529	287	629	278	232	515	225
V/C Ratio(X)	0.25	0.13		0.48	0.24	0.26	0.77	0.59	0.24	0.24	0.67	0.43
Avail Cap(c_a), veh/h	934	1854		518	1086	529	393	1186	524	330	1121	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98
Uniform Delay (d), s/veh	31.5	13.5	0.0	48.4	27.6	27.8	49.4	41.6	38.9	48.7	44.5	42.9
Incr Delay (d2), s/veh	0.1	0.1	0.0	1.3	0.5	1.2	6.3	0.9	0.4	0.5	1.5	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.6	0.0	1.8	2.6	2.8	3.2	4.7	1.6	0.7	4.5	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.7	13.7	0.0	49.6	28.1	28.9	55.7	42.5	39.3	49.2	46.0	44.2
LnGrp LOS	C	B		D	C	C	E	D	D	D	D	D
Approach Vol, veh/h		478	A		530			662			497	
Approach Delay, s/veh		22.4			33.7			46.6			46.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	24.8	12.3	62.0	14.4	21.2	34.3	40.0
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	5.3	* 5.3	4.6	* 4.9
Max Green Setting (Gmax), s	10.5	36.7	16.5	29.4	12.5	* 35	10.5	* 35
Max Q Clear Time (g_c+I1), s	3.7	12.6	6.0	5.9	8.9	12.1	7.8	8.7
Green Ext Time (p_c), s	0.1	2.7	0.3	1.5	0.2	2.5	0.2	2.5

Intersection Summary	
HCM 6th Ctrl Delay	38.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	229	23	10	366	59	34	9	12	56	7	63
Future Volume (veh/h)	49	229	23	10	366	59	34	9	12	56	7	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	269	20	12	431	38	40	11	9	66	8	47
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	1011	75	44	824	368	114	31	26	266	35	206
Arrive On Green	0.09	0.30	0.30	0.02	0.23	0.23	0.10	0.10	0.10	0.15	0.15	0.15
Sat Flow, veh/h	1781	3354	248	1781	3554	1585	1176	323	265	1781	235	1383
Grp Volume(v), veh/h	58	142	147	12	431	38	60	0	0	66	0	55
Grp Sat Flow(s),veh/h/ln	1781	1777	1825	1781	1777	1585	1764	0	0	1781	0	1619
Q Serve(g_s), s	1.2	2.5	2.5	0.3	4.3	0.8	1.3	0.0	0.0	1.3	0.0	1.2
Cycle Q Clear(g_c), s	1.2	2.5	2.5	0.3	4.3	0.8	1.3	0.0	0.0	1.3	0.0	1.2
Prop In Lane	1.00		0.14	1.00		1.00	0.67		0.15	1.00		0.85
Lane Grp Cap(c), veh/h	168	535	550	44	824	368	171	0	0	266	0	241
V/C Ratio(X)	0.34	0.26	0.27	0.27	0.52	0.10	0.35	0.00	0.00	0.25	0.00	0.23
Avail Cap(c_a), veh/h	414	1282	1317	392	2520	1124	1165	0	0	1176	0	1069
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.3	10.8	10.9	19.6	13.7	12.4	17.3	0.0	0.0	15.4	0.0	15.3
Incr Delay (d2), s/veh	1.2	0.3	0.3	3.2	0.5	0.1	1.2	0.0	0.0	0.5	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.8	0.9	0.1	1.5	0.2	0.5	0.0	0.0	0.5	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.5	11.1	11.1	22.8	14.2	12.5	18.5	0.0	0.0	15.9	0.0	15.8
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		347			481			60			121	
Approach Delay, s/veh		12.4			14.3			18.5			15.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	4.5	17.3	10.6	7.4	14.5	8.5
Change Period (Y+Rc), s	3.5	5.0	4.5	3.5	5.0	4.5
Max Green Setting (Gmax), s	9.0	29.5	27.0	9.5	29.0	27.0
Max Q Clear Time (g_c+I1), s	2.3	4.5	3.3	3.2	6.3	3.3
Green Ext Time (p_c), s	0.0	1.8	0.5	0.0	3.1	0.3

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	29	92	8	43	95	148	346	3	61	335	213
Future Volume (veh/h)	177	29	92	8	43	95	148	346	3	61	335	213
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	208	34	0	9	51	40	174	407	4	72	394	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	317		18	100	100	222	655	555	94	520	
Arrive On Green	0.17	0.17	0.00	0.06	0.06	0.06	0.12	0.35	0.35	0.05	0.28	0.00
Sat Flow, veh/h	1781	1870	1585	278	1578	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	208	34	0	60	0	40	174	407	4	72	394	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1856	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	5.0	0.7	0.0	1.4	0.0	1.1	4.3	8.2	0.1	1.8	8.7	0.0
Cycle Q Clear(g_c), s	5.0	0.7	0.0	1.4	0.0	1.1	4.3	8.2	0.1	1.8	8.7	0.0
Prop In Lane	1.00		1.00	0.15		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	301	317		117	0	100	222	655	555	94	520	
V/C Ratio(X)	0.69	0.11		0.51	0.00	0.40	0.78	0.62	0.01	0.77	0.76	
Avail Cap(c_a), veh/h	1260	1323		164	0	140	295	1104	936	244	1034	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.7	15.9	0.0	20.5	0.0	20.4	19.2	12.2	9.6	21.2	14.9	0.0
Incr Delay (d2), s/veh	2.8	0.1	0.0	3.4	0.0	2.6	9.6	1.0	0.0	12.3	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.3	0.0	0.7	0.0	0.4	2.1	2.7	0.0	1.0	3.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	16.0	0.0	23.9	0.0	22.9	28.8	13.2	9.6	33.4	17.2	0.0
LnGrp LOS	C	B		C	A	C	C	B	A	C	B	
Approach Vol, veh/h		242	A		100			585			466	A
Approach Delay, s/veh		19.9			23.5			17.8			19.7	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	20.8		12.2	9.1	17.6		6.4
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5
Max Green Setting (Gmax), s	6.3	* 27		32.0	7.5	25.0		4.0
Max Q Clear Time (g_c+I1), s	3.8	10.2		7.0	6.3	10.7		3.4
Green Ext Time (p_c), s	0.0	2.1		0.7	0.1	1.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	128	80	101	116	66	85	674	150	59	580	119
Future Volume (veh/h)	74	128	80	101	116	66	85	674	150	59	580	119
Initial Q (Qb), veh	0	1	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	142	29	112	129	35	94	749	0	66	644	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	175	146	138	314	82	103	2284		100	2278	
Arrive On Green	0.06	0.09	0.09	0.08	0.11	0.11	0.06	0.64	0.00	0.06	0.64	0.00
Sat Flow, veh/h	1781	1870	1555	1781	2774	727	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	82	142	29	112	81	83	94	749	0	66	644	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1555	1781	1777	1724	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.9	9.7	2.2	8.0	5.5	5.8	6.8	12.3	0.0	4.7	10.3	0.0
Cycle Q Clear(g_c), s	5.9	9.7	2.2	8.0	5.5	5.8	6.8	12.3	0.0	4.7	10.3	0.0
Prop In Lane	1.00		1.00	1.00		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	103	175	146	138	201	195	103	2284		100	2278	
V/C Ratio(X)	0.79	0.81	0.20	0.81	0.40	0.43	0.91	0.33		0.66	0.28	
Avail Cap(c_a), veh/h	308	308	256	377	361	350	103	2291		158	2284	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.5	57.9	54.4	59.0	53.6	53.7	60.9	10.5	0.0	60.2	10.2	0.0
Incr Delay (d2), s/veh	5.0	3.4	0.2	10.2	0.5	0.5	61.1	0.4	0.0	5.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.9	0.9	4.0	2.5	2.6	4.8	4.9	0.0	2.3	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.5	62.5	54.7	69.3	54.0	54.2	122.0	10.9	0.0	65.7	10.6	0.0
LnGrp LOS	E	E	D	E	D	D	F	B		E	B	
Approach Vol, veh/h		253			276			843	A		710	A
Approach Delay, s/veh		62.6			60.3			23.3			15.7	
Approach LOS		E			E			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	89.1	13.6	16.5	11.0	88.9	11.0	19.1
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6
Max Green Setting (Gmax), s	11.5	52.7	27.5	21.4	7.5	56.7	22.5	26.4
Max Q Clear Time (g_c+I1), s	6.7	14.3	10.0	11.7	8.8	12.3	7.9	7.8
Green Ext Time (p_c), s	0.0	8.8	0.2	0.3	0.0	7.2	0.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	30.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	1	48	4	1	4	56	657	1	3	685	249
Future Volume (veh/h)	233	1	48	4	1	4	56	657	1	3	685	249
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	262	1	38	4	1	2	63	738	1	3	770	231
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	365	32	41	274	75	111	82	1930	3	6	1151	513
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.05	0.37	0.37	0.00	0.32	0.32
Sat Flow, veh/h	1253	5	182	887	322	483	1781	5266	7	1781	3554	1584
Grp Volume(v), veh/h	301	0	0	7	0	0	63	477	262	3	770	231
Grp Sat Flow(s),veh/h/ln	1439	0	0	1692	0	0	1781	1702	1869	1781	1777	1584
Q Serve(g_s), s	15.9	0.0	0.0	0.0	0.0	0.0	2.8	8.3	8.3	0.1	15.0	9.2
Cycle Q Clear(g_c), s	16.1	0.0	0.0	0.2	0.0	0.0	2.8	8.3	8.3	0.1	15.0	9.2
Prop In Lane	0.87		0.13	0.57		0.29	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	438	0	0	460	0	0	82	1248	685	6	1151	513
V/C Ratio(X)	0.69	0.00	0.00	0.02	0.00	0.00	0.77	0.38	0.38	0.52	0.67	0.45
Avail Cap(c_a), veh/h	532	0	0	582	0	0	390	1248	685	390	1151	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	0.0	23.1	0.0	0.0	37.7	18.7	18.7	39.8	23.4	21.4
Incr Delay (d2), s/veh	2.6	0.0	0.0	0.0	0.0	0.0	14.0	0.2	0.4	58.2	3.1	2.8
Initial Q Delay(d3),s/veh	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	0.0	0.1	0.0	0.0	1.5	3.0	3.3	0.1	6.2	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.9	0.0	0.0	23.1	0.0	0.0	51.7	18.9	19.0	98.0	26.5	24.3
LnGrp LOS	C	A	A	C	A	A	D	B	B	F	C	C
Approach Vol, veh/h		301			7			802			1004	
Approach Delay, s/veh		34.9			23.1			21.5			26.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.8	33.9		23.1	7.2	30.5		23.1
Change Period (Y+Rc), s	3.5	4.6		4.1	3.5	* 4.6		4.1
Max Green Setting (Gmax), s	17.5	25.4		24.9	17.5	* 26		24.9
Max Q Clear Time (g_c+I1), s	12.1	10.3		18.1	4.8	17.0		2.2
Green Ext Time (p_c), s	0.0	3.9		0.9	0.1	3.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Churn Creek Rd & Industrial St

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	39	42	121	30	127	22	732	89	104	638	30
Future Volume (veh/h)	38	39	42	121	30	127	22	732	89	104	638	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	42	25	130	32	110	24	787	91	112	686	26
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	54	56	94	156	38	170	32	2022	234	136	2408	91
Arrive On Green	0.06	0.06	0.06	0.11	0.11	0.11	0.02	0.63	0.63	0.08	0.69	0.69
Sat Flow, veh/h	902	924	1560	1443	355	1581	1781	3200	370	1781	3488	132
Grp Volume(v), veh/h	83	0	25	162	0	110	24	437	441	112	349	363
Grp Sat Flow(s),veh/h/ln	1825	0	1560	1798	0	1581	1781	1777	1793	1781	1777	1843
Q Serve(g_s), s	5.9	0.0	2.0	11.6	0.0	8.7	1.8	15.7	15.7	8.1	9.9	9.9
Cycle Q Clear(g_c), s	5.9	0.0	2.0	11.6	0.0	8.7	1.8	15.7	15.7	8.1	9.9	9.9
Prop In Lane	0.49		1.00	0.80		1.00	1.00		0.21	1.00		0.07
Lane Grp Cap(c), veh/h	110	0	94	194	0	170	32	1123	1133	136	1227	1273
V/C Ratio(X)	0.75	0.00	0.27	0.84	0.00	0.65	0.76	0.39	0.39	0.82	0.28	0.29
Avail Cap(c_a), veh/h	293	0	250	288	0	253	88	1123	1133	279	1227	1273
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	0.0	58.8	57.3	0.0	56.0	64.1	11.8	11.8	59.6	7.8	7.8
Incr Delay (d2), s/veh	3.9	0.0	0.6	8.3	0.0	1.5	9.3	0.7	0.7	4.6	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.8	5.7	0.0	3.6	0.9	6.3	6.4	3.8	3.7	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.5	0.0	59.3	65.6	0.0	57.6	73.3	12.5	12.5	64.3	8.4	8.4
LnGrp LOS	E	A	E	E	A	E	E	B	B	E	A	A
Approach Vol, veh/h		108			272			902			824	
Approach Delay, s/veh		63.3			62.3			14.1			16.0	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.5	88.1		11.6	5.8	95.8		17.8
Change Period (Y+Rc), s	3.5	5.3		3.7	3.5	5.3		3.7
Max Green Setting (Gmax), s	20.5	52.7		21.0	6.5	66.7		21.0
Max Q Clear Time (g_c+I1), s	10.1	17.7		7.9	3.8	11.9		13.6
Green Ext Time (p_c), s	0.1	9.8		0.2	0.0	7.5		0.4

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Notes

User approved changes to right turn type.

HCM 6th TWSC
4: Industrial St & Del Monte St 11/22/2024

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	57	70	113	0	75	3	65	2	1	4	1	84
Future Vol, veh/h	57	70	113	0	75	3	65	2	1	4	1	84
Conflicting Peds, #/hr	4	0	2	0	0	0	2	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	82	133	0	88	4	76	2	1	5	1	99

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	96	0	0	217	0	0	429	381	151	378	445	98
Stage 1	-	-	-	-	-	-	285	285	-	94	94	-
Stage 2	-	-	-	-	-	-	144	96	-	284	351	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1498	-	-	1353	-	-	536	552	895	580	508	958
Stage 1	-	-	-	-	-	-	722	676	-	913	817	-
Stage 2	-	-	-	-	-	-	859	815	-	723	632	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1492	-	-	1350	-	-	458	520	893	552	479	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	458	520	-	552	479	-
Stage 1	-	-	-	-	-	-	683	639	-	862	814	-
Stage 2	-	-	-	-	-	-	766	812	-	682	598	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	14.4	9.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	1492	-	-	1350	-	-	911
HCM Lane V/C Ratio	0.173	0.045	-	-	-	-	-	0.115
HCM Control Delay (s)	14.4	7.5	0	-	0	-	-	9.5
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.4

HCM 6th Signalized Intersection Summary
5: Churn Creek Rd & Cypress Ave 11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	374	272	115	289	109	203	445	125	135	450	217
Future Volume (veh/h)	262	374	272	115	289	109	203	445	125	135	450	217
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	1	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	279	398	0	122	307	42	216	473	86	144	479	142
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	345	1853		255	2257	301	278	665	290	257	643	286
Arrive On Green	0.10	0.52	0.00	0.07	0.50	0.50	0.08	0.19	0.19	0.07	0.18	0.18
Sat Flow, veh/h	3456	3554	1585	3456	4557	608	3456	3554	1547	3456	3554	1580
Grp Volume(v), veh/h	279	398	0	122	227	122	216	473	86	144	479	142
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1760	1728	1777	1547	1728	1777	1580
Q Serve(g_s), s	9.5	7.2	0.0	4.1	4.3	4.5	7.4	15.0	5.7	4.8	15.3	9.7
Cycle Q Clear(g_c), s	9.5	7.2	0.0	4.1	4.3	4.5	7.4	15.0	5.7	4.8	15.3	9.7
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	345	1853		255	1686	872	278	665	290	257	643	286
V/C Ratio(X)	0.81	0.21		0.48	0.13	0.14	0.78	0.71	0.30	0.56	0.74	0.50
Avail Cap(c_a), veh/h	504	1856		504	1689	873	418	1057	460	418	1057	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	52.9	15.5	0.0	53.4	16.4	16.4	54.1	45.7	42.0	53.6	46.6	44.2
Incr Delay (d2), s/veh	6.2	0.3	0.0	1.4	0.2	0.3	5.2	1.4	0.6	1.8	1.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
%ile BackOfQ(50%),veh/ln	4.4	3.0	0.0	1.8	1.7	1.9	3.4	6.7	2.2	2.1	6.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.1	15.7	0.0	54.8	16.5	16.8	59.3	47.2	42.5	55.5	48.3	45.5
LnGrp LOS	E	B		D	B	B	E	D	D	E	D	D
Approach Vol, veh/h		677	A		471			775			765	
Approach Delay, s/veh		33.6			26.5			50.0			49.1	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	27.7	12.3	67.6	13.2	26.9	15.5	64.4
Change Period (Y+Rc), s	3.5	5.3	3.5	* 4.9	3.5	5.3	3.5	4.9
Max Green Setting (Gmax), s	14.5	35.7	17.5	* 35	14.5	35.7	17.5	35.1
Max Q Clear Time (g_c+I1), s	6.8	17.0	6.1	9.2	9.4	17.3	11.5	6.5
Green Ext Time (p_c), s	0.2	3.3	0.2	2.7	0.3	3.4	0.5	2.2

Intersection Summary	
HCM 6th Ctrl Delay	41.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	464	33	12	359	68	23	2	17	118	13	40
Future Volume (veh/h)	42	464	33	12	359	68	23	2	17	118	13	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	499	22	13	386	53	25	2	9	127	14	20
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	141	975	43	48	814	352	79	6	29	316	122	175
Arrive On Green	0.08	0.28	0.28	0.03	0.23	0.23	0.07	0.07	0.07	0.18	0.18	0.18
Sat Flow, veh/h	1781	3467	153	1781	3554	1535	1199	96	432	1781	688	983
Grp Volume(v), veh/h	45	255	266	13	386	53	36	0	0	127	0	34
Grp Sat Flow(s),veh/h/ln	1781	1777	1843	1781	1777	1535	1726	0	0	1781	0	1672
Q Serve(g_s), s	0.9	4.7	4.7	0.3	3.7	1.1	0.8	0.0	0.0	2.5	0.0	0.7
Cycle Q Clear(g_c), s	0.9	4.7	4.7	0.3	3.7	1.1	0.8	0.0	0.0	2.5	0.0	0.7
Prop In Lane	1.00		0.08	1.00		1.00	0.69		0.25	1.00		0.59
Lane Grp Cap(c), veh/h	141	500	518	48	814	352	114	0	0	316	0	297
V/C Ratio(X)	0.32	0.51	0.51	0.27	0.47	0.15	0.31	0.00	0.00	0.40	0.00	0.11
Avail Cap(c_a), veh/h	410	1319	1368	410	2638	1139	1193	0	0	1254	0	1176
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.0	11.8	11.8	18.6	13.0	12.0	17.4	0.0	0.0	14.2	0.0	13.5
Incr Delay (d2), s/veh	1.3	0.8	0.8	3.0	0.4	0.2	1.6	0.0	0.0	0.8	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.6	1.7	0.1	1.3	0.3	0.3	0.0	0.0	0.9	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	12.6	12.6	21.6	13.5	12.2	19.0	0.0	0.0	15.0	0.0	13.7
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		566			452			36			161	
Approach Delay, s/veh		13.0			13.5			19.0			14.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.6	16.0		11.4	6.6	14.0		7.1
Change Period (Y+Rc), s	3.5	5.0		4.5	3.5	5.0		4.5
Max Green Setting (Gmax), s	9.6	29.0		27.5	9.0	29.0		27.0
Max Q Clear Time (g_c+I1), s	2.3	6.7		4.5	2.9	5.7		2.8
Green Ext Time (p_c), s	0.0	3.3		0.5	0.0	2.9		0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	308	46	208	7	23	45	148	345	7	52	383	216
Future Volume (veh/h)	308	46	208	7	23	45	148	345	7	52	383	216
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	3	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	338	51	0	8	25	9	163	379	8	57	421	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	434	455		16	49	55	206	679	576	77	543	
Arrive On Green	0.24	0.24	0.00	0.04	0.04	0.04	0.12	0.36	0.36	0.04	0.29	0.00
Sat Flow, veh/h	1781	1870	1585	448	1400	1561	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	338	51	0	33	0	9	163	379	8	57	421	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1848	0	1561	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	9.2	1.1	0.0	0.9	0.0	0.3	4.6	8.4	0.2	1.6	10.7	0.0
Cycle Q Clear(g_c), s	9.2	1.1	0.0	0.9	0.0	0.3	4.6	8.4	0.2	1.6	10.7	0.0
Prop In Lane	1.00		1.00	0.24		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	434	455		65	0	55	206	679	576	77	543	
V/C Ratio(X)	0.78	0.11		0.51	0.00	0.17	0.79	0.56	0.01	0.74	0.77	
Avail Cap(c_a), veh/h	1100	1155		143	0	120	258	1010	856	168	902	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.5	15.4	0.0	24.9	0.0	24.6	22.6	13.3	10.7	24.8	17.2	0.0
Incr Delay (d2), s/veh	3.1	0.1	0.0	6.1	0.0	1.4	12.3	0.7	0.0	13.1	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.4	0.0	0.5	0.0	0.1	2.4	3.0	0.0	0.9	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	15.5	0.0	31.0	0.0	26.0	34.9	14.0	10.7	38.0	20.6	0.0
LnGrp LOS	C	B		C	A	C	C	B	B	D	C	
Approach Vol, veh/h		389	A		42			550			478	A
Approach Delay, s/veh		20.8			29.9			20.2			22.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	23.6		17.1	9.5	19.9		5.3
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5
Max Green Setting (Gmax), s	4.9	* 28		32.0	7.5	25.0		4.0
Max Q Clear Time (g_c+I1), s	3.6	10.4		11.2	6.6	12.7		2.9
Green Ext Time (p_c), s	0.0	2.0		1.2	0.0	1.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	67	51	182	200	75	26	310	94	34	378	64
Future Volume (veh/h)	39	67	51	182	200	75	26	310	94	34	378	64
Initial Q (Qb), veh	0	0	0	1	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	73	20	198	217	39	28	337	0	37	411	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	67	127	107	404	775	137	48	731		121	877	
Arrive On Green	0.04	0.07	0.07	0.23	0.26	0.26	0.03	0.21	0.00	0.07	0.25	0.00
Sat Flow, veh/h	1781	1870	1580	1781	3016	533	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	42	73	20	198	126	130	28	337	0	37	411	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1580	1781	1777	1772	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.9	1.5	0.5	3.8	2.2	2.3	0.6	3.3	0.0	0.8	3.8	0.0
Cycle Q Clear(g_c), s	0.9	1.5	0.5	3.8	2.2	2.3	0.6	3.3	0.0	0.8	3.8	0.0
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	67	127	107	404	456	455	48	731		121	877	
V/C Ratio(X)	0.63	0.58	0.19	0.49	0.28	0.28	0.59	0.46		0.31	0.47	
Avail Cap(c_a), veh/h	410	1005	850	502	1046	1043	274	2010		410	2283	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.6	17.7	17.2	13.2	11.6	11.7	18.8	13.6	0.0	17.4	12.5	0.0
Incr Delay (d2), s/veh	3.6	1.5	0.3	0.9	0.1	0.1	4.2	0.6	0.0	1.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.6	0.2	1.3	0.7	0.7	0.3	1.1	0.0	0.3	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.1	19.2	17.5	14.2	11.7	11.8	23.0	14.3	0.0	18.4	13.1	0.0
LnGrp LOS	C	B	B	B	B	B	C	B		B	B	
Approach Vol, veh/h		135			454			365	A		448	A
Approach Delay, s/veh		19.9			12.8			14.9			13.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	13.3	12.3	7.2	4.5	14.9	5.0	14.6
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6
Max Green Setting (Gmax), s	9.0	22.1	11.0	21.0	6.0	25.1	9.0	23.0
Max Q Clear Time (g_c+I1), s	2.8	5.3	5.8	3.5	2.6	5.8	2.9	4.3
Green Ext Time (p_c), s	0.0	2.6	0.2	0.2	0.0	3.4	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	223	4	56	1	1	0	63	523	5	11	515	293
Future Volume (veh/h)	223	4	56	1	1	0	63	523	5	11	515	293
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	262	5	46	1	1	0	74	615	6	13	606	261
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	361	38	49	246	226	0	97	1906	19	22	1151	506
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.00	0.05	0.37	0.37	0.01	0.32	0.32
Sat Flow, veh/h	1210	23	212	756	947	0	1781	5214	51	1781	3554	1564
Grp Volume(v), veh/h	313	0	0	2	0	0	74	401	220	13	606	261
Grp Sat Flow(s),veh/h/ln	1446	0	0	1702	0	0	1781	1702	1861	1781	1777	1564
Q Serve(g_s), s	16.6	0.0	0.0	0.0	0.0	0.0	3.3	6.8	6.8	0.6	11.1	10.8
Cycle Q Clear(g_c), s	16.7	0.0	0.0	0.1	0.0	0.0	3.3	6.8	6.8	0.6	11.1	10.8
Prop In Lane	0.84		0.15	0.50		0.00	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	448	0	0	472	0	0	97	1244	680	22	1151	506
V/C Ratio(X)	0.70	0.00	0.00	0.00	0.00	0.00	0.77	0.32	0.32	0.58	0.53	0.52
Avail Cap(c_a), veh/h	533	0	0	589	0	0	390	1244	680	390	1151	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	0.0	22.6	0.0	0.0	37.3	18.3	18.3	39.3	22.1	22.0
Incr Delay (d2), s/veh	3.2	0.0	0.0	0.0	0.0	0.0	11.8	0.1	0.3	21.7	1.7	3.7
Initial Q Delay(d3),s/veh	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	0.0	0.0	0.0	0.0	1.7	2.5	2.7	0.4	4.5	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.2	0.0	0.0	22.6	0.0	0.0	49.1	18.4	18.5	61.0	23.8	25.7
LnGrp LOS	D	A	A	C	A	A	D	B	B	E	C	C
Approach Vol, veh/h		313			2			695			880	
Approach Delay, s/veh		35.2			22.6			21.7			24.9	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	33.8		23.7	7.8	30.5		23.7
Change Period (Y+Rc), s	3.5	4.6		4.1	3.5	* 4.6		4.1
Max Green Setting (Gmax), s	17.5	25.4		24.9	17.5	* 26		24.9
Max Q Clear Time (g_c+I1), s	2.0	8.8		18.7	5.3	13.1		2.1
Green Ext Time (p_c), s	0.0	3.4		0.9	0.1	3.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Churn Creek Rd & Industrial St

11/14/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	69	15	53	22	41	22	393	222	103	429	10
Future Volume (veh/h)	12	69	15	53	22	41	22	393	222	103	429	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	71	5	55	23	29	23	405	207	106	442	8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	102	102	95	40	117	41	784	395	134	1421	26
Arrive On Green	0.06	0.06	0.06	0.07	0.07	0.07	0.02	0.35	0.35	0.08	0.40	0.40
Sat Flow, veh/h	268	1588	1585	1274	533	1559	1781	2266	1142	1781	3569	65
Grp Volume(v), veh/h	83	0	5	78	0	29	23	316	296	106	220	230
Grp Sat Flow(s),veh/h/ln	1857	0	1585	1807	0	1559	1781	1777	1632	1781	1777	1857
Q Serve(g_s), s	1.6	0.0	0.1	1.5	0.0	0.6	0.5	5.2	5.3	2.2	3.1	3.1
Cycle Q Clear(g_c), s	1.6	0.0	0.1	1.5	0.0	0.6	0.5	5.2	5.3	2.2	3.1	3.1
Prop In Lane	0.14		1.00	0.71		1.00	1.00		0.70	1.00		0.03
Lane Grp Cap(c), veh/h	120	0	102	135	0	117	41	614	564	134	707	739
V/C Ratio(X)	0.69	0.00	0.05	0.58	0.00	0.25	0.57	0.51	0.52	0.79	0.31	0.31
Avail Cap(c_a), veh/h	1251	0	1067	1217	0	1050	290	1346	1236	305	1361	1422
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	0.0	16.2	16.5	0.0	16.1	17.8	9.6	9.6	16.8	7.6	7.6
Incr Delay (d2), s/veh	2.7	0.0	0.1	1.4	0.0	0.4	4.5	1.0	1.1	4.0	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.6	0.0	0.2	0.2	1.6	1.5	0.9	0.8	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	0.0	16.2	17.9	0.0	16.5	22.4	10.5	10.7	20.7	8.0	8.0
LnGrp LOS	B	A	B	B	A	B	C	B	B	C	A	A
Approach Vol, veh/h		88			107			635			556	
Approach Delay, s/veh		19.4			17.5			11.0			10.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	6.3	18.0	6.1	4.3	20.0	6.5
Change Period (Y+Rc), s	3.5	5.3	3.7	3.5	5.3	3.7
Max Green Setting (Gmax), s	6.3	27.9	24.8	6.0	28.2	24.8
Max Q Clear Time (g_c+I1), s	4.2	7.3	3.6	2.5	5.1	3.5
Green Ext Time (p_c), s	0.0	5.4	0.2	0.0	3.7	0.2

Intersection Summary	
HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B

Notes

User approved changes to right turn type.

HCM 6th TWSC
4: Industrial St & Del Monte St

11/14/2024

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	250	21	122	0	8	0	24	0	1	0	2	83
Future Vol, veh/h	250	21	122	0	8	0	24	0	1	0	2	83
Conflicting Peds, #/hr	1	0	1	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	291	24	142	0	9	0	28	0	1	0	2	97

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	10	0	0	167	0	0	738	688	96	688	759	11
Stage 1	-	-	-	-	-	-	678	678	-	10	10	-
Stage 2	-	-	-	-	-	-	60	10	-	678	749	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1610	-	-	1411	-	-	334	369	960	360	336	1070
Stage 1	-	-	-	-	-	-	442	452	-	1011	887	-
Stage 2	-	-	-	-	-	-	951	887	-	442	419	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1608	-	-	1410	-	-	254	293	959	303	267	1068
Mov Cap-2 Maneuver	-	-	-	-	-	-	254	293	-	303	267	-
Stage 1	-	-	-	-	-	-	352	360	-	805	886	-
Stage 2	-	-	-	-	-	-	862	886	-	352	334	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.9	0	20.4	9
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	262	1608	-	-	1410	-	-	998
HCM Lane V/C Ratio	0.111	0.181	-	-	-	-	-	0.099
HCM Control Delay (s)	20.4	7.7	0	-	0	-	-	9
HCM Lane LOS	C	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.7	-	-	0	-	-	0.3

HCM 6th Signalized Intersection Summary
5: Churn Creek Rd & Cypress Ave

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	174	237	256	127	288	119	210	356	111	50	320	109
Future Volume (veh/h)	174	237	256	127	288	119	210	356	111	50	320	109
Initial Q (Qb), veh	2	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	183	249	0	134	303	63	221	375	70	53	337	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	946	1866		278	1359	271	287	623	275	227	503	220
Arrive On Green	0.27	0.53	0.00	0.08	0.32	0.32	0.08	0.18	0.18	0.07	0.14	0.14
Sat Flow, veh/h	3456	3554	1585	3456	4258	850	3456	3554	1571	3456	3554	1554
Grp Volume(v), veh/h	183	249	0	134	240	126	221	375	70	53	337	47
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1704	1728	1777	1571	1728	1777	1554
Q Serve(g_s), s	4.5	3.9	0.0	4.1	5.7	6.0	6.9	10.7	4.2	1.6	9.9	2.9
Cycle Q Clear(g_c), s	4.5	3.9	0.0	4.1	5.7	6.0	6.9	10.7	4.2	1.6	9.9	2.9
Prop In Lane	1.00		1.00	1.00		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	946	1866		278	1086	544	287	623	275	227	503	220
V/C Ratio(X)	0.19	0.13		0.48	0.22	0.23	0.77	0.60	0.25	0.23	0.67	0.21
Avail Cap(c_a), veh/h	946	1866		518	1086	544	393	1186	524	330	1121	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98
Uniform Delay (d), s/veh	30.7	13.3	0.0	48.4	27.4	27.5	49.4	41.8	39.2	48.8	44.8	41.8
Incr Delay (d2), s/veh	0.1	0.1	0.0	1.3	0.5	1.0	6.3	0.9	0.5	0.5	1.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.6	0.0	1.8	2.4	2.6	3.2	4.8	1.7	0.7	4.4	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.9	13.5	0.0	49.7	27.9	28.5	55.7	42.8	39.6	49.3	46.3	42.3
LnGrp LOS	C	B		D	C	C	E	D	D	D	D	D
Approach Vol, veh/h		432	A		500			666			437	
Approach Delay, s/veh		20.8			33.9			46.7			46.2	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	24.6	12.4	62.4	14.4	20.9	34.7	40.0
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	5.3	* 5.3	4.6	* 4.9
Max Green Setting (Gmax), s	10.5	36.7	16.5	29.4	12.5	* 35	10.5	* 35
Max Q Clear Time (g_c+I1), s	3.6	12.7	6.1	5.9	8.9	11.9	6.5	8.0
Green Ext Time (p_c), s	0.0	2.7	0.3	1.6	0.2	2.2	0.2	2.3

Intersection Summary	
HCM 6th Ctrl Delay	38.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	210	21	9	336	58	31	9	11	53	6	60
Future Volume (veh/h)	50	210	21	9	336	58	31	9	11	53	6	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	59	247	18	11	395	37	36	11	8	62	7	44
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	990	72	41	786	350	106	32	24	262	33	205
Arrive On Green	0.10	0.29	0.29	0.02	0.22	0.22	0.09	0.09	0.09	0.15	0.15	0.15
Sat Flow, veh/h	1781	3360	243	1781	3554	1585	1156	353	257	1781	222	1395
Grp Volume(v), veh/h	59	130	135	11	395	37	55	0	0	62	0	51
Grp Sat Flow(s),veh/h/ln	1781	1777	1826	1781	1777	1585	1766	0	0	1781	0	1617
Q Serve(g_s), s	1.2	2.2	2.2	0.2	3.8	0.7	1.2	0.0	0.0	1.2	0.0	1.1
Cycle Q Clear(g_c), s	1.2	2.2	2.2	0.2	3.8	0.7	1.2	0.0	0.0	1.2	0.0	1.1
Prop In Lane	1.00		0.13	1.00		1.00	0.65		0.15	1.00		0.86
Lane Grp Cap(c), veh/h	172	523	538	41	786	350	162	0	0	262	0	238
V/C Ratio(X)	0.34	0.25	0.25	0.27	0.50	0.11	0.34	0.00	0.00	0.24	0.00	0.21
Avail Cap(c_a), veh/h	429	1329	1365	406	2612	1165	1209	0	0	1219	0	1107
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.7	10.6	10.6	18.9	13.5	12.3	16.8	0.0	0.0	14.9	0.0	14.8
Incr Delay (d2), s/veh	1.2	0.2	0.2	3.4	0.5	0.1	1.2	0.0	0.0	0.5	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.7	0.8	0.1	1.4	0.2	0.5	0.0	0.0	0.5	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	10.8	10.8	22.4	14.0	12.4	18.0	0.0	0.0	15.3	0.0	15.3
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		324			443			55			113	
Approach Delay, s/veh		12.1			14.0			18.0			15.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	4.4	16.6	10.3	7.3	13.7	8.1
Change Period (Y+Rc), s	3.5	5.0	4.5	3.5	5.0	4.5
Max Green Setting (Gmax), s	9.6	29.5	27.0	9.5	29.0	27.0
Max Q Clear Time (g_c+I1), s	2.2	4.2	3.2	3.2	5.8	3.2
Green Ext Time (p_c), s	0.0	1.6	0.4	0.0	2.9	0.2

Intersection Summary	
HCM 6th Ctrl Delay	13.8
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	26	72	8	43	95	137	330	3	61	325	197
Future Volume (veh/h)	137	26	72	8	43	95	137	330	3	61	325	197
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	161	31	0	9	51	40	161	388	4	72	382	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	260		18	104	104	217	646	547	97	520	
Arrive On Green	0.14	0.14	0.00	0.07	0.07	0.07	0.12	0.35	0.35	0.05	0.28	0.00
Sat Flow, veh/h	1781	1870	1585	278	1578	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	161	31	0	60	0	40	161	388	4	72	382	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1856	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.6	0.6	0.0	1.3	0.0	1.0	3.6	7.1	0.1	1.7	7.7	0.0
Cycle Q Clear(g_c), s	3.6	0.6	0.0	1.3	0.0	1.0	3.6	7.1	0.1	1.7	7.7	0.0
Prop In Lane	1.00		1.00	0.15		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	260		122	0	104	217	646	547	97	520	
V/C Ratio(X)	0.65	0.12		0.49	0.00	0.38	0.74	0.60	0.01	0.74	0.74	
Avail Cap(c_a), veh/h	1367	1435		178	0	152	320	1198	1015	265	1121	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.0	15.7	0.0	18.8	0.0	18.7	17.7	11.3	9.0	19.4	13.7	0.0
Incr Delay (d2), s/veh	2.9	0.2	0.0	3.0	0.0	2.3	5.1	0.9	0.0	10.7	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.2	0.0	0.6	0.0	0.4	1.5	2.3	0.0	0.9	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.9	15.9	0.0	21.8	0.0	21.0	22.8	12.2	9.0	30.2	15.7	0.0
LnGrp LOS	B	B		C	A	C	C	B	A	C	B	
Approach Vol, veh/h		192	A		100			553			454	A
Approach Delay, s/veh		19.2			21.5			15.2			18.0	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	19.4		10.3	8.6	16.6		6.2
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5
Max Green Setting (Gmax), s	6.2	* 27		32.0	7.5	25.0		4.0
Max Q Clear Time (g_c+I1), s	3.7	9.1		5.6	5.6	9.7		3.3
Green Ext Time (p_c), s	0.0	2.0		0.6	0.1	1.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	112	79	102	112	66	45	665	144	59	583	79
Future Volume (veh/h)	66	112	79	102	112	66	45	665	144	59	583	79
Initial Q (Qb), veh	0	1	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	124	28	113	124	35	50	739	0	66	648	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	157	130	139	302	82	64	2317		100	2387	
Arrive On Green	0.05	0.08	0.08	0.08	0.11	0.11	0.04	0.65	0.00	0.06	0.67	0.00
Sat Flow, veh/h	1781	1870	1553	1781	2749	748	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	73	124	28	113	78	81	50	739	0	66	648	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1553	1781	1777	1719	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.3	8.5	2.2	8.1	5.4	5.7	3.6	11.8	0.0	4.7	9.5	0.0
Cycle Q Clear(g_c), s	5.3	8.5	2.2	8.1	5.4	5.7	3.6	11.8	0.0	4.7	9.5	0.0
Prop In Lane	1.00		1.00	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	93	157	130	139	195	189	64	2317		100	2387	
V/C Ratio(X)	0.78	0.79	0.21	0.81	0.40	0.43	0.78	0.32		0.66	0.27	
Avail Cap(c_a), veh/h	308	308	256	377	361	349	103	2323		158	2393	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.9	58.6	55.6	59.0	53.9	54.0	62.1	10.0	0.0	60.2	8.6	0.0
Incr Delay (d2), s/veh	5.4	3.3	0.3	10.3	0.5	0.5	7.3	0.4	0.0	5.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.3	0.9	4.0	2.4	2.5	1.8	4.6	0.0	2.3	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.2	63.3	55.9	69.3	54.4	54.6	69.4	10.3	0.0	65.7	8.9	0.0
LnGrp LOS	E	E	E	E	D	D	E	B		E	A	
Approach Vol, veh/h		225			272			789	A		714	A
Approach Delay, s/veh		63.3			60.6			14.1			14.1	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	90.3	13.7	15.3	8.2	92.9	10.3	18.7
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6
Max Green Setting (Gmax), s	11.5	52.7	27.5	21.4	7.5	56.7	22.5	26.4
Max Q Clear Time (g_c+I1), s	6.7	13.8	10.1	10.5	5.6	11.5	7.3	7.7
Green Ext Time (p_c), s	0.0	8.7	0.2	0.2	0.0	7.2	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	26.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	1	44	4	1	4	51	604	1	3	630	230
Future Volume (veh/h)	214	1	44	4	1	4	51	604	1	3	630	230
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	240	1	33	4	1	2	57	679	1	3	708	209
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	30	36	259	71	103	74	1905	3	6	1151	513
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.04	0.36	0.36	0.00	0.32	0.32
Sat Flow, veh/h	1260	5	173	882	329	484	1781	5265	8	1781	3554	1584
Grp Volume(v), veh/h	274	0	0	7	0	0	57	439	241	3	708	209
Grp Sat Flow(s),veh/h/ln	1439	0	0	1695	0	0	1781	1702	1869	1781	1777	1584
Q Serve(g_s), s	14.4	0.0	0.0	0.0	0.0	0.0	2.5	7.6	7.6	0.1	13.5	8.2
Cycle Q Clear(g_c), s	14.7	0.0	0.0	0.2	0.0	0.0	2.5	7.6	7.6	0.1	13.5	8.2
Prop In Lane	0.88		0.12	0.57		0.29	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	0	433	0	0	74	1232	676	6	1151	513
V/C Ratio(X)	0.66	0.00	0.00	0.02	0.00	0.00	0.77	0.36	0.36	0.52	0.62	0.41
Avail Cap(c_a), veh/h	532	0	0	579	0	0	390	1232	676	390	1151	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.0	0.0	0.0	24.1	0.0	0.0	38.0	18.7	18.7	39.8	22.8	21.1
Incr Delay (d2), s/veh	1.9	0.0	0.0	0.0	0.0	0.0	15.6	0.2	0.3	58.2	2.5	2.4
Initial Q Delay(d3),s/veh	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.0	0.0	0.1	0.0	0.0	1.4	2.8	3.1	0.1	5.6	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.0	0.0	0.0	24.2	0.0	0.0	53.6	18.9	19.0	98.0	25.3	23.5
LnGrp LOS	D	A	A	C	A	A	D	B	B	F	C	C
Approach Vol, veh/h		274			7			737			920	
Approach Delay, s/veh		35.0			24.2			21.6			25.1	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.8	33.6		21.7	6.8	30.5		21.7
Change Period (Y+Rc), s	3.5	4.6		4.1	3.5	* 4.6		4.1
Max Green Setting (Gmax), s	17.5	25.4		24.9	17.5	* 26		24.9
Max Q Clear Time (g_c+I1), s	12.1	9.6		16.7	4.5	15.5		2.2
Green Ext Time (p_c), s	0.0	3.6		0.9	0.1	3.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Churn Creek Rd & Industrial St

11/14/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	40	42	88	24	83	22	712	65	107	638	30
Future Volume (veh/h)	38	40	42	88	24	83	22	712	65	107	638	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	43	25	95	26	62	24	766	65	115	686	26
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	54	57	95	120	33	134	32	2158	183	139	2486	94
Arrive On Green	0.06	0.06	0.06	0.08	0.08	0.08	0.02	0.65	0.65	0.08	0.71	0.71
Sat Flow, veh/h	891	935	1560	1413	387	1579	1781	3308	281	1781	3488	132
Grp Volume(v), veh/h	84	0	25	121	0	62	24	411	420	115	349	363
Grp Sat Flow(s),veh/h/ln	1826	0	1560	1800	0	1579	1781	1777	1812	1781	1777	1843
Q Serve(g_s), s	5.9	0.0	2.0	8.6	0.0	4.9	1.8	13.7	13.7	8.3	9.2	9.2
Cycle Q Clear(g_c), s	5.9	0.0	2.0	8.6	0.0	4.9	1.8	13.7	13.7	8.3	9.2	9.2
Prop In Lane	0.49		1.00	0.79		1.00	1.00		0.15	1.00		0.07
Lane Grp Cap(c), veh/h	111	0	95	153	0	134	32	1159	1182	139	1266	1314
V/C Ratio(X)	0.76	0.00	0.26	0.79	0.00	0.46	0.76	0.35	0.36	0.83	0.28	0.28
Avail Cap(c_a), veh/h	293	0	250	289	0	253	88	1159	1182	279	1266	1314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	0.0	58.7	58.8	0.0	57.1	64.1	10.3	10.3	59.5	6.7	6.7
Incr Delay (d2), s/veh	3.9	0.0	0.5	3.4	0.0	0.9	9.8	0.6	0.6	4.6	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.8	4.1	0.0	2.0	0.9	5.4	5.5	3.9	3.4	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	59.2	62.2	0.0	58.0	73.8	10.9	10.9	64.1	7.3	7.3
LnGrp LOS	E	A	E	E	A	E	E	B	B	E	A	A
Approach Vol, veh/h		109			183			855			827	
Approach Delay, s/veh		63.2			60.8			12.7			15.2	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.7	90.8		11.7	5.8	98.7		14.8
Change Period (Y+Rc), s	3.5	5.3		3.7	3.5	5.3		3.7
Max Green Setting (Gmax), s	20.5	52.7		21.0	6.5	66.7		21.0
Max Q Clear Time (g_c+I1), s	10.3	15.7		7.9	3.8	11.2		10.6
Green Ext Time (p_c), s	0.1	9.2		0.2	0.0	7.5		0.3

Intersection Summary	
HCM 6th Ctrl Delay	21.0
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	64	114	0	69	3	68	2	1	4	1	77
Future Vol, veh/h	52	64	114	0	69	3	68	2	1	4	1	77
Conflicting Peds, #/hr	4	0	2	0	0	0	2	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	61	75	134	0	81	4	80	2	1	5	1	91

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	89	0	0	211	0	0	399	355	144	353	420	91
Stage 1	-	-	-	-	-	-	266	266	-	87	87	-
Stage 2	-	-	-	-	-	-	133	89	-	266	333	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1506	-	-	1360	-	-	561	571	903	602	525	967
Stage 1	-	-	-	-	-	-	739	689	-	921	823	-
Stage 2	-	-	-	-	-	-	870	821	-	739	644	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1500	-	-	1357	-	-	486	541	901	576	497	960
Mov Cap-2 Maneuver	-	-	-	-	-	-	486	541	-	576	497	-
Stage 1	-	-	-	-	-	-	703	655	-	874	820	-
Stage 2	-	-	-	-	-	-	784	818	-	701	612	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	13.8	9.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	491	1500	-	-	1357	-	-	920
HCM Lane V/C Ratio	0.17	0.041	-	-	-	-	-	0.105
HCM Control Delay (s)	13.8	7.5	0	-	0	-	-	9.4
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	251	376	258	117	291	109	184	407	124	135	450	218
Future Volume (veh/h)	251	376	258	117	291	109	184	407	124	135	450	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	1	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	267	400	0	124	310	42	196	433	85	144	479	143
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	333	1872		255	2301	304	259	645	281	257	643	286
Arrive On Green	0.10	0.53	0.00	0.07	0.51	0.51	0.07	0.18	0.18	0.07	0.18	0.18
Sat Flow, veh/h	3456	3554	1585	3456	4562	603	3456	3554	1547	3456	3554	1580
Grp Volume(v), veh/h	267	400	0	124	229	123	196	433	85	144	479	143
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1761	1728	1777	1547	1728	1777	1580
Q Serve(g_s), s	9.1	7.2	0.0	4.1	4.3	4.4	6.7	13.6	5.7	4.8	15.3	9.8
Cycle Q Clear(g_c), s	9.1	7.2	0.0	4.1	4.3	4.4	6.7	13.6	5.7	4.8	15.3	9.8
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	1872		255	1717	888	259	645	281	257	643	286
V/C Ratio(X)	0.80	0.21		0.49	0.13	0.14	0.76	0.67	0.30	0.56	0.74	0.50
Avail Cap(c_a), veh/h	504	1875		504	1720	890	418	1057	460	418	1057	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97
Uniform Delay (d), s/veh	53.1	15.1	0.0	53.4	15.8	15.9	54.4	45.8	42.5	53.6	46.6	44.3
Incr Delay (d2), s/veh	5.4	0.3	0.0	1.4	0.2	0.3	4.5	1.2	0.6	1.9	1.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
%ile BackOfQ(50%),veh/ln	4.2	3.0	0.0	1.8	1.7	1.8	3.1	6.1	2.2	2.2	6.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.5	15.4	0.0	54.8	16.0	16.2	58.9	47.0	43.1	55.5	48.3	45.6
LnGrp LOS	E	B		D	B	B	E	D	D	E	D	D
Approach Vol, veh/h		667	A		476			714			766	
Approach Delay, s/veh		32.7			26.1			49.8			49.2	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	27.0	12.4	68.2	12.5	26.9	15.1	65.5
Change Period (Y+Rc), s	3.5	5.3	3.5	* 4.9	3.5	5.3	3.5	4.9
Max Green Setting (Gmax), s	14.5	35.7	17.5	* 35	14.5	35.7	17.5	35.1
Max Q Clear Time (g_c+I1), s	6.8	15.6	6.1	9.2	8.7	17.3	11.1	6.4
Green Ext Time (p_c), s	0.2	3.1	0.2	2.7	0.3	3.4	0.5	2.2

Intersection Summary		
HCM 6th Ctrl Delay		41.0
HCM 6th LOS		D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/14/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	426	30	11	330	65	21	3	16	110	13	40
Future Volume (veh/h)	43	426	30	11	330	65	21	3	16	110	13	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	458	19	12	355	50	23	3	8	118	14	20
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	144	960	40	45	783	338	74	10	26	314	122	174
Arrive On Green	0.08	0.28	0.28	0.03	0.22	0.22	0.06	0.06	0.06	0.18	0.18	0.18
Sat Flow, veh/h	1781	3477	144	1781	3554	1534	1172	153	408	1781	688	983
Grp Volume(v), veh/h	46	234	243	12	355	50	34	0	0	118	0	34
Grp Sat Flow(s),veh/h/ln	1781	1777	1844	1781	1777	1534	1732	0	0	1781	0	1672
Q Serve(g_s), s	0.9	4.2	4.2	0.3	3.3	1.0	0.7	0.0	0.0	2.2	0.0	0.7
Cycle Q Clear(g_c), s	0.9	4.2	4.2	0.3	3.3	1.0	0.7	0.0	0.0	2.2	0.0	0.7
Prop In Lane	1.00		0.08	1.00		1.00	0.68		0.24	1.00		0.59
Lane Grp Cap(c), veh/h	144	491	509	45	783	338	110	0	0	314	0	295
V/C Ratio(X)	0.32	0.48	0.48	0.27	0.45	0.15	0.31	0.00	0.00	0.38	0.00	0.12
Avail Cap(c_a), veh/h	444	1351	1402	420	2655	1146	1226	0	0	1284	0	1205
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	11.5	11.5	18.3	12.9	12.0	17.1	0.0	0.0	13.9	0.0	13.2
Incr Delay (d2), s/veh	1.3	0.7	0.7	3.2	0.4	0.2	1.6	0.0	0.0	0.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.4	1.5	0.1	1.1	0.3	0.3	0.0	0.0	0.8	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	12.2	12.2	21.4	13.3	12.2	18.6	0.0	0.0	14.6	0.0	13.4
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		523			417			34			152	
Approach Delay, s/veh		12.7			13.4			18.6			14.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	15.5		11.2	6.6	13.4		6.9
Change Period (Y+Rc), s	3.5	5.0		4.5	3.5	5.0		4.5
Max Green Setting (Gmax), s	9.6	29.0		27.5	9.5	28.5		27.0
Max Q Clear Time (g_c+I1), s	2.3	6.2		4.2	2.9	5.3		2.7
Green Ext Time (p_c), s	0.0	3.0		0.5	0.0	2.6		0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave

11/14/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	42	208	7	21	43	133	318	7	52	383	213
Future Volume (veh/h)	278	42	208	7	21	43	133	318	7	52	383	213
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	3	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	305	46	0	8	23	7	146	349	8	57	421	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	405	425		16	45	51	190	670	568	79	553	
Arrive On Green	0.23	0.23	0.00	0.03	0.03	0.03	0.11	0.35	0.35	0.04	0.29	0.00
Sat Flow, veh/h	1781	1870	1585	477	1370	1562	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	305	46	0	31	0	7	146	349	8	57	421	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1847	0	1562	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	7.7	0.9	0.0	0.8	0.0	0.2	3.9	7.2	0.2	1.5	10.0	0.0
Cycle Q Clear(g_c), s	7.7	0.9	0.0	0.8	0.0	0.2	3.9	7.2	0.2	1.5	10.0	0.0
Prop In Lane	1.00		1.00	0.26		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	405	425		61	0	51	190	670	568	79	553	
V/C Ratio(X)	0.75	0.11		0.51	0.00	0.14	0.77	0.52	0.01	0.73	0.76	
Avail Cap(c_a), veh/h	1177	1236		153	0	129	276	1000	848	258	966	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.7	15.0	0.0	23.3	0.0	23.0	21.3	12.4	10.1	23.1	15.8	0.0
Incr Delay (d2), s/veh	2.9	0.1	0.0	6.4	0.0	1.2	7.8	0.6	0.0	12.0	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.4	0.0	0.4	0.0	0.1	1.8	2.4	0.0	0.8	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	15.1	0.0	29.7	0.0	24.2	29.1	13.0	10.1	35.1	18.9	0.0
LnGrp LOS	C	B		C	A	C	C	B	B	D	B	
Approach Vol, veh/h		351	A		38			503			478	A
Approach Delay, s/veh		19.8			28.7			17.6			20.8	
Approach LOS		B			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	22.2		15.5	8.7	19.1		5.1
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5
Max Green Setting (Gmax), s	7.6	* 26		32.0	7.5	25.0		4.0
Max Q Clear Time (g_c+I1), s	3.5	9.2		9.7	5.9	12.0		2.8
Green Ext Time (p_c), s	0.0	1.7		1.1	0.1	2.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	67	52	225	200	75	55	333	105	34	381	64
Future Volume (veh/h)	39	67	52	225	200	75	55	333	105	34	381	64
Initial Q (Qb), veh	0	0	0	1	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	73	22	245	217	39	60	362	0	37	414	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	66	126	106	412	789	139	86	775		120	841	
Arrive On Green	0.04	0.07	0.07	0.23	0.26	0.26	0.05	0.22	0.00	0.07	0.24	0.00
Sat Flow, veh/h	1781	1870	1580	1781	3016	533	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	42	73	22	245	126	130	60	362	0	37	414	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1580	1781	1777	1772	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.9	1.5	0.5	5.0	2.3	2.4	1.3	3.6	0.0	0.8	4.1	0.0
Cycle Q Clear(g_c), s	0.9	1.5	0.5	5.0	2.3	2.4	1.3	3.6	0.0	0.8	4.1	0.0
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	66	126	106	412	465	464	86	775		120	841	
V/C Ratio(X)	0.63	0.58	0.21	0.59	0.27	0.28	0.70	0.47		0.31	0.49	
Avail Cap(c_a), veh/h	395	968	818	483	1007	1004	303	1935		395	2119	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.3	18.4	17.9	14.0	11.9	11.9	19.0	13.8	0.0	18.0	13.4	0.0
Incr Delay (d2), s/veh	3.7	1.6	0.4	1.4	0.1	0.1	3.7	0.6	0.0	1.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.6	0.2	1.8	0.7	0.7	0.6	1.3	0.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.0	19.9	18.3	15.5	12.0	12.1	22.7	14.5	0.0	19.1	14.0	0.0
LnGrp LOS	C	B	B	B	B	B	C	B		B	B	
Approach Vol, veh/h		137			501			422	A		451	A
Approach Delay, s/veh		20.6			13.7			15.6			14.4	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	14.2	12.9	7.3	5.5	14.9	5.0	15.2
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6
Max Green Setting (Gmax), s	9.0	22.1	11.0	21.0	6.9	24.2	9.0	23.0
Max Q Clear Time (g_c+I1), s	2.8	5.6	7.0	3.5	3.3	6.1	2.9	4.4
Green Ext Time (p_c), s	0.0	2.8	0.3	0.2	0.0	3.3	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	243	4	61	1	1	0	69	570	5	12	561	319
Future Volume (veh/h)	243	4	61	1	1	0	69	570	5	12	561	319
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	286	5	52	1	1	0	81	671	6	14	660	291
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	380	41	54	260	240	0	106	1930	17	24	1151	506
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.00	0.06	0.37	0.37	0.01	0.32	0.32
Sat Flow, veh/h	1205	21	219	761	938	0	1781	5219	47	1781	3554	1564
Grp Volume(v), veh/h	343	0	0	2	0	0	81	437	240	14	660	291
Grp Sat Flow(s),veh/h/ln	1446	0	0	1699	0	0	1781	1702	1862	1781	1777	1564
Q Serve(g_s), s	18.3	0.0	0.0	0.0	0.0	0.0	3.6	7.4	7.4	0.6	12.3	12.4
Cycle Q Clear(g_c), s	18.3	0.0	0.0	0.1	0.0	0.0	3.6	7.4	7.4	0.6	12.3	12.4
Prop In Lane	0.83		0.15	0.50		0.00	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	475	0	0	500	0	0	106	1259	689	24	1151	506
V/C Ratio(X)	0.72	0.00	0.00	0.00	0.00	0.00	0.76	0.35	0.35	0.59	0.57	0.57
Avail Cap(c_a), veh/h	532	0	0	590	0	0	390	1259	689	390	1151	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	0.0	21.5	0.0	0.0	37.1	18.2	18.2	39.2	22.5	22.5
Incr Delay (d2), s/veh	4.1	0.0	0.0	0.0	0.0	0.0	10.8	0.2	0.3	20.9	2.1	4.7
Initial Q Delay(d3),s/veh	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	0.0	0.0	0.0	0.0	1.8	2.7	3.0	0.4	5.1	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	0.0	0.0	21.5	0.0	0.0	47.9	18.4	18.5	60.2	24.5	27.2
LnGrp LOS	D	A	A	C	A	A	D	B	B	E	C	C
Approach Vol, veh/h		343			2			758			965	
Approach Delay, s/veh		35.4			21.5			21.6			25.9	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.6	34.2		25.2	8.3	30.5		25.2
Change Period (Y+Rc), s	3.5	4.6		4.1	3.5	* 4.6		4.1
Max Green Setting (Gmax), s	17.5	25.4		24.9	17.5	* 26		24.9
Max Q Clear Time (g_c+I1), s	12.6	9.4		20.3	5.6	14.4		2.1
Green Ext Time (p_c), s	0.0	3.6		0.8	0.1	4.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Churn Creek Rd & Industrial St

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	74	15	87	22	67	22	424	285	126	441	10
Future Volume (veh/h)	12	74	15	87	22	67	22	424	285	126	441	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	76	5	90	23	56	23	437	272	130	455	8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	106	104	149	38	163	40	680	419	166	1414	25
Arrive On Green	0.07	0.07	0.07	0.10	0.10	0.10	0.02	0.33	0.33	0.09	0.40	0.40
Sat Flow, veh/h	253	1604	1585	1433	366	1558	1781	2089	1289	1781	3571	63
Grp Volume(v), veh/h	88	0	5	113	0	56	23	371	338	130	226	237
Grp Sat Flow(s),veh/h/ln	1858	0	1585	1799	0	1558	1781	1777	1601	1781	1777	1857
Q Serve(g_s), s	1.8	0.0	0.1	2.4	0.0	1.3	0.5	7.0	7.1	2.8	3.5	3.5
Cycle Q Clear(g_c), s	1.8	0.0	0.1	2.4	0.0	1.3	0.5	7.0	7.1	2.8	3.5	3.5
Prop In Lane	0.14		1.00	0.80		1.00	1.00		0.80	1.00		0.03
Lane Grp Cap(c), veh/h	122	0	104	188	0	163	40	578	521	166	704	736
V/C Ratio(X)	0.72	0.00	0.05	0.60	0.00	0.34	0.57	0.64	0.65	0.78	0.32	0.32
Avail Cap(c_a), veh/h	1170	0	998	1133	0	981	271	785	707	308	821	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	17.2	16.9	0.0	16.4	19.1	11.3	11.4	17.5	8.2	8.2
Incr Delay (d2), s/veh	3.0	0.0	0.1	1.2	0.0	0.5	4.7	1.7	1.9	3.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.9	0.0	0.4	0.2	2.4	2.2	1.1	1.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	0.0	17.3	18.0	0.0	16.9	23.7	13.0	13.3	20.5	8.6	8.6
LnGrp LOS	C	A	B	B	A	B	C	B	B	C	A	A
Approach Vol, veh/h		93			169			732			593	
Approach Delay, s/veh		20.8			17.6			13.5			11.2	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.2	18.1		6.3	4.4	20.9		7.8
Change Period (Y+Rc), s	3.5	5.3		3.7	3.5	5.3		3.7
Max Green Setting (Gmax), s	3.8	17.4		24.8	6.0	18.2		24.8
Max Q Clear Time (g_c+I1), s	4.8	9.1		3.8	2.5	5.5		4.4
Green Ext Time (p_c), s	0.0	3.7		0.2	0.0	2.9		0.4

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

Notes

User approved changes to right turn type.

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	272	23	132	0	9	0	26	0	1	0	2	90
Future Vol, veh/h	272	23	132	0	9	0	26	0	1	0	2	90
Conflicting Peds, #/hr	1	0	1	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	316	27	153	0	10	0	30	0	1	0	2	105

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	11	0	0	181	0	0	802	748	105	747	824	12
Stage 1	-	-	-	-	-	-	737	737	-	11	11	-
Stage 2	-	-	-	-	-	-	65	11	-	736	813	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1608	-	-	1394	-	-	302	341	949	329	308	1069
Stage 1	-	-	-	-	-	-	410	425	-	1010	886	-
Stage 2	-	-	-	-	-	-	946	886	-	411	392	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1606	-	-	1393	-	-	223	264	948	272	239	1067
Mov Cap-2 Maneuver	-	-	-	-	-	-	223	264	-	272	239	-
Stage 1	-	-	-	-	-	-	318	330	-	784	885	-
Stage 2	-	-	-	-	-	-	850	885	-	319	304	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5	0	23.1	9.1
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	230	1606	-	-	1393	-	-	992
HCM Lane V/C Ratio	0.137	0.197	-	-	-	-	-	0.108
HCM Control Delay (s)	23.1	7.8	0	-	0	-	-	9.1
HCM Lane LOS	C	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0.7	-	-	0	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	237	256	127	294	143	210	357	111	53	327	157
Future Volume (veh/h)	222	237	256	127	294	143	210	357	111	53	327	157
Initial Q (Qb), veh	2	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	234	249	0	134	309	89	221	376	70	56	344	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	934	1854		278	1269	347	287	629	278	232	515	225
Arrive On Green	0.27	0.52	0.00	0.08	0.32	0.32	0.08	0.18	0.18	0.07	0.14	0.14
Sat Flow, veh/h	3456	3554	1585	3456	3976	1086	3456	3554	1572	3456	3554	1555
Grp Volume(v), veh/h	234	249	0	134	262	136	221	376	70	56	344	97
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1658	1728	1777	1572	1728	1777	1555
Q Serve(g_s), s	5.8	4.0	0.0	4.1	6.2	6.7	6.9	10.7	4.2	1.7	10.1	6.3
Cycle Q Clear(g_c), s	5.8	4.0	0.0	4.1	6.2	6.7	6.9	10.7	4.2	1.7	10.1	6.3
Prop In Lane	1.00		1.00	1.00		0.66	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	934	1854		278	1086	529	287	629	278	232	515	225
V/C Ratio(X)	0.25	0.13		0.48	0.24	0.26	0.77	0.60	0.25	0.24	0.67	0.43
Avail Cap(c_a), veh/h	934	1854		518	1086	529	393	1186	524	330	1121	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98
Uniform Delay (d), s/veh	31.5	13.5	0.0	48.4	27.6	27.8	49.4	41.7	39.0	48.7	44.5	42.9
Incr Delay (d2), s/veh	0.1	0.2	0.0	1.3	0.5	1.2	6.3	0.9	0.5	0.5	1.5	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.6	0.0	1.8	2.6	2.8	3.2	4.8	1.6	0.7	4.5	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.7	13.7	0.0	49.7	28.2	28.9	55.7	42.6	39.5	49.2	46.0	44.2
LnGrp LOS	C	B		D	C	C	E	D	D	D	D	D
Approach Vol, veh/h		483	A		532			667			497	
Approach Delay, s/veh		22.4			33.8			46.6			46.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	24.8	12.4	62.0	14.4	21.2	34.3	40.0
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	5.3	* 5.3	4.6	* 4.9
Max Green Setting (Gmax), s	10.5	36.7	16.5	29.4	12.5	* 35	10.5	* 35
Max Q Clear Time (g_c+I1), s	3.7	12.7	6.1	6.0	8.9	12.1	7.8	8.7
Green Ext Time (p_c), s	0.1	2.7	0.3	1.6	0.2	2.5	0.2	2.5

Intersection Summary	
HCM 6th Ctrl Delay	38.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	229	23	10	366	63	34	10	12	58	7	65
Future Volume (veh/h)	54	229	23	10	366	63	34	10	12	58	7	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	64	269	20	12	431	43	40	12	9	68	8	49
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	1027	76	44	819	365	113	34	25	267	34	209
Arrive On Green	0.10	0.31	0.31	0.02	0.23	0.23	0.10	0.10	0.10	0.15	0.15	0.15
Sat Flow, veh/h	1781	3354	248	1781	3554	1585	1158	347	260	1781	227	1390
Grp Volume(v), veh/h	64	142	147	12	431	43	61	0	0	68	0	57
Grp Sat Flow(s),veh/h/ln	1781	1777	1825	1781	1777	1585	1766	0	0	1781	0	1618
Q Serve(g_s), s	1.4	2.5	2.5	0.3	4.4	0.9	1.3	0.0	0.0	1.4	0.0	1.3
Cycle Q Clear(g_c), s	1.4	2.5	2.5	0.3	4.4	0.9	1.3	0.0	0.0	1.4	0.0	1.3
Prop In Lane	1.00		0.14	1.00		1.00	0.66		0.15	1.00		0.86
Lane Grp Cap(c), veh/h	179	544	559	44	819	365	172	0	0	267	0	243
V/C Ratio(X)	0.36	0.26	0.26	0.27	0.53	0.12	0.35	0.00	0.00	0.25	0.00	0.23
Avail Cap(c_a), veh/h	408	1262	1297	386	2482	1107	1148	0	0	1158	0	1052
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	10.9	10.9	19.9	14.0	12.6	17.5	0.0	0.0	15.6	0.0	15.5
Incr Delay (d2), s/veh	1.2	0.3	0.2	3.2	0.5	0.1	1.2	0.0	0.0	0.5	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.9	0.9	0.1	1.6	0.3	0.5	0.0	0.0	0.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	11.1	11.1	23.1	14.5	12.8	18.8	0.0	0.0	16.1	0.0	16.0
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		353			486			61			125	
Approach Delay, s/veh		12.5			14.6			18.8			16.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	17.7		10.7	7.7	14.6		8.5
Change Period (Y+Rc), s	3.5	5.0		4.5	3.5	5.0		4.5
Max Green Setting (Gmax), s	9.0	29.5		27.0	9.5	29.0		27.0
Max Q Clear Time (g_c+I1), s	2.3	4.5		3.4	3.4	6.4		3.3
Green Ext Time (p_c), s	0.0	1.8		0.5	0.1	3.2		0.3

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave

11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	29	93	8	43	95	151	346	3	61	335	214
Future Volume (veh/h)	178	29	93	8	43	95	151	346	3	61	335	214
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	209	34	0	9	51	40	178	407	4	72	394	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	302	317		18	100	100	226	659	558	94	520	
Arrive On Green	0.17	0.17	0.00	0.06	0.06	0.06	0.13	0.35	0.35	0.05	0.28	0.00
Sat Flow, veh/h	1781	1870	1585	278	1578	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	209	34	0	60	0	40	178	407	4	72	394	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1856	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	5.0	0.7	0.0	1.4	0.0	1.1	4.4	8.2	0.1	1.8	8.8	0.0
Cycle Q Clear(g_c), s	5.0	0.7	0.0	1.4	0.0	1.1	4.4	8.2	0.1	1.8	8.8	0.0
Prop In Lane	1.00		1.00	0.15		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	317		117	0	100	226	659	558	94	520	
V/C Ratio(X)	0.69	0.11		0.51	0.00	0.40	0.79	0.62	0.01	0.77	0.76	
Avail Cap(c_a), veh/h	1252	1315		163	0	139	293	1097	930	243	1027	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.8	16.0	0.0	20.6	0.0	20.5	19.3	12.2	9.6	21.3	15.0	0.0
Incr Delay (d2), s/veh	2.8	0.1	0.0	3.4	0.0	2.6	10.2	0.9	0.0	12.4	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.3	0.0	0.7	0.0	0.4	2.2	2.7	0.0	1.0	3.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	16.1	0.0	24.1	0.0	23.1	29.4	13.2	9.6	33.7	17.3	0.0
LnGrp LOS	C	B		C	A	C	C	B	A	C	B	
Approach Vol, veh/h		243	A		100			589			466	A
Approach Delay, s/veh		20.0			23.7			18.1			19.9	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	21.0		12.2	9.3	17.6		6.4
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5
Max Green Setting (Gmax), s	6.2	* 27		32.0	7.5	25.0		4.0
Max Q Clear Time (g_c+I1), s	3.8	10.2		7.0	6.4	10.8		3.4
Green Ext Time (p_c), s	0.0	2.1		0.7	0.0	1.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Churn Creek Rd & Mistletoe Ln

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	128	82	102	116	66	86	677	150	59	583	119
Future Volume (veh/h)	74	128	82	102	116	66	86	677	150	59	583	119
Initial Q (Qb), veh	0	1	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	142	31	113	129	35	96	752	0	66	648	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	175	146	139	316	83	103	2282		100	2276	
Arrive On Green	0.06	0.09	0.09	0.08	0.11	0.11	0.06	0.64	0.00	0.06	0.64	0.00
Sat Flow, veh/h	1781	1870	1555	1781	2774	727	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	82	142	31	113	81	83	96	752	0	66	648	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1555	1781	1777	1724	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.9	9.7	2.4	8.1	5.5	5.8	7.0	12.4	0.0	4.7	10.4	0.0
Cycle Q Clear(g_c), s	5.9	9.7	2.4	8.1	5.5	5.8	7.0	12.4	0.0	4.7	10.4	0.0
Prop In Lane	1.00		1.00	1.00		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	103	175	146	139	202	196	103	2282		100	2276	
V/C Ratio(X)	0.79	0.81	0.21	0.81	0.40	0.42	0.93	0.33		0.66	0.28	
Avail Cap(c_a), veh/h	308	308	256	377	361	350	103	2288		158	2282	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.5	57.9	54.5	59.0	53.5	53.6	61.0	10.6	0.0	60.2	10.3	0.0
Incr Delay (d2), s/veh	5.0	3.4	0.3	10.2	0.5	0.5	67.0	0.4	0.0	5.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.9	0.9	4.0	2.5	2.5	5.1	4.9	0.0	2.3	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.5	62.5	54.8	69.2	53.9	54.1	128.0	11.0	0.0	65.7	10.6	0.0
LnGrp LOS	E	E	D	E	D	D	F	B		E	B	
Approach Vol, veh/h		255			277			848	A		714	A
Approach Delay, s/veh		62.5			60.2			24.2			15.7	
Approach LOS		E			E			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	89.0	13.7	16.6	11.0	88.8	11.0	19.2
Change Period (Y+Rc), s	3.5	5.3	3.5	4.6	3.5	5.3	3.5	4.6
Max Green Setting (Gmax), s	11.5	52.7	27.5	21.4	7.5	56.7	22.5	26.4
Max Q Clear Time (g_c+I1), s	6.7	14.4	10.1	11.7	9.0	12.4	7.9	7.8
Green Ext Time (p_c), s	0.0	8.9	0.2	0.3	0.0	7.2	0.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	30.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Victor Ave & Mistletoe Ln

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	1	48	4	1	4	56	658	1	3	686	250
Future Volume (veh/h)	233	1	48	4	1	4	56	658	1	3	686	250
Initial Q (Qb), veh	0	5	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	262	1	38	4	1	2	63	739	1	3	771	232
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	365	32	41	274	75	111	82	1930	3	6	1151	513
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.05	0.37	0.37	0.00	0.32	0.32
Sat Flow, veh/h	1253	5	182	887	322	483	1781	5266	7	1781	3554	1584
Grp Volume(v), veh/h	301	0	0	7	0	0	63	478	262	3	771	232
Grp Sat Flow(s),veh/h/ln	1439	0	0	1692	0	0	1781	1702	1869	1781	1777	1584
Q Serve(g_s), s	15.9	0.0	0.0	0.0	0.0	0.0	2.8	8.3	8.3	0.1	15.0	9.3
Cycle Q Clear(g_c), s	16.1	0.0	0.0	0.2	0.0	0.0	2.8	8.3	8.3	0.1	15.0	9.3
Prop In Lane	0.87		0.13	0.57		0.29	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	438	0	0	460	0	0	82	1248	685	6	1151	513
V/C Ratio(X)	0.69	0.00	0.00	0.02	0.00	0.00	0.77	0.38	0.38	0.52	0.67	0.45
Avail Cap(c_a), veh/h	532	0	0	582	0	0	390	1248	685	390	1151	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	0.0	23.1	0.0	0.0	37.7	18.7	18.7	39.8	23.4	21.4
Incr Delay (d2), s/veh	2.6	0.0	0.0	0.0	0.0	0.0	14.0	0.2	0.4	58.2	3.1	2.9
Initial Q Delay(d3),s/veh	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	0.0	0.1	0.0	0.0	1.5	3.0	3.3	0.1	6.2	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.9	0.0	0.0	23.1	0.0	0.0	51.7	18.9	19.0	98.0	26.5	24.3
LnGrp LOS	C	A	A	C	A	A	D	B	B	F	C	C
Approach Vol, veh/h		301			7			803			1006	
Approach Delay, s/veh		34.9			23.1			21.5			26.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	3.8	33.9	23.1	7.2	30.5	23.1
Change Period (Y+Rc), s	3.5	4.6	4.1	3.5	* 4.6	4.1
Max Green Setting (Gmax), s	7.5	25.4	24.9	17.5	* 26	24.9
Max Q Clear Time (g_c+I1), s	2.1	10.3	18.1	4.8	17.0	2.2
Green Ext Time (p_c), s	0.0	3.9	0.9	0.1	3.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	40	42	124	31	131	22	732	92	110	638	30
Future Volume (veh/h)	38	40	42	124	31	131	22	732	92	110	638	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	43	25	133	33	114	24	787	94	118	686	26
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	54	57	95	158	39	174	32	1994	238	142	2399	91
Arrive On Green	0.06	0.06	0.06	0.11	0.11	0.11	0.02	0.63	0.63	0.08	0.69	0.69
Sat Flow, veh/h	891	935	1560	1441	357	1581	1781	3187	381	1781	3488	132
Grp Volume(v), veh/h	84	0	25	166	0	114	24	439	442	118	349	363
Grp Sat Flow(s),veh/h/ln	1826	0	1560	1798	0	1581	1781	1777	1791	1781	1777	1843
Q Serve(g_s), s	5.9	0.0	2.0	11.9	0.0	9.1	1.8	16.1	16.1	8.6	10.0	10.0
Cycle Q Clear(g_c), s	5.9	0.0	2.0	11.9	0.0	9.1	1.8	16.1	16.1	8.6	10.0	10.0
Prop In Lane	0.49		1.00	0.80		1.00	1.00		0.21	1.00		0.07
Lane Grp Cap(c), veh/h	111	0	95	198	0	174	32	1111	1120	142	1222	1267
V/C Ratio(X)	0.76	0.00	0.26	0.84	0.00	0.66	0.76	0.39	0.39	0.83	0.29	0.29
Avail Cap(c_a), veh/h	293	0	250	288	0	253	88	1111	1120	279	1222	1267
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	0.0	58.7	57.2	0.0	55.9	64.1	12.2	12.2	59.4	8.0	8.0
Incr Delay (d2), s/veh	3.9	0.0	0.5	9.3	0.0	1.6	9.3	0.7	0.7	4.6	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.8	5.9	0.0	3.7	0.9	6.5	6.5	4.0	3.8	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	59.2	66.4	0.0	57.5	73.3	12.9	12.9	64.0	8.5	8.5
LnGrp LOS	E	A	E	E	A	E	E	B	B	E	A	A
Approach Vol, veh/h		109			280			905			830	
Approach Delay, s/veh		63.2			62.8			14.5			16.4	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.0	87.2		11.7	5.8	95.4		18.1				
Change Period (Y+Rc), s	3.5	5.3		3.7	3.5	5.3		3.7				
Max Green Setting (Gmax), s	30.5	52.7		21.0	6.5	66.7		21.0				
Max Q Clear Time (g_c+I1), s	10.6	18.1		7.9	3.8	12.0		13.9				
Green Ext Time (p_c), s	0.1	9.8		0.2	0.0	7.5		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	57	70	123	0	75	3	73	2	1	4	1	84
Future Vol, veh/h	57	70	123	0	75	3	73	2	1	4	1	84
Conflicting Peds, #/hr	4	0	2	0	0	0	2	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	82	145	0	88	4	86	2	1	5	1	99

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	96	0	0	229	0	0	435	387	157	384	457	98
Stage 1	-	-	-	-	-	-	291	291	-	94	94	-
Stage 2	-	-	-	-	-	-	144	96	-	290	363	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1498	-	-	1339	-	-	531	547	889	574	500	958
Stage 1	-	-	-	-	-	-	717	672	-	913	817	-
Stage 2	-	-	-	-	-	-	859	815	-	718	625	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1492	-	-	1336	-	-	453	515	887	546	471	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	453	515	-	546	471	-
Stage 1	-	-	-	-	-	-	678	636	-	862	814	-
Stage 2	-	-	-	-	-	-	766	812	-	677	591	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	14.8	9.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	457	1492	-	-	1336	-	-	910
HCM Lane V/C Ratio	0.196	0.045	-	-	-	-	-	0.115
HCM Control Delay (s)	14.8	7.5	0	-	0	-	-	9.5
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0	-	-	0.4

HCM 6th Signalized Intersection Summary
5: Churn Creek Rd & Cypress Ave

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	376	272	117	291	109	203	447	127	135	451	218
Future Volume (veh/h)	263	376	272	117	291	109	203	447	127	135	451	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	1	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	400	0	124	310	42	216	476	88	144	480	143
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	1852		255	2257	298	278	666	290	257	644	286
Arrive On Green	0.10	0.52	0.00	0.07	0.50	0.50	0.08	0.19	0.19	0.07	0.18	0.18
Sat Flow, veh/h	3456	3554	1585	3456	4562	603	3456	3554	1547	3456	3554	1580
Grp Volume(v), veh/h	280	400	0	124	229	123	216	476	88	144	480	143
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1702	1761	1728	1777	1547	1728	1777	1580
Q Serve(g_s), s	9.5	7.3	0.0	4.1	4.4	4.5	7.4	15.1	5.9	4.8	15.4	9.8
Cycle Q Clear(g_c), s	9.5	7.3	0.0	4.1	4.4	4.5	7.4	15.1	5.9	4.8	15.4	9.8
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	1852		255	1684	871	278	666	290	257	644	286
V/C Ratio(X)	0.81	0.22		0.49	0.14	0.14	0.78	0.71	0.30	0.56	0.74	0.50
Avail Cap(c_a), veh/h	504	1854		504	1687	873	418	1057	460	418	1057	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	52.9	15.5	0.0	53.4	16.4	16.5	54.1	45.7	42.0	53.6	46.6	44.2
Incr Delay (d2), s/veh	6.2	0.3	0.0	1.4	0.2	0.3	5.2	1.4	0.6	1.8	1.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
%ile BackOfQ(50%),veh/ln	4.4	3.0	0.0	1.8	1.7	1.9	3.4	6.8	2.3	2.1	6.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.1	15.8	0.0	54.8	16.6	16.8	59.3	47.2	42.6	55.5	48.3	45.5
LnGrp LOS	E	B		D	B	B	E	D	D	E	D	D
Approach Vol, veh/h		680	A		476			780			767	
Approach Delay, s/veh		33.6			26.6			50.0			49.1	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	27.7	12.4	67.5	13.2	27.0	15.5	64.4
Change Period (Y+Rc), s	3.5	5.3	3.5	* 4.9	3.5	5.3	3.5	4.9
Max Green Setting (Gmax), s	14.5	35.7	17.5	* 35	14.5	35.7	17.5	35.1
Max Q Clear Time (g_c+I1), s	6.8	17.1	6.1	9.3	9.4	17.4	11.5	6.5
Green Ext Time (p_c), s	0.2	3.3	0.2	2.7	0.3	3.4	0.5	2.2

Intersection Summary	
HCM 6th Ctrl Delay	41.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
6: Alfreda Way & Cypress Ave

11/22/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	464	33	12	359	71	23	3	17	120	14	43
Future Volume (veh/h)	46	464	33	12	359	71	23	3	17	120	14	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	499	22	13	386	56	25	3	9	129	15	23
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	150	988	44	48	810	350	79	9	28	318	117	180
Arrive On Green	0.08	0.29	0.29	0.03	0.23	0.23	0.07	0.07	0.07	0.18	0.18	0.18
Sat Flow, veh/h	1781	3467	153	1781	3554	1535	1169	140	421	1781	658	1009
Grp Volume(v), veh/h	49	255	266	13	386	56	37	0	0	129	0	38
Grp Sat Flow(s),veh/h/ln	1781	1777	1843	1781	1777	1535	1730	0	0	1781	0	1666
Q Serve(g_s), s	1.0	4.8	4.8	0.3	3.7	1.2	0.8	0.0	0.0	2.5	0.0	0.8
Cycle Q Clear(g_c), s	1.0	4.8	4.8	0.3	3.7	1.2	0.8	0.0	0.0	2.5	0.0	0.8
Prop In Lane	1.00		0.08	1.00		1.00	0.68		0.24	1.00		0.61
Lane Grp Cap(c), veh/h	150	507	525	48	810	350	117	0	0	318	0	297
V/C Ratio(X)	0.33	0.50	0.51	0.27	0.48	0.16	0.32	0.00	0.00	0.41	0.00	0.13
Avail Cap(c_a), veh/h	405	1302	1350	405	2603	1124	1180	0	0	1237	0	1157
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.1	11.8	11.8	18.9	13.2	12.2	17.6	0.0	0.0	14.4	0.0	13.7
Incr Delay (d2), s/veh	1.3	0.8	0.8	3.0	0.4	0.2	1.5	0.0	0.0	0.8	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.7	1.7	0.1	1.3	0.4	0.3	0.0	0.0	1.0	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	12.6	12.6	21.9	13.7	12.5	19.1	0.0	0.0	15.2	0.0	13.9
LnGrp LOS	B	B	B	C	B	B	B	A	A	B	A	B
Approach Vol, veh/h		570			455			37			167	
Approach Delay, s/veh		13.1			13.8			19.1			14.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	4.6	16.3	11.6	6.8	14.0	7.2
Change Period (Y+Rc), s	3.5	5.0	4.5	3.5	5.0	4.5
Max Green Setting (Gmax), s	9.0	29.0	27.5	9.0	29.0	27.0
Max Q Clear Time (g_c+I1), s	2.3	6.8	4.5	3.0	5.7	2.8
Green Ext Time (p_c), s	0.0	3.3	0.5	0.0	2.9	0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.8
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
7: Victor Ave & Cypress Ave 11/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	309	46	209	7	23	45	150	345	7	52	383	217
Future Volume (veh/h)	309	46	209	7	23	45	150	345	7	52	383	217
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	3	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	340	51	0	8	25	9	165	379	8	57	421	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	435	457		16	49	54	209	681	577	77	543	
Arrive On Green	0.24	0.24	0.00	0.03	0.03	0.03	0.12	0.36	0.36	0.04	0.29	0.00
Sat Flow, veh/h	1781	1870	1585	448	1400	1561	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	340	51	0	33	0	9	165	379	8	57	421	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1848	0	1561	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	9.3	1.1	0.0	0.9	0.0	0.3	4.7	8.5	0.2	1.6	10.8	0.0
Cycle Q Clear(g_c), s	9.3	1.1	0.0	0.9	0.0	0.3	4.7	8.5	0.2	1.6	10.8	0.0
Prop In Lane	1.00		1.00	0.24		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	435	457		64	0	54	209	681	577	77	543	
V/C Ratio(X)	0.78	0.11		0.51	0.00	0.17	0.79	0.56	0.01	0.74	0.78	
Avail Cap(c_a), veh/h	1094	1148		142	0	120	256	1005	852	167	897	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.6	15.5	0.0	25.0	0.0	24.7	22.7	13.3	10.7	25.0	17.3	0.0
Incr Delay (d2), s/veh	3.1	0.1	0.0	6.2	0.0	1.4	12.7	0.7	0.0	13.2	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.4	0.0	0.5	0.0	0.1	2.5	3.0	0.0	0.9	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	15.6	0.0	31.2	0.0	26.1	35.4	14.1	10.7	38.2	20.7	0.0
LnGrp LOS	C	B		C	A	C	D	B	B	D	C	
Approach Vol, veh/h		391	A		42			552			478	A
Approach Delay, s/veh		20.9			30.1			20.4			22.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	23.8		17.3	9.6	19.9		5.3				
Change Period (Y+Rc), s	3.5	* 5		4.5	3.5	5.0		3.5				
Max Green Setting (Gmax), s	4.9	* 28		32.0	7.5	25.0		4.0				
Max Q Clear Time (g_c+I1), s	3.6	10.5		11.3	6.7	12.8		2.9				
Green Ext Time (p_c), s	0.0	2.0		1.2	0.0	1.9		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
PLANNED DEVELOPMENT PLAN APPLICATION PD-2025-00230

MITIGATION MONITORING PROGRAM CONTENTS

This document is the Mitigation Monitoring Program (MMP) for the California Heritage YouthBuild Academy (CHYBA). The MMP includes a brief discussion of the legal basis for and purpose of the program, discussion and direction regarding complaints about noncompliance, a key to understanding the monitoring matrix, and the monitoring matrix itself.

LEGAL BASIS OF AND PURPOSE FOR THE MITIGATION MONITORING PROGRAM

California Public Resources Code Section 21081.6 requires public agencies to adopt mitigation monitoring or reporting programs whenever certifying an Environmental Impact Report (EIR) or a Mitigated Negative Declaration. This requirement facilitates implementation of all mitigation measures adopted through the California Environmental Quality Act (CEQA) process.

The MMP contained herein is intended to satisfy the requirements of CEQA as they relate to the Initial Study/Mitigated Negative Declaration prepared for CHYBA. It is intended to be used by City of Redding (City) staff, participating agencies, project contractors, and mitigation monitoring personnel during implementation of the Project.

Mitigation is defined by CEQA Guidelines Section 15370 as a measure that does any of the following:

- Avoids impacts altogether by not taking a certain action or parts of an action.
- Minimizes impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifies impacts by repairing, rehabilitating or restoring the impacted environment.
- Reduces or eliminates impacts over time by preservation and maintenance operations during the life of the project.
- Compensates for impacts by replacing or providing substitute resources or environments.

The intent of the MMP is to ensure the effective implementation and enforcement of adopted mitigation measures and permit conditions. The MMP will provide for monitoring of construction activities as necessary, on-site identification and resolution of environmental problems, and proper reporting to City staff

MITIGATION MONITORING TABLE

The Mitigation Monitoring Table identifies the mitigation measures proposed for CHYBA. These mitigation measures are reproduced from the Initial Study and conditions of approval for the Project. The tables have the following columns:

Mitigation Measure: Lists the mitigation measures identified within the Initial Study for a specific impact, along with the number for each measure as enumerated in the Initial Study.

Timing: Identifies at what point in time, review process, or phase the mitigation measure will be completed.

Agency/Department Consultation: References the City department or any other public agency with which coordination is required to satisfy the identified mitigation measure.

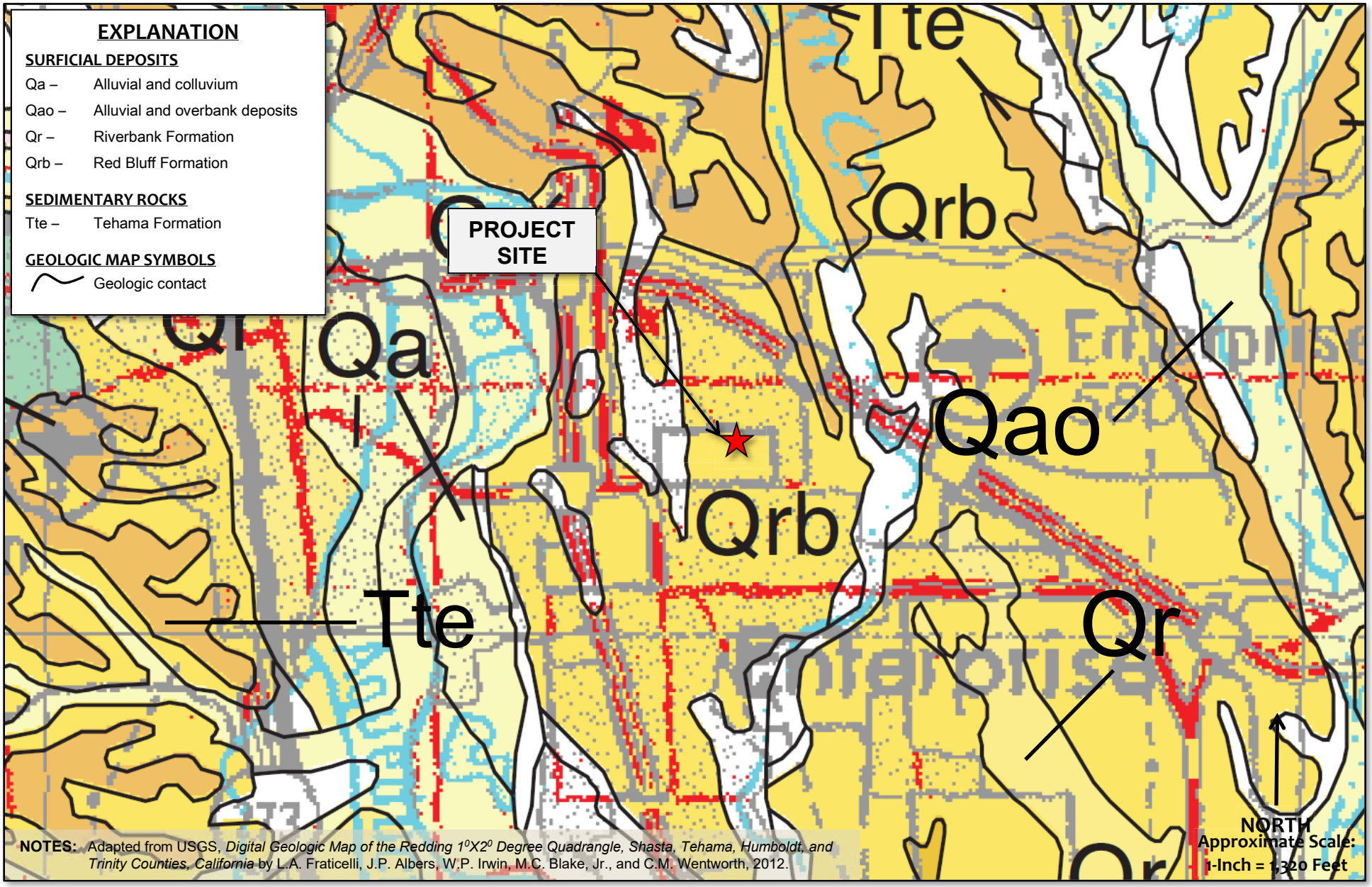
Verification: Spaces to be initialed and dated by the individual designated to verify adherence to a specific mitigation measure.

NONCOMPLIANCE COMPLAINTS

Any person or agency may file a complaint asserting noncompliance with the mitigation measures associated with the project. The complaint shall be directed to the City in written form, providing specific information on the asserted violation. The City shall conduct an investigation and determine the validity of the complaint. If noncompliance with a mitigation measure has occurred, the City shall take appropriate action to remedy any violation. The complainant shall receive written confirmation indicating the results of the investigation or the final action corresponding to the particular noncompliance issue.

MITIGATION MONITORING TABLE
FOR THE CHYBA MITIGATION MONITORING PROGRAM

Mitigation Measure	Timing/ Implementation	Enforcement/ Monitoring	Verification (Date and Initials)
Biological Resources			
Bio-1: Migratory Birds/Raptors: If feasible, vegetation removal and/or construction shall be conducted between September 1 and January 31. If vegetation removal and/or construction activities are to occur during the nesting season (February 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active nest is found, a non-disturbance buffer shall be established by a qualified biologist in coordination with CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If construction activities cease for a period greater than seven (7) days, additional preconstruction surveys will be required.	At time of development	Public Works, Planning	
Bio-2: Bats: If vegetation removal and/or construction activities are to occur during the roosting season (March 1 through August 31), a qualified biologist shall conduct a preconstruction survey no more than seven (7) days before vegetation removal or construction activities begin. If an active roost is found, a non-disturbance buffer shall be established for a distance of five hundred feet (500') around the nest unless a smaller buffer zone is approved by CDFW. Construction may resume once the young have left the nest or as approved by the qualified biologist. The survey shall be provided to the CDFW. If a lapse in construction activities of fourteen (14) days or more occurs during the roosting season, an additional roost survey is required to ensure no roosts were established in the area while construction was on hold. Minimum qualifications for a Qualified Biologist include a bachelor's degree in biological or environmental science, natural resources management, or related discipline; field experience in the habitat types that may occur at the project site; familiarity with the Covered Species (or closely related species) that may occur at the Project site; and prior preconstruction survey, construction monitoring, or construction oversight experience (if and as relevant to the activity to be conducted).	At time of development	Public Works, Planning	



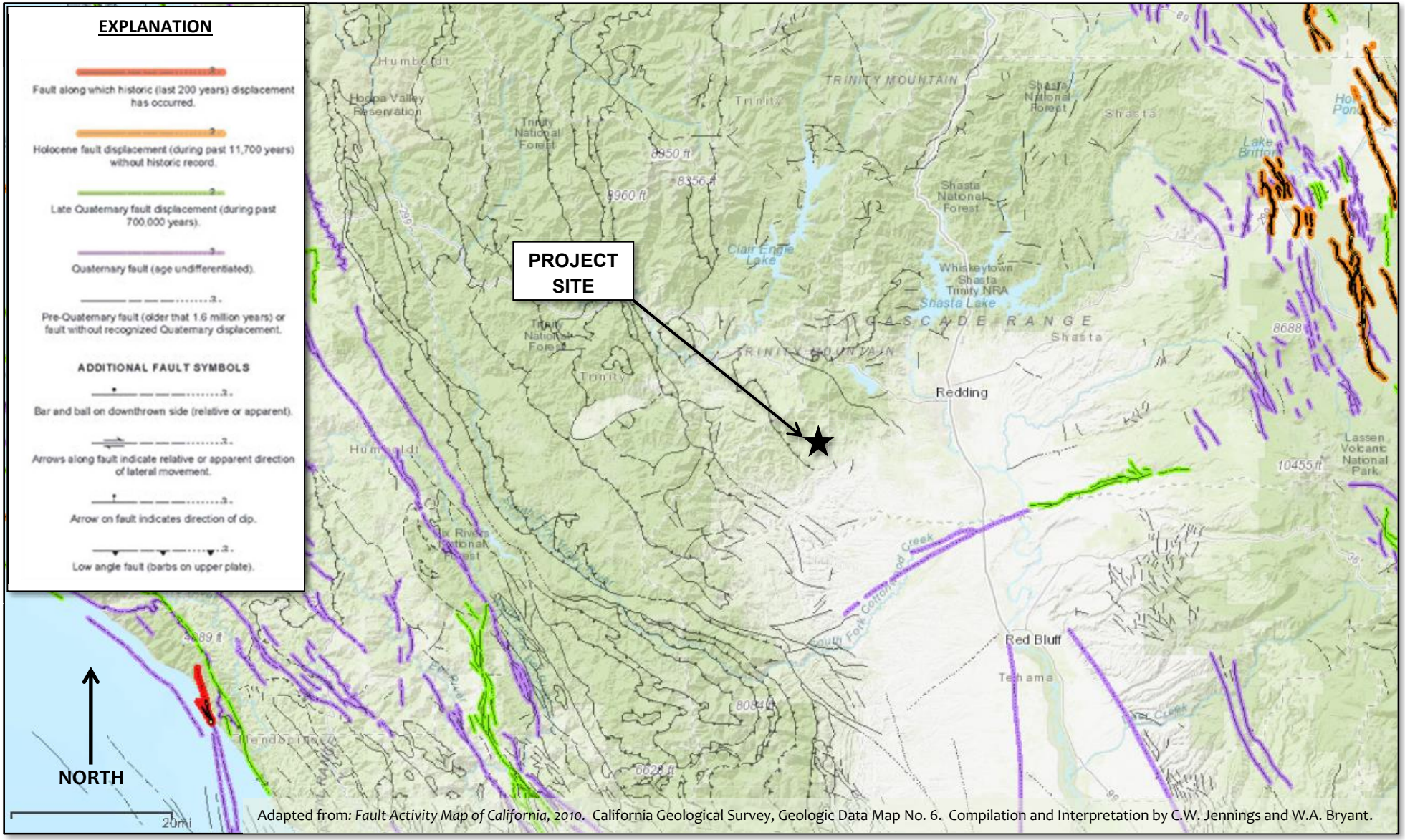
NOTES: Adapted from USGS, *Digital Geologic Map of the Redding 1^0X2^0 Degree Quadrangle, Shasta, Tehama, Humboldt, and Trinity Counties, California* by L.A. Fraticelli, J.P. Albers, W.P. Irwin, M.C. Blake, Jr., and C.M. Wentworth, 2012.

MPE
MID PACIFIC ENGINEERING, INC.

REGIONAL GEOLOGIC MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY
1400 Industrial Street
Redding, California

FIGURE 2
Date: 09/24
MPE No. 07207-01



Adapted from: *Fault Activity Map of California, 2010.* California Geological Survey, Geologic Data Map No. 6. Compilation and Interpretation by C.W. Jennings and W.A. Bryant.

MPE
MID PACIFIC ENGINEERING, INC.

REGIONAL FAULT MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

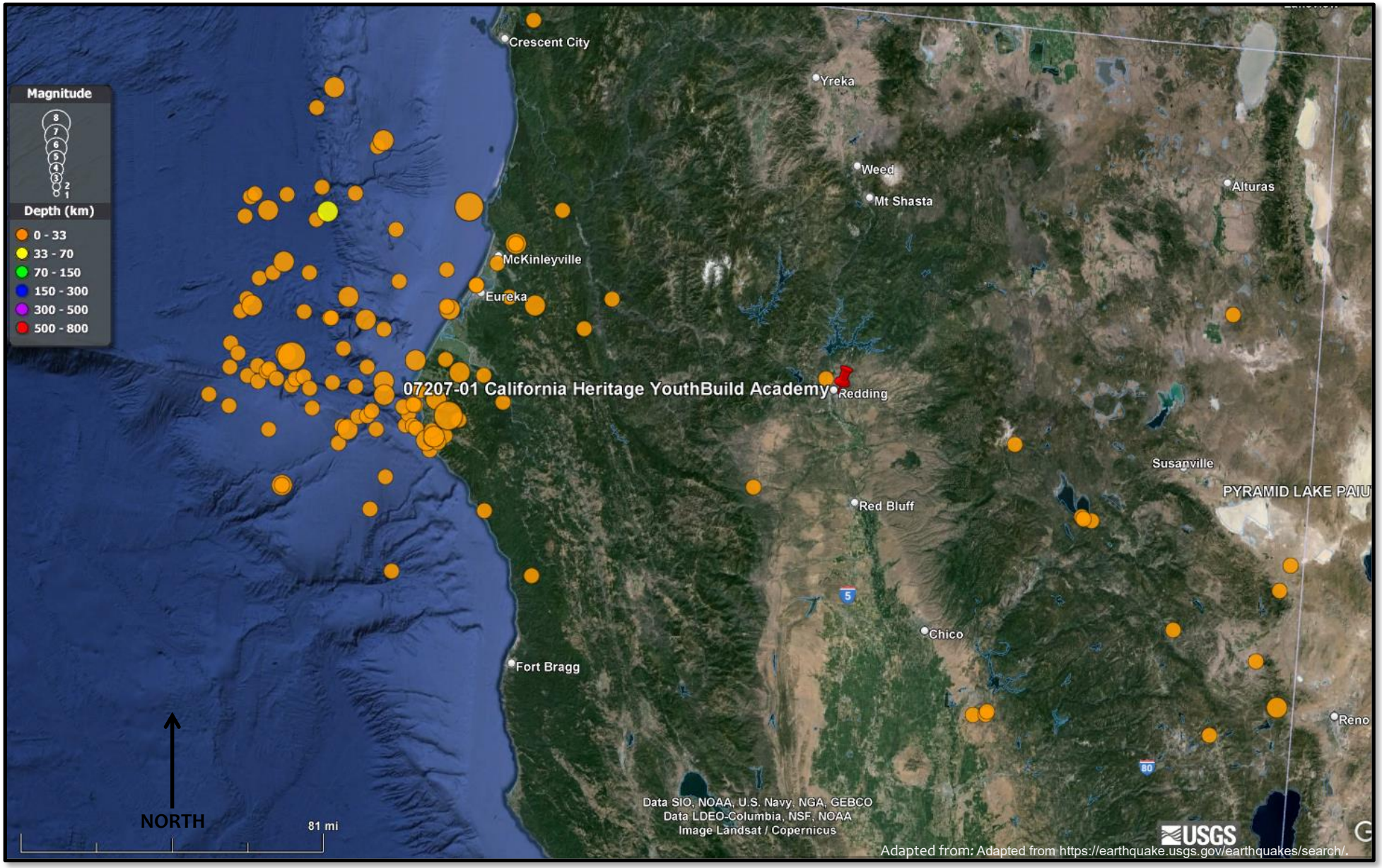
1400 Industrial Street

Redding, California

FIGURE 3

Date: 09/24

MPE No. 07207-01



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EARTHQUAKE EPICENTER MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

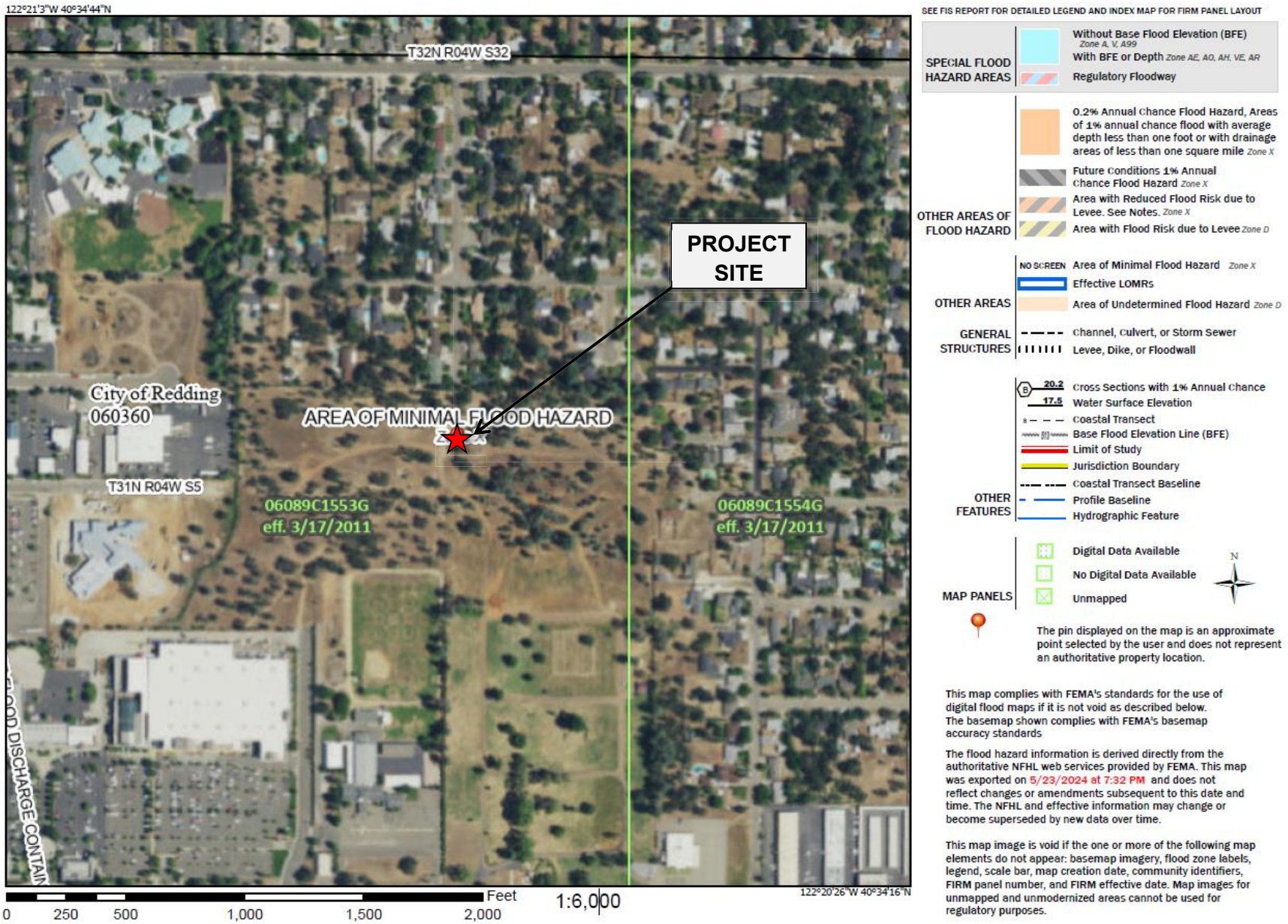
1400 Industrial Street

Redding, California

FIGURE 4

Date: 09/24

MPE No. 07207-01



NOTES: Adapted from *Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM), Map Numbers 06089C1553G/06089C1554G*, Effective Date 03/17/2011.

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FEMA FLOOD MAP

CALIFORNIA HERITAGE YOUTHBUILD ACADEMY

1400 Industrial Street

Redding, California

FIGURE 5

Date: 09/24

MPE No. 07207-01