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. Tentative Subdivision Map Application S-2023-00027 and Amendment Application AMND-2024-00226 to Planned Development Plan PD-2019-00309
State Clearinghouse No. ____________

SUBJECT

Tentative Subdivision Map Application S-2023-00027 and Amendment Application AMND-2024-00226 to Planned Development Plan PD-2019-00309, by Sierra Pacific Land and Timber.

PROJECT DESCRIPTION

Tentative Subdivision Map Application S-2023-00027, Silverstone Unit 5, and Planned Development Application Amendment AMND-2024-00226 to Planned Development Plan PD-2019-00309, is a request to subdivide 5.41 acres of land into 41 single-family residences on property located at 2923 Rancho Road. The project involves an amendment to the existing Planned Development Plan to allow development of the property with 24 motor court lots: six houses will take access from each of the four proposed motor courts, and 17 lots have direct access to the street. The project is an extension to the previously approved and recorded Silverstone Subdivision, Units 1 through 4, currently under construction.

ENVIRONMENTAL SETTING

The 5.41 acre parcel is located in the City of Redding, Shasta County, California, Latitude 40.53426, Longitude -122.31623, within the United States Geological Survey (USGS) 7.5' "Enterprise, CA" quadrangle, within Section 21, Township 31N, Range 4W. The project site is located within the northernmost extent of the Central Valley in Redding, California. The site is currently composed primarily of previously disturbed vacant property consisting of sparsely vegetated areas of annual grassland. However, the site was historically dominated by oak woodland and annual grasses. The property was previously graded during the development of Silverstone Subdivision Units 1-4 (previously Stonecreek Subdivision) and fairly flat. The approved subdivision (Silverstone Subdivision Units 1-4) is currently under construction directly south of the subject property. The project site is located south of Rancho Road at the southeast corner of Rancho Road and Shasta View Drive. Primary access to the subject parcel is taken from Rancho Road at the northeasterly corner of the property. Secondary access is provided to the subject property through Silverstone Subdivision Units 1-4. Alternate access to the Silverstone Subdivision Units 1-4 is located on the westerly side of the subject property off of Shasta View Drive.

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 in 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 to Noise.

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

Mitigation: NOISE-1: A minimum 6-foot-high masonry sound wall shall be constructed at the boundaries of both Rancho Road and Shasta View Drive right-of-ways adjacent to all residential lots. The walls shall be constructed of decorative masonry materials that have a density of four pounds per square foot and designed to reduce noise levels to 60 dB Ldn/CNEL or less. The wall design shall incorporate materials providing two distinct surface reliefs, columns/pilasters articulated a minimum of two inches from the face of the wall, and a cap feature. The wall aesthetic design shall be approved by the Development Services Director.

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
- AT&T
- Caltrans, District 2
- Charter Communications
- Shasta County Air Quality District
- Shasta County Planning Department
- Shasta County Office of Education
- Shasta Mosquito Abatement District
- U.S. Post Office, Main, AIS Office
- Western Shasta Resource Conservation District
- Pacheco Elementary School District
- Anderson Union High School District
- All property owners within 300 feet of the property boundary

PUBLIC REVIEW

(X) Draft document referred for comments ___March 8, 2024___.

( ) 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).

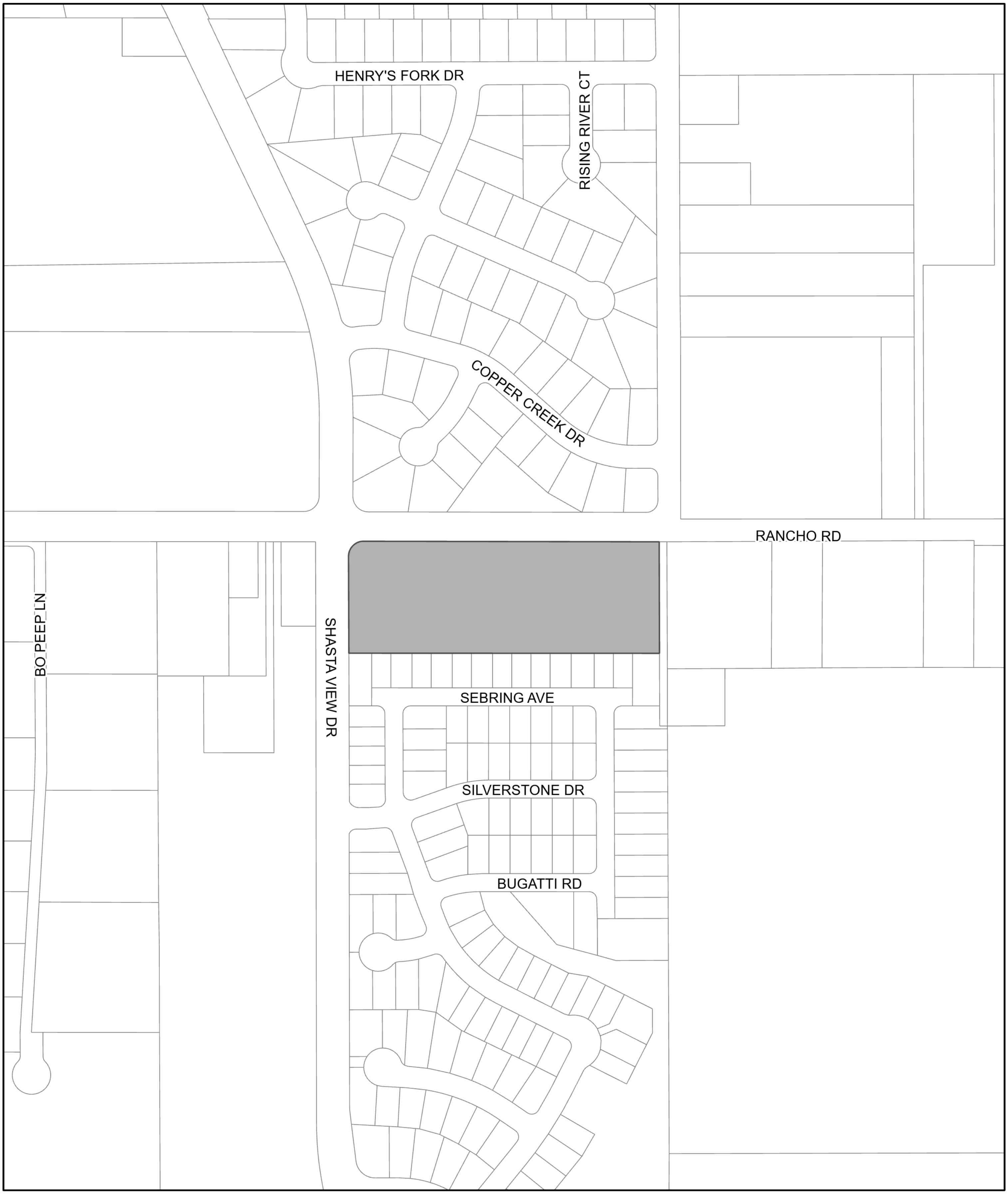
Copies of the Mitigated Negative Declaration, the Initial Study, documentation materials, and the Mitigation Monitoring Program may be obtained at the Planning Division of the Development Services Department, City of Redding, 777 Cypress Avenue, Redding, CA 96001 and online on the Planning/Projects page of the Development Services website at: www.cityofredding.gov. Contact: Tiffany Lightle at (530) 245-7112.

Jeremy Pagan
Director of Development Services

March 8, 2024
Date

____
Date of Final Report

Attachments:
A. Location map
B. Initial Study
C. Mitigation Monitoring Program
D. Comments and Response to Comments (if any)



N W E S	**GIS DIVISION** INFORMATION TECHNOLOGY DEPARTMENT	**LOCATION MAP**	MTG. DATE:
	DATE PRODUCED: JANUARY 20, 2023	S-2023-00027 SIERRA PACIFIC LAND TIMBER 2923 RANCHO ROAD AP# 054-910-080	ITEM:
	0 200 400 Feet		ATTACHMENT:

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ENVIRONMENTAL INITIAL STUDY

INITIAL STUDY CHECKLIST
References and Documentation
Silverstone Subdivision, Unit 5
Tentative Subdivision Map Application S-2023-00027 and
Amendment Application AMND-2024-00226
to Planned Development PD-2019-00309

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

March 8, 2024

CITY OF REDDING
ENVIRONMENTAL CHECKLIST FORM

1. **Project Title:**
Silverstone Subdivision, Unit 5 consisting of Tentative Subdivision Map Application S-2023-00027.

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:**
Tiffany Lightle, Associate Planner, (530) 245-7112

4. **Project Location:**
2923 Rancho Road, Redding, CA 96002 APN# 054-910-080

5. **Applicant's Name and Address:**
Sierra Pacific Land and Timber
ATTN: Gary Blanc
PO Box 496014
Redding, CA 96049-6014

Representative's Name and Address:
Sharrah Dunlap Sawyer
320 Hartnell Ave.
Redding, CA 96002

6. **General Plan Designation:** "Residential, 2 to 3.5 dwelling units per acre"

7. **Zoning:** "RS-3-PD" Residential Single Family with Planned Development Overlay District

8. **Description of Project:** The tentative subdivision map for Silverstone Subdivision, Unit 5, is a request to subdivide approximately 5.41 acres into 41 single-family residential lots. The application includes Amendment Application AMND-2024-00226, an amendment to the existing Planned Development Plan PD-2019-00309 approved as part of the Silverstone Subdivision, Units 1 through 4 (previously approved as Stonecreek Subdivision) to include this new unit. The Planned Development Plan will facilitate development of the property with 24 motor court lots: six houses will take access from each of the four proposed motor courts, and 17 lots have direct access to the street. Lot sizes range from approximately 3,200-square-feet to 4,557 square-feet in size. The project includes a connection to Rancho Road to the north utilizing an existing adjacent access easement and an additional road connection to Sebring Avenue to the south. The adjacent easement will be paved and accommodate pedestrian access up to the wellhouse adjacent to the project site. The project is an extension to the previously approved and recorded Silverstone Subdivision, Units 1 through 4, currently under construction.

9. **Surrounding Land Uses and Setting:** The 5.41-acre property consists of one parcel located at the southeast corner of Rancho Road and Shasta View Drive. Surrounding land uses consists of single-family residential uses and vacant land. The site is bounded on all sides by single-family residential, both vacant and developed; however, vacant land located at the northwest corner of Rancho Road and Shasta View Drive is zoned "SC" Shopping Center District. The property was previously graded during the development of the preceding units of the Silverstone Subdivision and is fairly level, with elevations ranging from 508 to 512 feet above mean sea level (msl). The site is sparsely vegetated with small areas of annual grassland present around the borders of the graded area. Barren sections of the parcel consist of graded areas.

10. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):** None required.

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.?

Tribal consultation was sent on April 24, 2023. No requests for consultation or comments have been received.

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
	Biological Resources		Cultural Resources		Energy
	Geology / Soils		Greenhouse Gas Emissions		Hazards & Hazardous Materials
	Hydrology / Water Quality		Land Use / Planning		Mineral Resources
X	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 Tiffany Lightle, Associate Planner at (530) 245-7112.

Tiffany Lightle
Development Services Department

March 8, 2024
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*, 2000
- *City of Redding General Plan Final Environmental Impact Report*, 2000, SCH #1998072103

List of attachments/references:

Attachment A – Figure 1 – Location Map
Figure 2 – Tentative Subdivision Map (three pages)
Figure 3 – Planned Development Book for Silverstone Subdivision, Unit 5
Attachment B – *Biological Resource Assessment, by Gallaway Enterprises, dated October 2018* (on file in the Development Services Department, Planning Division)
Attachment C – Draft Delineation of Jurisdictional Waters of the United States, by Gallaway Enterprises, dated October 2018 (on file in the Development Services Department, Planning Division)
Attachment D – Biological Resources Memorandum, by Gallaway Enterprises, dated October 12, 2023
Attachment E – Cultural Resource Inventory Survey, by Gallaway Enterprises, dated September 11, 2022

Attachment F – Letters sent to Redding Rancheria and Wintu Tribe of Northern California, April 24, 2023
Attachment G – Entitlement Storm Drainage Analysis, Sharrah Dunlap Sawyer, Inc., December 29, 2022
Attachment H – Central Valley Water Quality Control Board Response to Comments, February 8, 2023
Attachment I – Transportation Impact Study, W-Trans, October 4, 2023

SUMMARY OF MITIGATION MEASURES:

MIT 1- A minimum 6-foot-high masonry sound wall shall be constructed at the boundaries of both Rancho Road and Shasta View Drive right-of-ways adjacent to all residential lots. The walls shall be constructed of decorative masonry materials that have a density of four (4) pounds per square foot and designed to reduce noise levels to 60 dB Ldn/CNEL or less. The wall design shall incorporate materials providing two distinct surface reliefs, columns/pilasters articulated a minimum of 2 inches from the face of the wall, and a cap feature. The wall aesthetic design shall be approved by the Development Services Director.

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 publically 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) The houses within the project must comply with the height standards of the City's Zoning Ordinance. Project construction would not obstruct any documented scenic vistas. 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.

c) The project will be compatible with the existing visual character of the property and its surroundings.

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, Natural Resources Element, 2000.
City of Redding Zoning Ordinance, Chapter 18.40.090.

Mitigation:
None necessary.

II. <u>AGRICULTURE RESOURCES</u>: *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) The project site does not contain designated farmland, forest land, or timberlands. The project site has not been historically used for agricultural purposes, nor does it possess soils that are prime for agricultural production. The site is not located within an area 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, Natural Resources Element, 2000.
City of Redding General Plan Background Report, Chapter 9.4: Agricultural Lands.
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.

Mitigation:
None necessary.

III. <u>AIR QUALITY</u>: *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**	

III. <u>AIR QUALITY</u>: *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**
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-c) 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 Environmental Impact Report for the *General Plan* acknowledged this dilemma; and as a result, Findings and a Statement of Overriding Considerations were adopted by the City Council for impacts to air quality resulting from growth supported under the *General Plan*.

The City Air Quality Element of the *General Plan* establishes emission-reduction goals of 20 to 25 percent, depending on the projected level of unmitigated emissions for a project. Mitigation thresholds are established 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}). The mitigation thresholds for these pollutants are tiered at two levels 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}

If a project has unmitigated emissions less than the Level "A" threshold, then it is viewed as a minor project (from an air quality perspective) and only application of Standard Mitigation Measures (SMMs) is required to try to achieve at least a 20 percent reduction in emissions, or the best reduction feasible otherwise. Land uses that generate unmitigated emissions above Level "A" require application of appropriate Best Available Mitigation Measures (BAMMs), in addition to the SMMs, in order to achieve a net emission reduction of 20 percent or more. If, after applying SMMs and BAMMs, a use still exceeds the Level "B" threshold, then a minimum of 25 percent of the unmitigated emissions exceeding 137 pounds per day must be offset by reducing emissions from existing sources of pollution; otherwise, an Environmental Impact Report is required.

Under policy of the Air Quality Element, a 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}) emissions are possible during construction activities. As a residential development, a project does not have the potential to generate significant emission concentrations of other pollutants subject to state and federal ambient air quality standards.

Application of Standard Mitigation Measures (SMMs) is required in order to strive toward the *General Plan* policy of a 20 percent reduction in emissions to address small-scale cumulative effects. SMMs applicable to this project address primarily short-term impacts related to construction and are standard development regulations promulgated in the City Grading Ordinance and California Building Code identified below. Application of the SMMs and the application of Best Available Mitigation Measures for NOx emissions as outlined below would reduce the project's potential air quality impacts to a level less than significant.

1. Nontoxic soil stabilizers shall be applied according to manufacturer's specification to all inactive construction areas (previously graded areas inactive for ten days or more).
2. All grading operations shall be suspended when winds (as instantaneous gusts) exceed 20 miles per hour.
3. Temporary traffic control shall be provided as appropriate during all phases of construction to improve traffic flow (e.g., flag person).

4. Construction activities that could affect traffic flow shall be scheduled in off-peak hours.
5. Active construction areas, haul roads, etc., shall be watered at least twice daily or more as needed to limit dust.
6. Exposed stockpiles of soil and other backfill material shall either be covered, watered, or have soil binders added to inhibit dust and wind erosion.
7. All trucks hauling solid and other loose material shall be covered or should maintain at least two feet 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. All public roadways used by the project contractor shall be maintained free from dust, dirt, and debris caused by construction activities. Streets shall be swept at the end of the day if visible soil materials are carried onto adjacent public paved roads. Wheel washers shall be used where vehicles enter and exit unpaved roads onto paved roads, or trucks and any equipment shall be washed off leaving the site with each trip.
9. Alternatives to open burning of cleared vegetative material on the project site shall be used unless otherwise deemed infeasible by the City Planning Division. Suitable alternatives include, but are not limited to, on-site chipping and mulching and/or hauling to a biomass fuel site.

d) Potential impacts to neighboring homes (sensitive receptors) from fugitive dust caused during construction are mitigated by application of the SMMs discussed above.

e) The project does not involve land use that could generate objectionable odors affecting a substantial number of people.

Documentation:
Shasta County APCD Air Quality Maintenance Plan and Implementing Measures.
City of Redding General Plan, Air Quality Element.
City of Redding General Plan Final Environmental Impact Report, 2000, SCH #1998072103, Chapter 8.6, Air Quality.
CEQA Findings of Fact and Statement of Overriding Considerations for the *City of Redding General Plan Final Environmental Impact Report*, as adopted by the Redding City Council on October 3, 2000, by Resolution 2000-166.
City of Redding General Plan Background Report, Chapter 9.7, Natural Resources and Air Quality.
California Air Resources Board. 2017. Area designations maps/state and national. http://www.arb.ca.gov/desig/adm/adm.html (accessed on December 28, 2023).

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**	

IV. **BIOLOGICAL RESOURCES**: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
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-d) The 5.41-acre property has been previously disturbed as part of the overall grading done for Silverstone Subdivision, Units 1-4. The site is characterized as mixed oak woodland scattered throughout the site and annual grassland throughout the rest of the property, with minimal barren habitat and developed residential uses surrounding the site. The site is generally flat with topography approximately 505 feet above mean sea level (msl). Both a wetland delineation and biological study were prepared as a part of previous studies for the Maryanne Faire Project, completed by Gallaway Enterprises in October 2018. The studies included a Habitat Assessment to determine if suitable habitat occurs for special status species, a Plant Survey for the purpose of determining presence of special status species and suitable habitat elements for those species, and an aquatic survey to determine the presence of potential jurisdictional waters of the U.S. Both studies were updated in 2022 with memorandums addressing current conditions.

The 2018 Biological Resource Assessment, conducted by Gallaway Enterprises, identified two sensitive plant species. Nesting birds and bat populations had the potential to occur. Mitigation measures were adopted and upheld during the approval of the previous Stonecreek Subdivision. The current Biological Resources Memorandum concludes that no wetlands, riparian habitat, or other sensitive natural communities, or sensitive species trees were observed on the project site. Therefore, there will be no impact to biological resources and the project would not conflict with Federal or State programs concerning biological resources, nor conflict with any local policies or ordinances.

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. The ordinance also recognizes that the preservation of trees will sometimes conflict with necessary land-development requirements. The City's General Plan Environmental Impact Report (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.

The project site was previously assessed in October 2018 as part of a phased northern section of the Stonecreek Subdivision. The entirety of the project site and the overall Stonecreek subdivision areas were conditioned to mitigate any potential impacts to include the avoidance of impacts to avian species such as migratory birds and raptors. Previous grading activities have occurred on-site as part of the development of the Stonecreek Subdivision which resulted in the removal of all trees on the current project site area. A small area of grassland land has remained at the time and no trees are currently present.

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:

California Department of Fish and Wildlife: Natural Diversity Data Base.
City of Redding General Plan, Natural Resources Element, 2000.
City of Redding Municipal Code, Chapter 18.45, Tree Management Ordinance.
City of Redding General Plan Environmental Impact Report, 2000, SCH #1998072103.
Biological Resource Assessment, by Gallaway Enterprises INC, dated October 2018.
Draft Delineation of Jurisdictional Waters of the United States, by Gallaway Enterprises INC., dated October 2018.

Biological Resource Memorandum, by Gallaway Enterprises INC., dated October 12, 2023.

Mitigation: None necessary.

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 outside of dedicated cemeteries?				**X**

Discussion

a-c) Based upon archaeological reports, records searches, and information contained in the Cultural Resource Inventory Survey conducted by Gallaway Enterprises pertinent to the vicinity of the subject property, it has been determined that the project site is not in an area of archaeological or cultural sensitivity. No impacts in this area are anticipated.

Documentation:
City of Redding General Plan Background Report, 1998.
City of Redding General Plan Final Environmental Impact Report, 2000, SCH #1998072103.
Cultural Resource Inventory Survey, by Gallaway Enterprises dated September 11, 2022.

Mitigation:
None necessary.

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 powering homes and other associated residential uses is expected to be less than significant due to the small scale of the project.

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

Documentation:
City of Redding General Plan, Air Quality Element, 2000.
California Long-Term Energy Efficiency Strategic Plan, 2011.
Regional Transportation Plan for Shasta County, 2015.

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, d) There are no Alquist-Priolo earthquake faults designated in the Redding area of Shasta County. 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 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 no potential for liquefaction. No portion of the site falls within the 100-year floodplain of the Sacramento River or any creek.

b) The project site contains one primary soil classification: Red Bluff Loam (RbA). This classification is characterized by 0 to 3 percent slopes throughout the site. Runoff is medium occurrence with a slight erosion potential. The site has been previously graded per City and State regulations. Proposed grading consists of only that necessary for construction of streets and utilities, including subsurface detention basins, and individual units and driveways.

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 Permi*t." 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.

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 Health and Safety Element, figures 4-1 (Ground Shaking Potential) and 4.2 (Liquefaction Potential).
City of Redding General Plan Final Environmental Impact Report.
City of Redding General Plan Background Report, 1998.
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.

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	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				X

Discussion:

a) In 2005, the Governor of California signed Executive Oder S-3-05, establishing that it is the State of California's goal to reduce statewide greenhouse gas (GHG) emission levels. Subsequently, in 2006, the California State Legislature adopted Assembly Bill AB 32, the California Global Warming Solutions Act. In part, AB 32 requires the California Air Resources Board to develop and adopt regulations to achieve a reduction in the State's GHG emissions to year 1990 levels by year 2020.

California Senate Bill SB 97 established that an individual project's effect on GHG emission levels and global warming must be assessed under CEQA. SB 97 further directed that the State Office of Planning and Research (OPR) develop guidelines for the assessment of a project's GHG emissions. Those guidelines for GHG emissions were subsequently included as amendments to the CEQA Guidelines. The guidelines did not establish thresholds of significance and there are currently no state, regional, county, or city guidelines or thresholds with which to direct project-level CEQA review. As a result, the City of Redding has utilized the best available information to develop a threshold until a specific quantitative threshold is adopted by the state or regional air district.

As the Lead Agency, the City has opted to utilize a quantitative non-zero project-specific threshold using a methodology recommended by the California Air Pollution Officers (CAPCOA) and accepted by the California Air Resources Board. According to CAPCOA's *Threshold 2.3, CARB Reporting Threshold,* 10,000 metric tons of carbon-dioxide equivalents per year (mtCO2eq/yr) is recommended as a quantitative non-zero threshold. According to the CAPCOA, this threshold would be equivalent to 550 dwelling units, 400,000 square feet of office use, 120,000 square feet of retail, or 70,000 square feet of supermarket use. This approach is estimated to capture over half the future residential and commercial development projects and is designed to support the goals of AB 32 and not hinder it.

The United States Environmental Protection Agency (EPA) identifies four primary constituents that are most representative of the GHG emissions. They are:

- **Carbon Dioxide (CO_2):** Emitted primarily through the burning of fossil fuels. Other sources include the burning of solid waste and wood and/or wood products and cement manufacturing.
- **Methane (CH_4):** Emissions occur during the production and transport of fuels, such as coal and natural gas. Additional emissions are generated by livestock and agricultural land uses, as well as the decomposition of solid waste.
- **Nitrous Oxide (N_2O):** The principal emitters include agricultural and industrial land uses and fossil fuel and waste combustion.
- **Fluorinated Gases:** These can be emitted during some industrial activities. Also, many of these gases are substitutes for ozone-depleting substances, such as CFCs, which have been used historically as refrigerants. Collectively, these gases are often referred to as "high global-warming potential" gases.

The primary generators of GHG emissions in the United States are electricity generation and transportation. The EPA estimates that nearly 85 percent of the nation's GHG emissions are comprised of carbon dioxide (CO_2). The majority of CO_2 is generated by petroleum consumption associated with transportation, and coal consumption associated with electricity generation. The remaining emissions are predominately the result of natural-gas consumption associated with a variety of uses.

With regard to the project, the predominant associated GHG is CO_2 generated by motor-vehicle travel to and from the site. To a substantially lesser degree, the project will result in CH_4 emissions associated with use of electric power generated by the Redding Electric Utility (REU), though it should be noted that REU distributes power from a variety of sources, including hydroelectric, wind, and natural gas.

Given the scope and nature of the proposed project compared to that of similar projects, emissions from the project would be significantly below the thresholds put forth by CARB, as well as the City's air-quality thresholds. Therefore, the project would not contribute significantly to GHG emissions in the air basin. Additionally, the City and State's construction standards and BMPs, including Air Quality SSM 1 through 9 (listed in Section III, Air Quality, above), will be used during construction to further limit any potential contribution to negative impacts from GHG emissions. The project's direct or indirect impact on measurable GHGs in the Redding area would be less than significant.

On a larger scale, the City of Redding's General Plan acknowledges that land use decisions have an impact on climate and air quality. Land use decisions that result in low or very low density on the periphery of the community increase the amount of vehicle-miles traveled (VMT), which increases vehicle emissions. In response to this impact, the City's *General Plan* includes a number of goals and policies in the Community Development and Design Element, Transportation Element, and Housing Element that promote a compact urban form and encourage infill development, advocate higher housing density, and ensure connectivity to citywide bikeways and pedestrian plans. The goal of these policies is to reduce VMT, which also reduces emissions and reduces a wide variety of air quality impacts. Since automobiles are considered a major source of GHG emission, each vehicle trip reduced also reduces GHG emissions.

b) The project would not conflict with any applicable plan, policies, or regulations adopted to reduce GHG emission. As noted, in "a" above, the project is in conformance with the City's air quality policies and thresholds, State guidelines and regulations, and Standard Mitigation Measures listed in Section III Air Quality, above. The proposed project would have no impact on any plans, policies, or regulations related to GHG emissions.

Documentation:
City of Redding General Plan, 2000.
CPCOA website, July 19, 2010.
California Office of the Attorney General, "The California Environmental Quality Act Addressing Global Warming Impacts at the Local Agency Level," updated January 6, 2010.

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 residential subdivision 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.

e) The project is located outside the established approach/departure clear zones for Redding Municipal Airport. The project's land use of low-density residential would not conflict with operations of the Airport or present a safety hazard to people residing in the subdivision.

f) The project does not involve a use or activity that could interfere with emergency-response or emergency-evacuation plans for the area.

g) The project site is not located within a Very High Fire Risk Area as designated by the State of California. The project area is primarily barren, flat terrain and is mostly surrounded with developed single-family residential homes with ease of access from the surrounding areas. Shasta View Drive, which borders the western boundary of the site, serves as a major arterial collector and provides a secondary access connection to hundreds of residents in the larger Silverstone and Shastina Ranch Subdivisions. Additionally, the project will gain access from Rancho Road, a major arterial, as its primary point of access. Impacts associated with wildland fire hazards would be considered less than significant, and no mitigation measures are necessary.

Documentation:
City of Redding General Plan, Health and Safety Element, 2000.

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**
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 not impact groundwater supplies.

c,e) Stormwater runoff from the site flows generally in an easterly direction gently sloping from the northwest corner of the site to the east toward Clover Creek, and would not be significantly altered with construction of the project. A series of on-site underground drainage management areas are proposed within the private motor court driveways and will eventually drain to Rancho Road and east in the same manner as existing storm water flows.

The project is subject to standard requirements defined under Section VII., *Geology and Soils*, and *Biological Resources*, above, 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.

City of Redding Policy 1806 requires that all subdivision development include stormwater detention facilities designed to maintain existing predevelopment rates of runoff during a 10-, 25-, and 100-year storm event with a 6-hour duration. The project application includes a storm drainage analysis prepared by Sharrah Dunlap Sawyer, Inc. dated December 29, 2022 that concludes that the proposed design is sufficient to maintain or reduce existing flows from the site in accordance with City Council Policy 1806, and City of Redding Engineering Division requirements for protection of floodplains and downstream drainage concerns. Development of the subdivision will not have significant impacts to storm drain runoff. The project would not conflict with a water quality control plan or groundwater management plan.

d) The project site is not located in a flood hazard, tsunami or seiche zone.

Documentation:
City of Redding General Plan Background Report, Chapter 10, Health and Safety Element, 1998.
Federal Emergency Management Agency Floodplain regulations, FIRM map 06089C1562G dated March 17, 2011.
City of Redding Storm Drain Master Plan, Montgomery-Watson Engineers 1993.
Entitlement Storm Drainage Analysis, Sharrah Dunlap Sawyer, Inc., December 29, 2022.

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 is a single-family development located in an area that is zoned for this use, and is surrounded by other similar or compatible uses. Therefore, the project does not have the potential to physically divide an established community.

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, Community Development and Design Element, 2000.
City of Redding General Plan Environmental Impact Report, 2000, SCH #1998072103.
City of Redding General Plan, Natural Resources Element, 2000.
Central Valley Water Quality Control Board Response to Comments, February 8, 2023

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, Natural Resources Element, 2000.

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) The project site is located adjacent to Rancho Road and Shasta View Drive and may be affected primarily by traffic noise along Rancho Road. Shasta View Drive has been reduced to a two-lane arterial through the existing portions of the Stonecreek Subdivision and the Shasta Ranch Subdivision access from Airport Road, therefore noise levels would not be considered significant in this location.

The City of Redding *General Plan* Noise Element establishes 60 dB Ldn as the standard acceptable exterior noise level for residential land use (in the outdoor activity area/backyard) and 45dB Ldn for interior noise levels (40dB in sleeping areas). Noise levels exceeding those standards from traffic noise along arterial streets is typically attenuated by construction of a standard 6-foot-high arterial block wall adjacent to proposed subdivisions.

Table 5-2 of the Noise Element presents projected noise contours from the major road segments in the City, including Rancho Road. This table indicates that the projected 60 dB noise contour extends a projected 76 feet from road centerline into the project site for those lots adjacent to Rancho Road. The General Plan requires that, where not possible to reduce outdoor activity areas to 60 dB Ldn/CNEL or less, using a practical application of the best-available noise-reduction measures (i.e. a 6-foot-high block wall), higher exterior noise levels may be allowed provided that practical exterior noise-level reduction measures have been implemented and that interior noise levels are in compliance with the General Plan Table 5-4. Therefore, as mitigation for potential noise impacts, an 8-foot-high block wall will be required along Rancho Road and along the lot adjoining Shasta View Drive. The wall will then transition to a 6-foot-high wall to connect to the existing wall along Units 1 through 4 of the subdivision These measures will ensure that residents are not exposed to noise levels that would be considered significant by the City of Redding standards.

During the construction of the proposed project, there will be a temporary increase in noise in the project 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.

b) Due to the nature of the project as a residential subdivision, the use 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.

c) The proposed subdivision site is not located within any of the noise contours of Redding Municipal Airport and is located approximately two miles away. There are no private airstrips in the vicinity of the project site.

Documentation:
City of Redding General Plan, Noise Element, 2000.
City of Redding Grading Ordinance Redding Municipal Code, Section 16.12.120.
City of Redding General Plan, Transportation Element, 2000.
City of Redding Zoning Ordinance Redding Municipal Code, Section 18.40.100.
City of Redding Municipal Airport Area Plan.

Mitigation:
NSE 1- A minimum 6-foot-high masonry sound wall shall be constructed at the boundaries of both Rancho Road and Shasta View Drive right-of-ways adjacent to all residential lots. The walls shall be constructed of decorative masonry materials that have a density of four (4) pounds per square foot and designed to reduce noise levels to 60 dB Ldn/CNEL or less. The wall design shall incorporate materials providing two distinct surface reliefs, columns/pilasters articulated a minimum of 2 inches from the face of the wall, and a cap feature. The wall aesthetic design shall be approved by the Development Services Director.

XIV. <u>POPULATION AND HOUSING</u>: *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 project would create opportunity for the construction of new homes as planned and anticipated by the Redding *General Plan*. As previously noted, the project is similar in character to that in the surrounding area. The project would not induce unplanned population growth and does not propose the extension of any new roads or utilities not anticipated by the *General Plan*. The project does not displace substantial numbers of people or housing. The project will be providing housing.

Documentation:
City of Redding General Plan, Housing Element, 2020

Mitigation:
None necessary.

XV. <u>PUBLIC SERVICES</u>: *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 Pacheco Elementary School Elementary School District and Anderson Union High School District and may contribute to the total student enrollment in these districts. However, a school-facility impact (in-lieu) fee exists, as provided under State law, that is paid prior to the issuance of a building permit for each residential unit to address school-facility funding necessitated by the effects of growth citywide.

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. The project is subject to Chapter 16.20 of the Redding Municipal Code, which requires new residential development to pay a citywide park and recreation-facilities impact fee calculated to mitigate a project's fair share of cumulative impacts to the City's parks and recreation infrastructure, based upon improvements necessary to accommodate new development under the City's General Plan. See discussion under Item XVI (Recreation) below.

Other public facilities:

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

Documentation:
City of Redding General Plan, Public Facilities Element, 2000.

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, b) 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.

Chapter 17.54 of the City's Subdivision Ordinance, *Park and Recreational Land Dedications* and *In-Lieu Fees*, requires that as a condition of approval of a tentative map, a subdivider shall either dedicate land or pay a fee in lieu thereof, or both, for park or recreation purposes. In accordance with state subdivision law, only projects containing 50 or more lots may be *required* to dedicate land for park development.

Documentation:
City of Redding General Plan, Natural Resources Element, 2000.
City of Redding General Plan, Recreation Element, 2000.
City of Redding General Plan, Public Facilities Element, 2000.

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**	

XVII. TRANSPORTATION: *Would the project:*	**Potentially Significant Impact**	**Less-Than-Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
d) Result in inadequate emergency access?				**X**

Discussion:

a-c) A Transportation Impact Study for the Silverstone Residential Subdivision was prepared by W-Trans. The study recommended multiple traffic-calming suggestions as a result of the addition of project traffic to the area. The site is part of a larger complex of developments that includes Silverstone Subdivision Units 1 through 5 located directly south of this project and consisting of 116 residential units (construction currently underway), and the Shastina Ranch project located further to the south (with access to Airport Road) with a total of 409 lots having been constructed. The road extension of Shasta View Drive from Rancho Road through the entire project (Silverstone Subdivision Units 1 through 4 and the current Unit 5) has been completed along with the road extension which crosses Clover Creek and connects to all of the subdivisions. The primary access to the proposed subdivision (Unit 5) would be from Rancho Road via construction of a new street (Road C) located near the intersection of Rancho Road and Goodwater Avenue (Figure 2). Shasta View Drive provides bicycle lanes and sidewalks which, with the construction of dwelling units on the project site, will extend along Shasta View Drive and along Rancho Road. A raised median will be installed on Rancho Road to physically prohibit left turns to and from the project entrance to ensure traffic safety. The site plan includes new two-lane local streets having connections to Rancho Road and the Silverstone Subdivision Units 1 through 4. Many of the housing units would be served by a dead-end street or side streets. No units would have direct vehicle access to Shasta View Drive or Rancho Road.

The Transportation Element of the *General Plan* establishes acceptable peak-hour "Level of Service" (LOS) criteria for roadways and intersections for use in transportation planning and project review. The LOS methodology is an established way of ranking the degree of traffic-flow efficiency and congestion. For most of the City, LOS "C" or "acceptable delay" is identified as the maximum allowable threshold before a more congested and potentially significant traffic condition occurs. For state highway interchange connections with local streets, a maximum LOS "D" or "tolerable delay" is established. A thorough explanation of LOS methodology is provided in the Transportation Element and the Transportation and Circulation Section of the *General Plan* Environmental Impact Report (EIR).

The traffic study prepared for the project analyzed project impacts during both morning and evening peak hours for both existing conditions and cumulative (year 2030) conditions help assess potential LOS and traffic-movement impacts. Impacts were analyzed at Churn Creek Road, Ranch Road, and Shasta View Drive critical intersections. These include:

Intersections Studied

- ***Churn Creek Rd./ Rancho Rd. (westbound approach)***
- ***Shasta View Dr./ Rancho Rd. (northbound approach)***
- ***Shasta View Dr./ Rancho Rd. (southbound approach)***
- ***Goodwater Ave./Rancho Rd. (southbound approach)***

In its review of the noted intersections and streets, the study finds that while traffic associated with pending development in the project vicinity added to existing volumes at the Churn Creek Road/ Rancho Road intersection would deteriorate to LOS "D," the proposed project would add less than five seconds of additional delay to this approach, and the project's effect would be considered acceptable. Based on the Office of Planning Research (OPR) and information contained within the Shasta Regional Transportation Agency (SRTA) travel demand model, the study determined that the project's impact on Vehicle Miles Traveled (VMT) would be considered less than significant.

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

The project would not conflict with any program, plan, ordinance, or policy addressing the circulation system. The project will not conflict with CEQA guidelines section 15064.3(b).

d) With the streets proposed in the Silverstone Subdivision, Unit 5 there will be one access point on Rancho Road and another which connects to Silverstone Subdivision Units 1 through 4. These units have multiple connection points on Shasta View Drive. With these measures, there would be adequate emergency access to the proposed subdivision. The Redding Fire Marshal has deemed this to be adequate access for emergency access and fire protection.

General Plan Health and Safety Policies HS4J and HS4I generally require that residential neighborhoods having 50 or more dwelling units have at least two points of public-street access and that cul-de-sac or dead-end street lengths not exceed 600 feet. The project is under the 50-lot threshold for a second access; therefore, the proposed roadways and access points comply with *General Plan* Policy HS4J.

Documentation:
City of Redding General Plan, Transportation Element, 2000.
City of Redding General Plan Environmental Impact Report, 2000, SCH #1998072103.
City of Redding Parks, Trails, and Open Space Master Plan, 2018.
City of Redding Traffic Impact Fee Program.
City of Redding Active Transportation Plan, 2018.
Redding Area Bus Authority System Map and Route Guide, October 2000.
Transportation Impact Study, W-Trans, October 4, 2023.

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) The project was referred to the appropriate tribal entities and no request for consultation was received.

Documentation:
Letters sent to Redding Rancheria and the Wintu Tribe of Northern California, dated April 24, 2023.

Mitigation:
None necessary.

XIX. <u>UTILITIES AND SERVICE SYSTEMS</u>: *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**
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 of nor 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 is 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 homes in the subdivision 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, Public Facilities Elements, 2000.
City of Redding Water and Sewer Atlas.

Mitigation:
None necessary.

XX. <u>WILDFIRE</u>: *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**
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 site is not located within the Very High Fire Severity Zone and is not adjacent to areas with significant fuel loads. The project would not impair an emergency response plan or emergency evacuation plan.

b-d) Because the project site is flat without any slope and no vegetation, nor is it surrounded by any significant vegetated area or slopes, the project would not exacerbate wildfire risks or expose project occupants to pollutant concentrations from a wildfire, require the installation or maintenance of associated infrastructure that could exacerbate wildfire risks, or expose people or structures to downstream flooding or landslides. No impacts associated with wildfire are anticipated.

Documentation:
CalFire, Fire Hazard Severity Zone Maps, Shasta County, 2008.

Mitigation:
None necessary.

XXI. <u>MANDATORY FINDINGS OF SIGNIFICANCE</u>:	**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**		
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**	

XXI. MANDATORY FINDINGS OF SIGNIFICANCE:	**Potentially Significant Impact**	**Less-Than-Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
c) Does the project have potential environmental effects which may cause substantial adverse effects on human beings, either directly or indirectly?				**X**

Discussion:

a) As discussed under Item XIII, *Noise*, if unmitigated, the project has the potential to result in impacts to the comfort and safety of residents due to the distance of proposed dwelling units from Rancho Road and Shasta View Drive. Mitigation Measure 1 is established to reduce potential impacts to 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) will eliminate the potential for air quality impacts from this project.

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

Documentation:
See all Sections above.

List of Attachments

Attachment A
Figure 1 – Location Map
Figure 2 – Tentative Subdivision Map
Figure 3 – Planned Development Book for Silverstone Subdivision, Unit 5

Attachment B
Biological Resource Assessment

Attachment C
Draft Delineation of Jurisdictional Waters of the United States

Attachment D
Gallaway Biological Resources Memorandum

Attachment E
Cultural Resource Inventory Survey

Attachment F
Letters sent to Redding Rancheria and Wintu Tribe of Northern California

Attachment G
Entitlement Storm Drainage Analysis

Attachment H
Central Valley Water Quality Control Board Response to Comments

Attachment I
Transportation Impact Study

Attachment A

Figure 1 – Location Map

Figure 2 – Tentative Subdivision Map

Figure 3 – Planned Development Book for Silverstone Subdivision, Unit 5

Attachment B
Biological Resource Assessment

Attachment C

Draft Delineation of Jurisdictional Waters of the United States

Attachment D
Gallaway Biological Resources Memorandum

Attachment E

Cultural Resources Inventory Survey

NOTE TO REVIEWER: Information contained in the Cultural Resources Inventory Survey (Gallaway Enterprises, Inc., 2022) 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 F
Letters sent to Redding Rancheria and Wintu Tribe of Northern California

Attachment G

Entitlement Storm Drainage Analysis

Attachment H

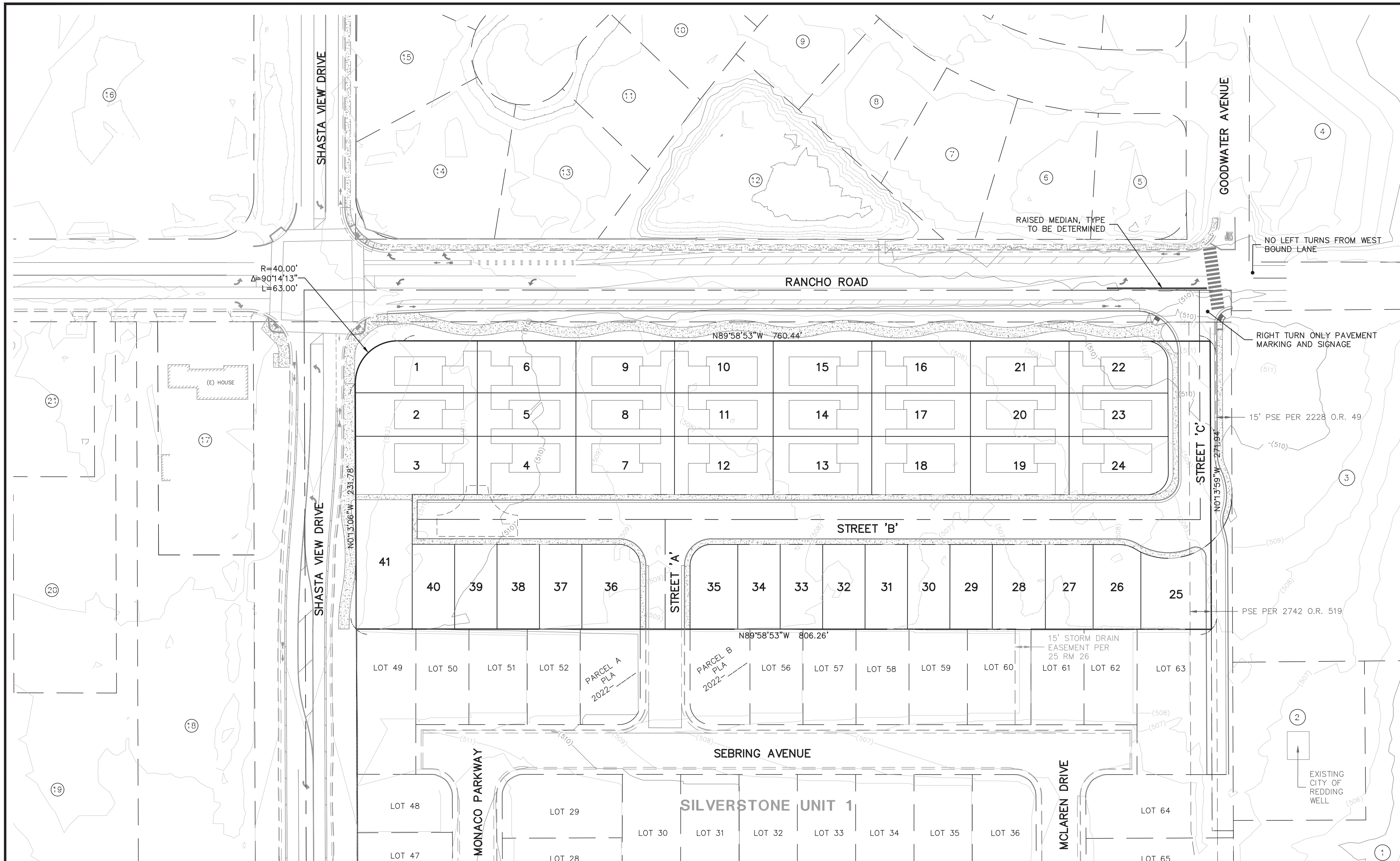
Central Valley Water Quality Control Board Response to Comments

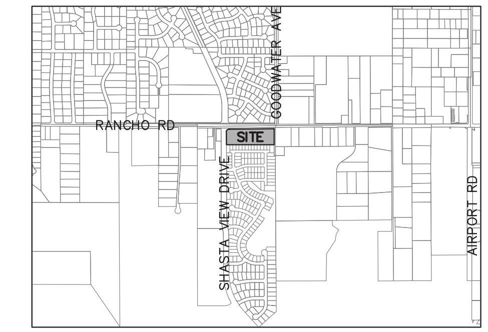
Attachment I

Transportation Impact Study

N W E S	**GIS DIVISION** INFORMATION TECHNOLOGY DEPARTMENT	**LOCATION MAP**	MTG. DATE:
	DATE PRODUCED: JANUARY 20, 2023	S-2023-00027 SIERRA PACIFIC LAND TIMBER 2923 RANCHO ROAD AP# 054-910-080	ITEM:
	0 200 400 Feet		ATTACHMENT:

P:\Planning\ProProjects\S\S-2023-00027.aprx





SITE MAP
SCALE: NTS

CLIENT:
SIERRA PACIFIC LAND AND TIMBER
P.O. BOX 496014
REDDING, CA 96049

OWNER:
SIERRA PACIFIC LAND AND TIMBER
P.O. BOX 496014
REDDING, CA 96049

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

SITE DATA
A.P.#: 054-910-080
EXISTING USE: VACANT
PROPOSED USE: 41 LOT RESIDENTIAL SUBDIVISION
GENERAL PLAN: RES 2-3.5
ZONING: RS-3-PD
SITE AREA: 5.0 AC
TOTAL AREA: 66.6 AC
PROJECT UNITS: 41
TOTAL UNITS: 229
DENSITY: 3.4 D.U./AC
ELECTRICITY: REDDING ELECTRIC UTILITY
WATER: CITY OF REDDING
SEWER: CITY OF REDDING
TELEPHONE: AT&T

ADJACENT LAND OWNERS

1. 054-520-025
FRANKLIN
5140 PALO VERDE LANE,
REDDING, CA 96002

2. 054-520-026
CITY OF REDDING
777 CYPRESS AVENUE,
REDDING, CA 96002

3. 054-520-001
SMITH LIVING TRUST
8116 CABERNET COURT,
SAN JOSE, CA 95135

4. 054-070-011
SINGH ET. AL.
2596 SATURN SKYWAY,
REDDING, CA 96002

5. 054-740-038
WELCH
3197 COPPER CREEK DRIVE,
REDDING, CA 96002

6. 054-740-039
LAROY PROPERTIES LLC.
P.O. BOX 494372,
REDDING, CA 96049

7. 054-740-040
HOUSEWORTH
2122 HOUNSLOW DRIVE,
SAN JOSE, CA 95131-2621

8. 054-740-041
MIKKELSEN
3143 COPPER CREEK DRIVE,
REDDING, CA 96002

9. 054-740-042
NEGRI REVOCABLE TRUST
2462 BALFOUR COURT,
NAPA, CA 94558

10. 054-740-044
COURANGE REVOCABLE TRUST
5029 LOST CREEK COURT,
REDDING, CA 96002

11. 054-740-045
GARCHA
2931 FOREST HILLS DRIVE,
REDDING, CA 96002

12. 054-740-052
CITY OF REDDING
777 CYPRESS AVENUE,
REDDING, CA 96002

13. 054-740-046
BARNES
5069 LOST CREEK COURT,
REDDING, CA 96002

14. 054-740-047
COLOSIO
5089 LOST CREEK COURT,
REDDING, CA 96002

15. 054-740-048
HERNANDEZ LIVING TRUST
5086 LOST CREEK COURT,
REDDING, CA

16. 054-090-029
LEWIS 2019 TRUST ET. AL.
1073 HARRINGTON WAY,
CARMICHAEL, CA 95608

17. 054-510-012
BROWN REVOCABLE TRUST
2845 RANCHO ROAD,
REDDING, CA 96002

18. 054-510-045
S&J DEVELOPMENT INC. ET. AL.
19207 PINNACLE COURT,
REDDING, CA 96003

19. 054-510-024
ADDISON FAMILY TRUST
2811 RANCHO ROAD,
REDDING, CA 96002

20. 054-510-023
KEZER
2805 RANCHO ROAD,
REDDING, CA 96002

21. 054-510-007
SILVEY
2801 RANCHO ROAD,
REDDING, CA 96002

50 0 25 50
1 INCH = 50 FEET

SILVERSTONE 5
TENTATIVE SUBDIVISION MAP

LOCATED IN THE NORTHEAST 1/4 OF SECTION 21,
TOWNSHIP 31 NORTH, RANGE 4 WEST, M.D.M.,
CITY OF REDDING, SHASTA COUNTY, CALIFORNIA

FOR

SIERRA PACIFIC LAND AND TIMBER

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: AUGUST 10, 2023 SCALE: 1"=50' SHEET 1 OF 3

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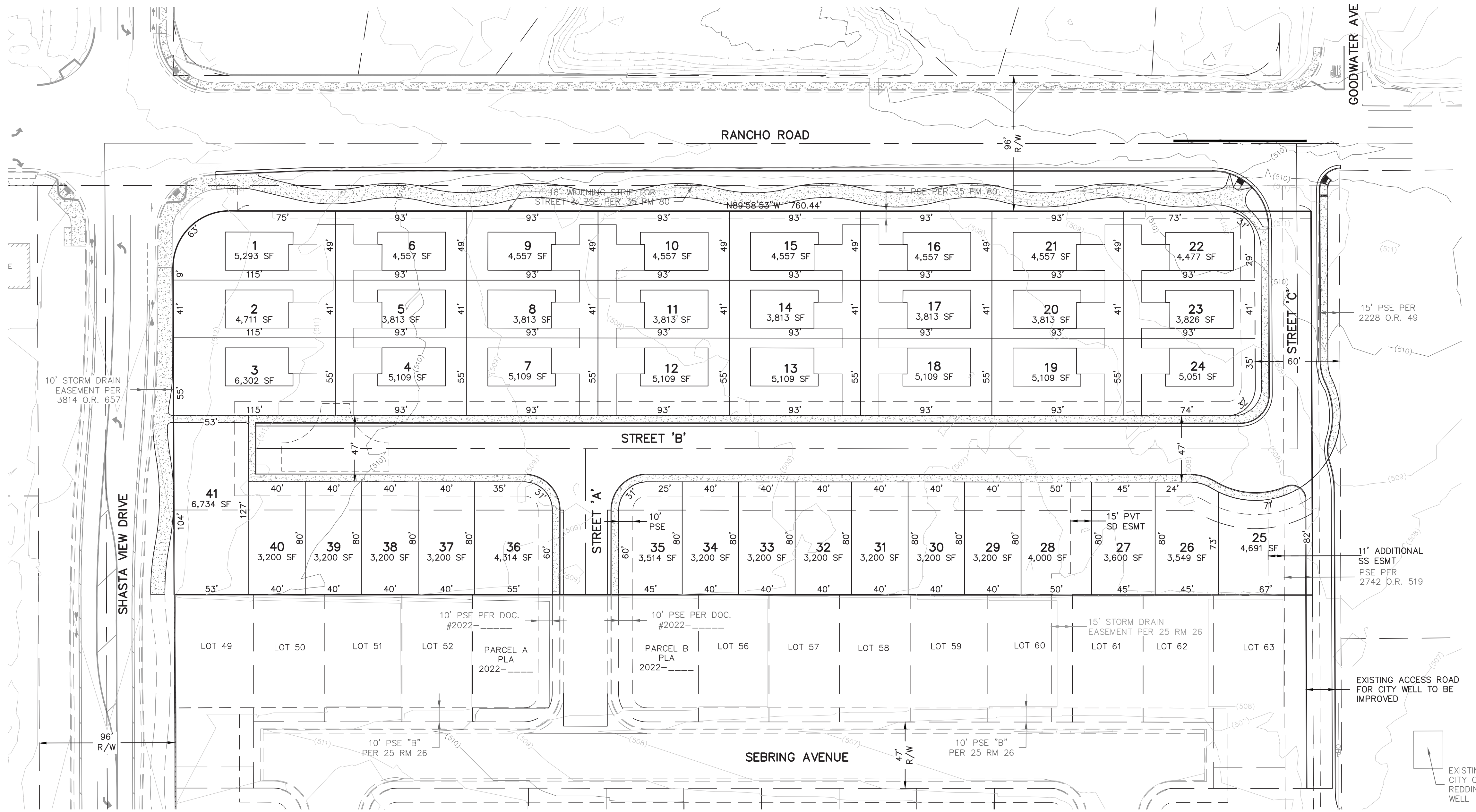
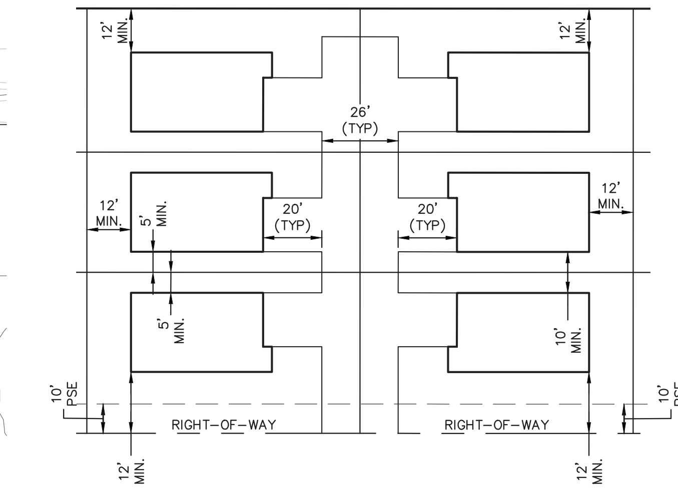
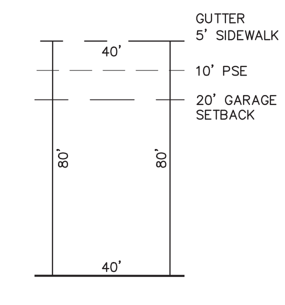
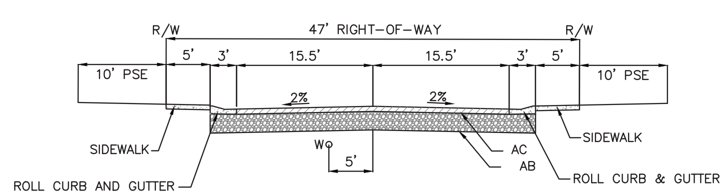




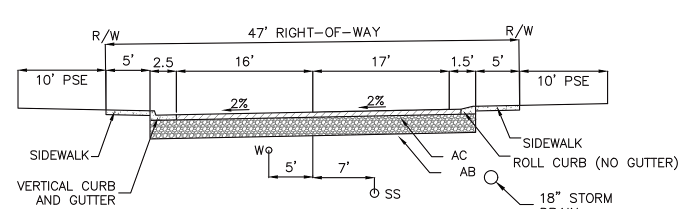
TYPICAL MOTORCOURT LOTS
UNITS 1-24
1" = 30'



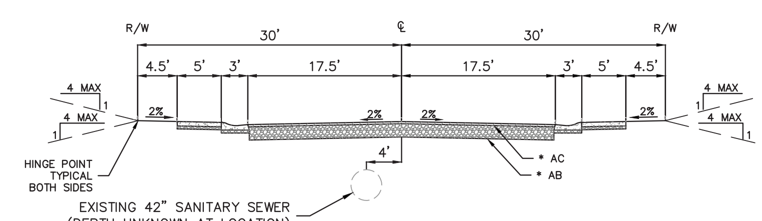
TYPICAL TRADITIONAL LOT
LOTS 25-41
1" = 30'



47' STREET SECTION
STREET A
1" = 10'



47' STREET SECTION
STREET B
1" = 10'



60' STREET SECTION
STREET C
1" = 10'

1 INCH = 40 FEET

SILVERSTONE 5
TENTATIVE SUBDIVISION MAP

LOCATED IN THE NORTHEAST 1/4 OF SECTION 21,
TOWNSHIP 31 NORTH, RANGE 4 WEST, M.D.M.,
CITY OF REDDING, SHASTA COUNTY, CALIFORNIA

FOR

SIERRA PACIFIC LAND AND TIMBER

BY

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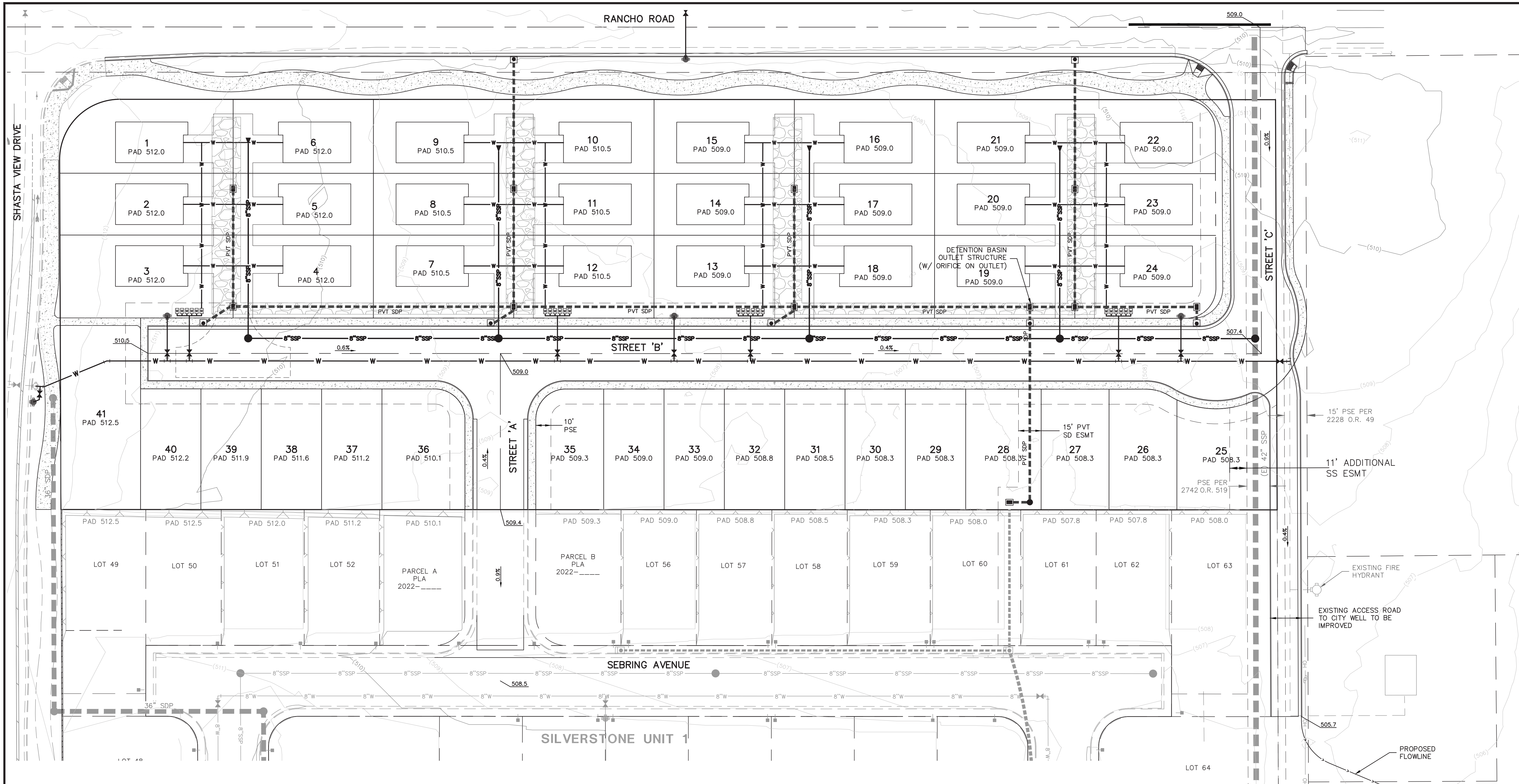
320 Hartnell Avenue, Redding, CA 96002
530.221.1792 voice • info@sdsengineering.com

DATE: AUGUST 10, 2023 SCALE: 1"=40' SHEET 2 OF 3



LEGEND

EXISTING	PROPOSED	
SDP	SDP	STORM DRAIN LINE
SSP	SSP	SANITARY SEWER LINE
		WATER METER MANIFOLD
W	W	WATER LINE
		STORM DRAIN MANHOLE
		SANITARY SEWER MANHOLE
		SANITARY SEWER CLEANOUT
		STORM DRAIN CATCH BASIN
		AREA DRAIN
		FIRE HYDRANT
		WATER VALVE
		SUBSURFACE DETENTION BASIN

NOTE:
PRELIMINARY DESIGN FOR MS4 FEATURES ARE SHOWN ON THE MS4 EXHIBIT WITHIN THE ENTITLEMENT LEVEL SUBMITTAL DATED 4/26/23.

N

30 0 15 30
1 INCH = 30 FEET

SILVERSTONE 5 PRELIMINARY GRADING & UTILITY PLAN

LOCATED IN THE NORTHEAST 1/4 OF SECTION 21, TOWNSHIP 31 NORTH, RANGE 4 WEST, M.D.M., CITY OF REDDING, SHASTA COUNTY, CALIFORNIA

FOR

SIERRA PACIFIC LAND AND TIMBER

BY

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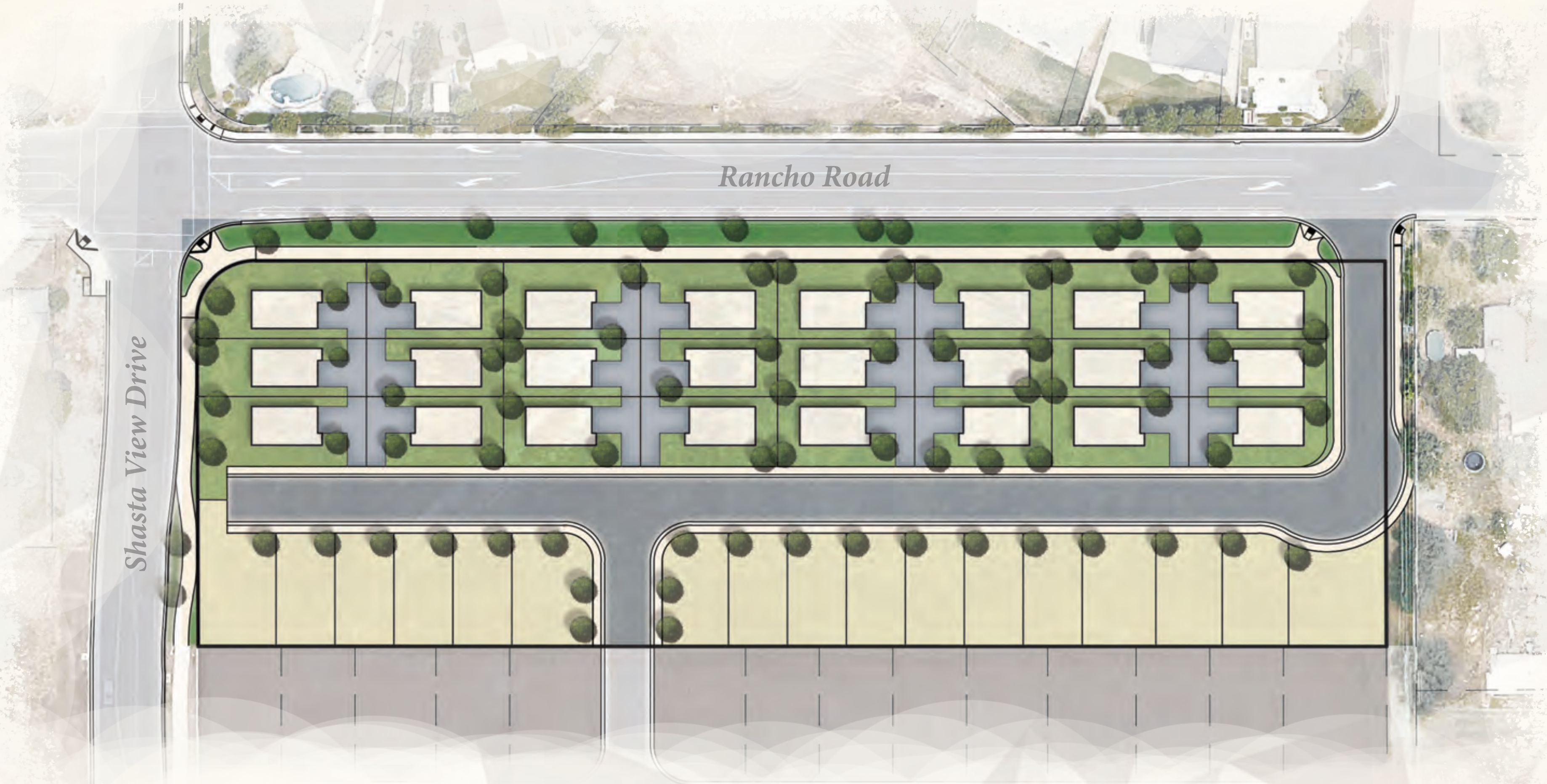
Landscape Architecture • Presentation Graphics
320 Hartnell Avenue, Redding, CA 96002
530.221.1792 voice • info@sdsengineering.com

DATE: AUGUST 10, 2023 SCALE: 1"=30' SHEET 3 OF 3

SILVERSTONE 5 PLANNED DEVELOPMENT



Prepared for:

Sierra Pacific Industries Land & Timber

Palomar Your Ultimate Home

January 2023

Prepared by:

Sharrah Dunlap Sawyer Incorporated

JANUARY 2023

SITE PLAN

Site Data:

APN:	054-910-080
Existing Use:	Vacant
General Plan:	Res. 2-3.5
Zoning:	RS-3-PD
Proposed Use:	41 Lot Residential Subdivision
Site Area:	5.0 AC
Total Area:	66.6 AC
Project Units:	41
Total Units:	229
Project Density:	3.4 D.U./AC
Electricity:	Redding Electric Utility
Water:	City of Redding
Sewer:	City of Redding
Telephone:	AT&T

Legend:

	Traditional Lots	*17*
	Motor Court Lots	24
	Total:	***41***
	Project Boundary	

N

1" = 80'

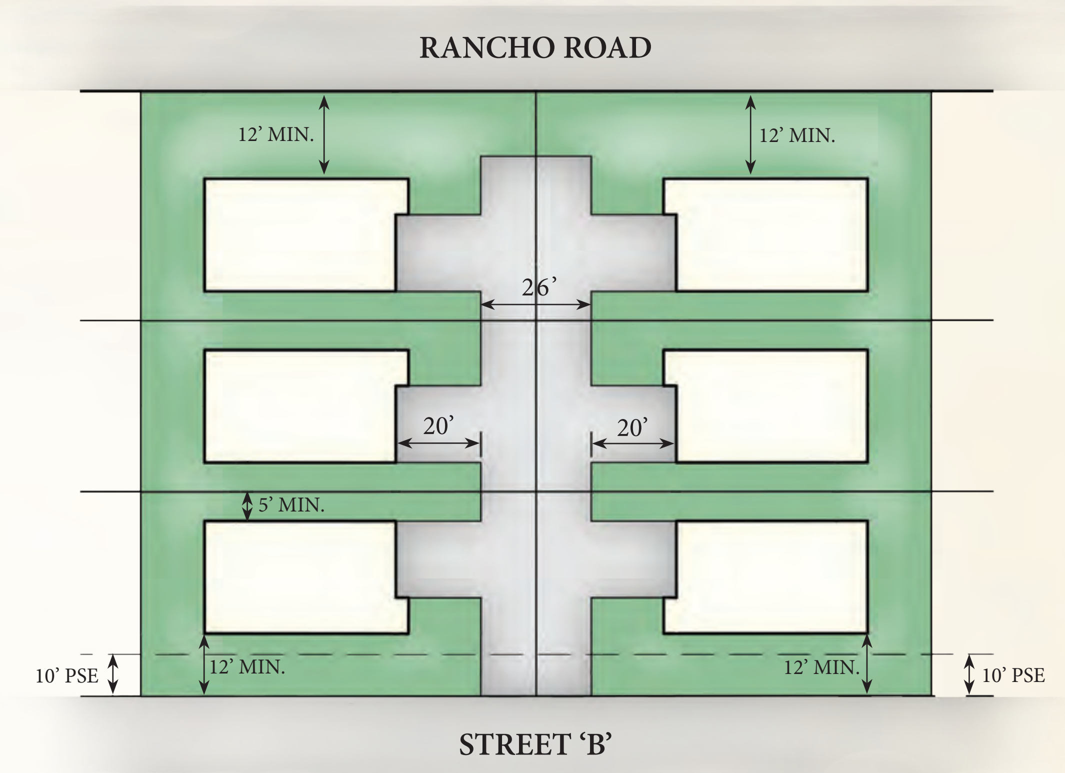
Prepared by: SHARRAH DUNLAP SAWYER INCORPORATED

Prepared for: SIERRA PACIFIC INDUSTRIES LAND & TIMBER; PALOMAR YOUR ULTIMATE HOME

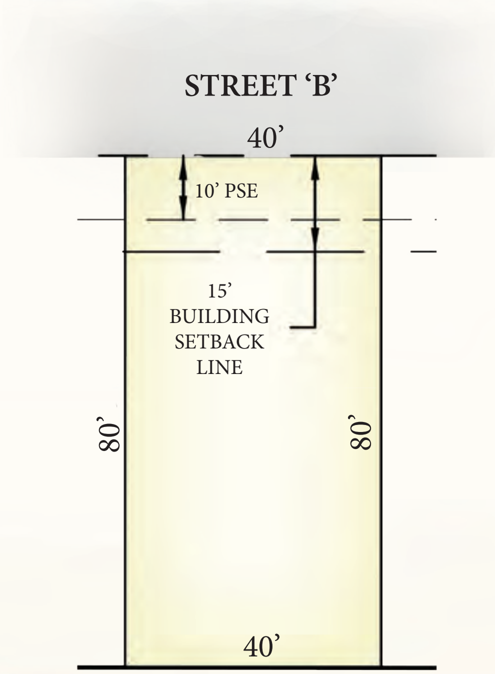
Job No. 22.0142

TYPICAL LOT

SITE MAP



MOTORCOURT LOTS
LOTS 1-24



TRADITIONAL LOT
LOTS 25-41

TYPICAL MIN. DIMENSIONS

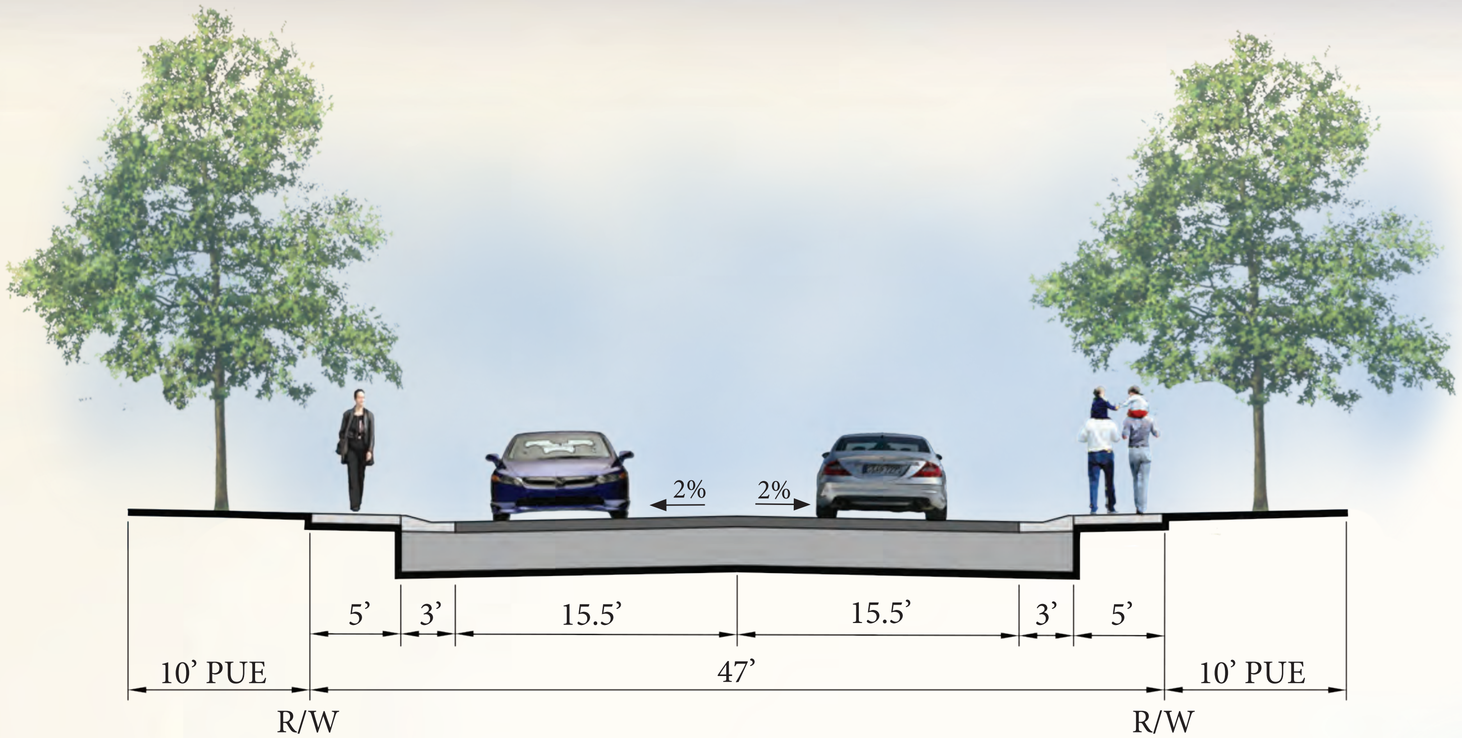
Garage Setback:	20'
Rear Setback:	12'
Side Setback:	5'
Corner Side Setback:	12'

Prepared by: SHARRAH DUNLAP SAWYER INCORPORATED

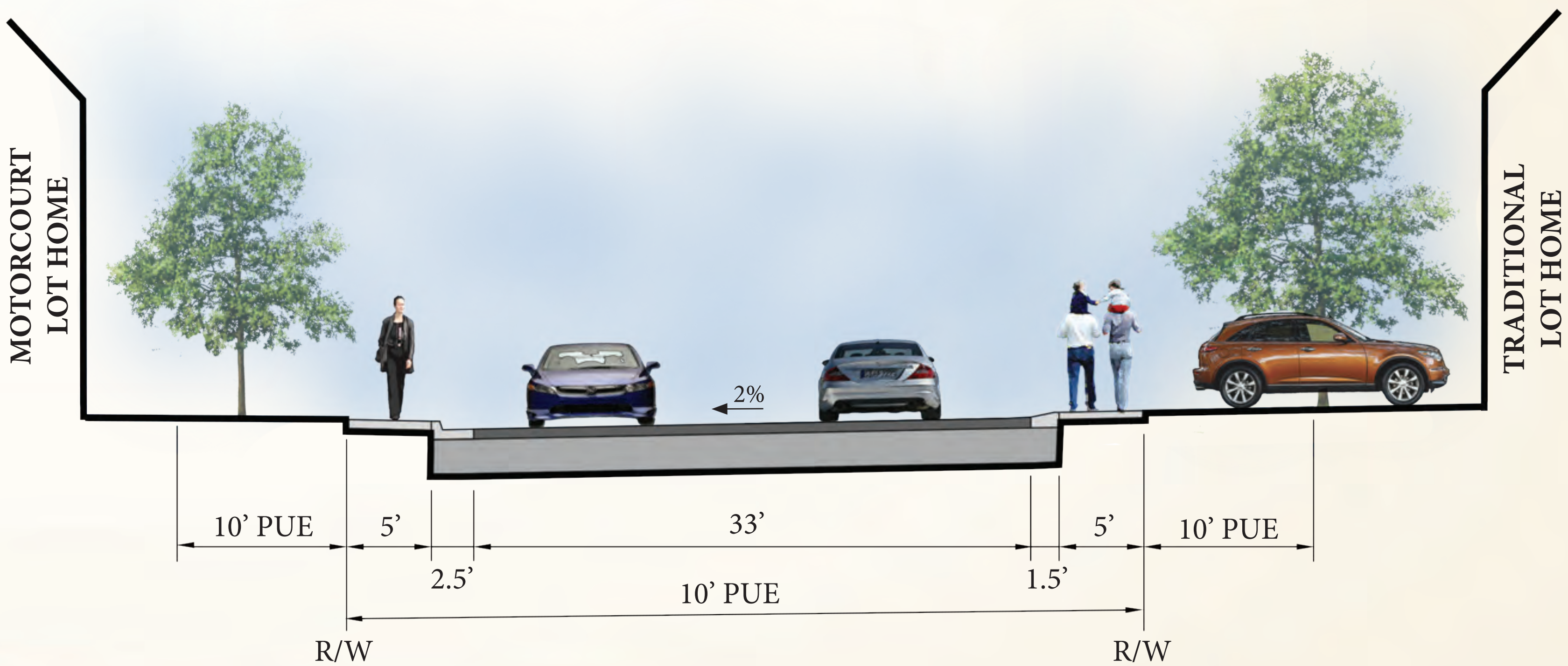
Prepared for: SIERRA PACIFIC INDUSTRIES LAND & TIMBER · PALOMAR YOUR ULTIMATE HOME

Job No. 22.0142

STREET SECTIONS



47' STREET SECTION
STREET 'A'
N.T.S.



47' STREET SECTION
STREET 'B'
N.T.S.

Prepared by:

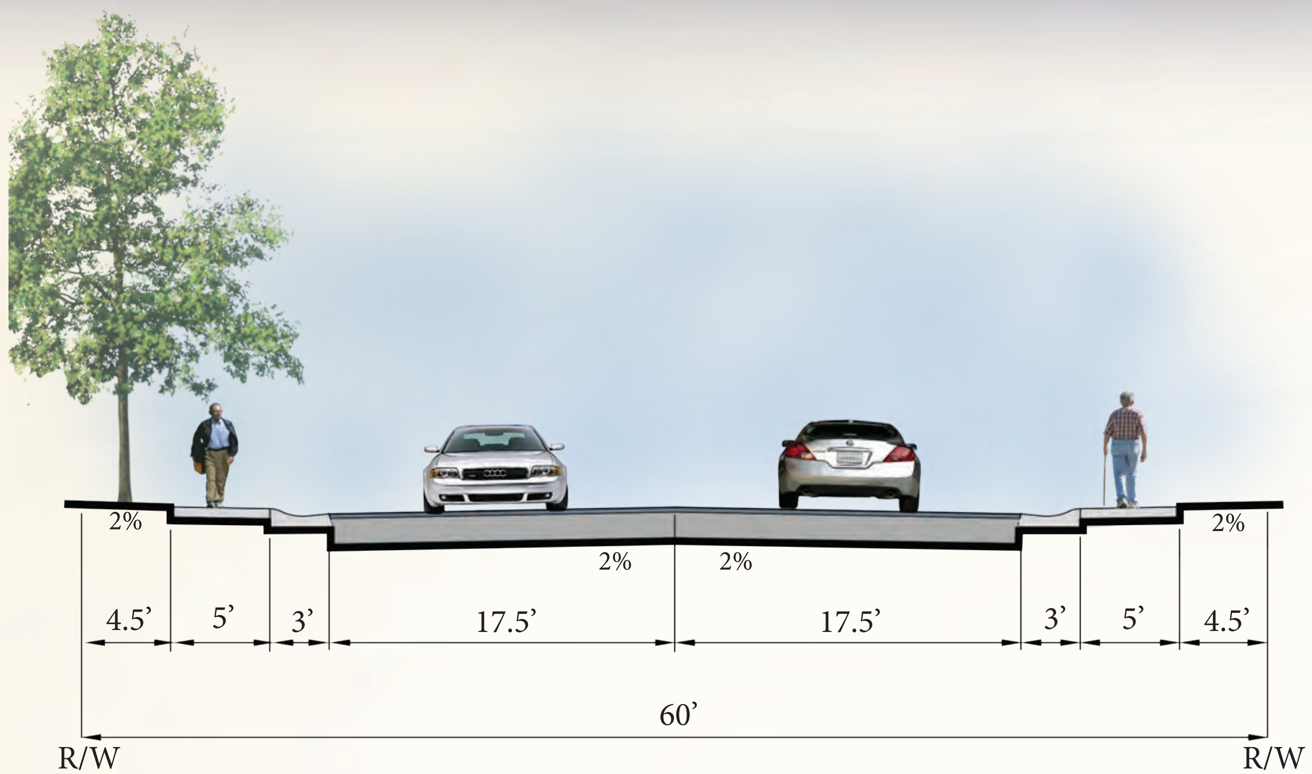
SHARRAH DUNLAP SAWYER INCORPORATED

Prepared for:

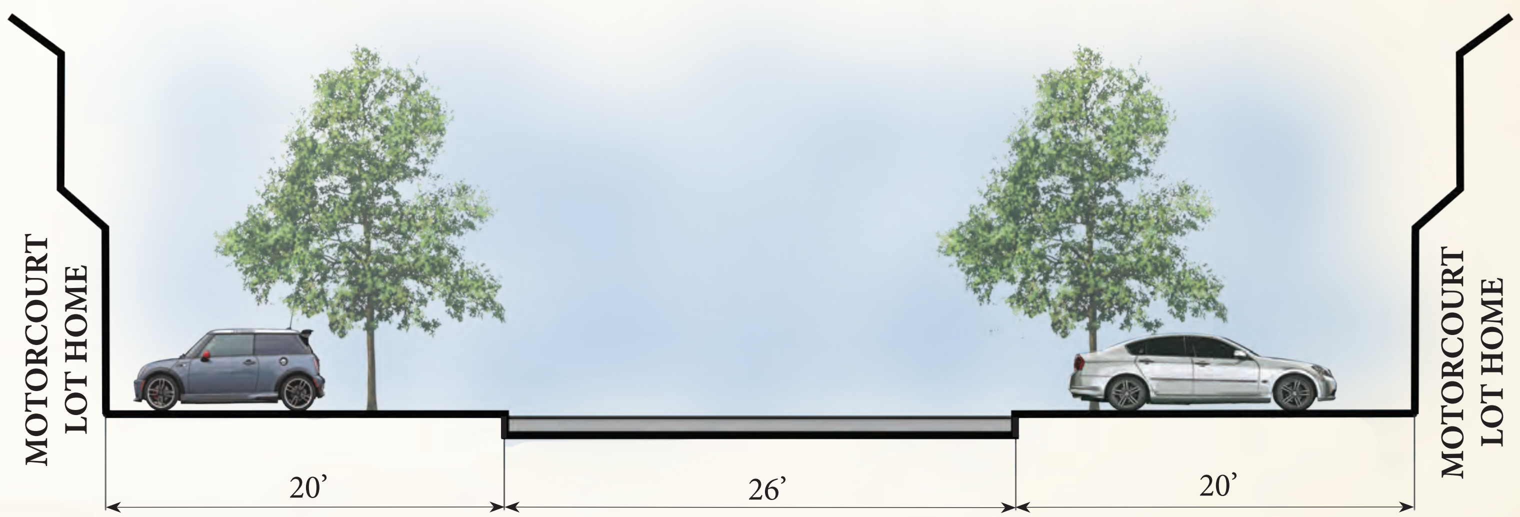
SIERRA PACIFIC INDUSTRIES LAND & TIMBER

PALOMAR YOUR ULTIMATE HOME

STREET SECTIONS



60' STREET SECTION
STREET 'C'
N.T.S.

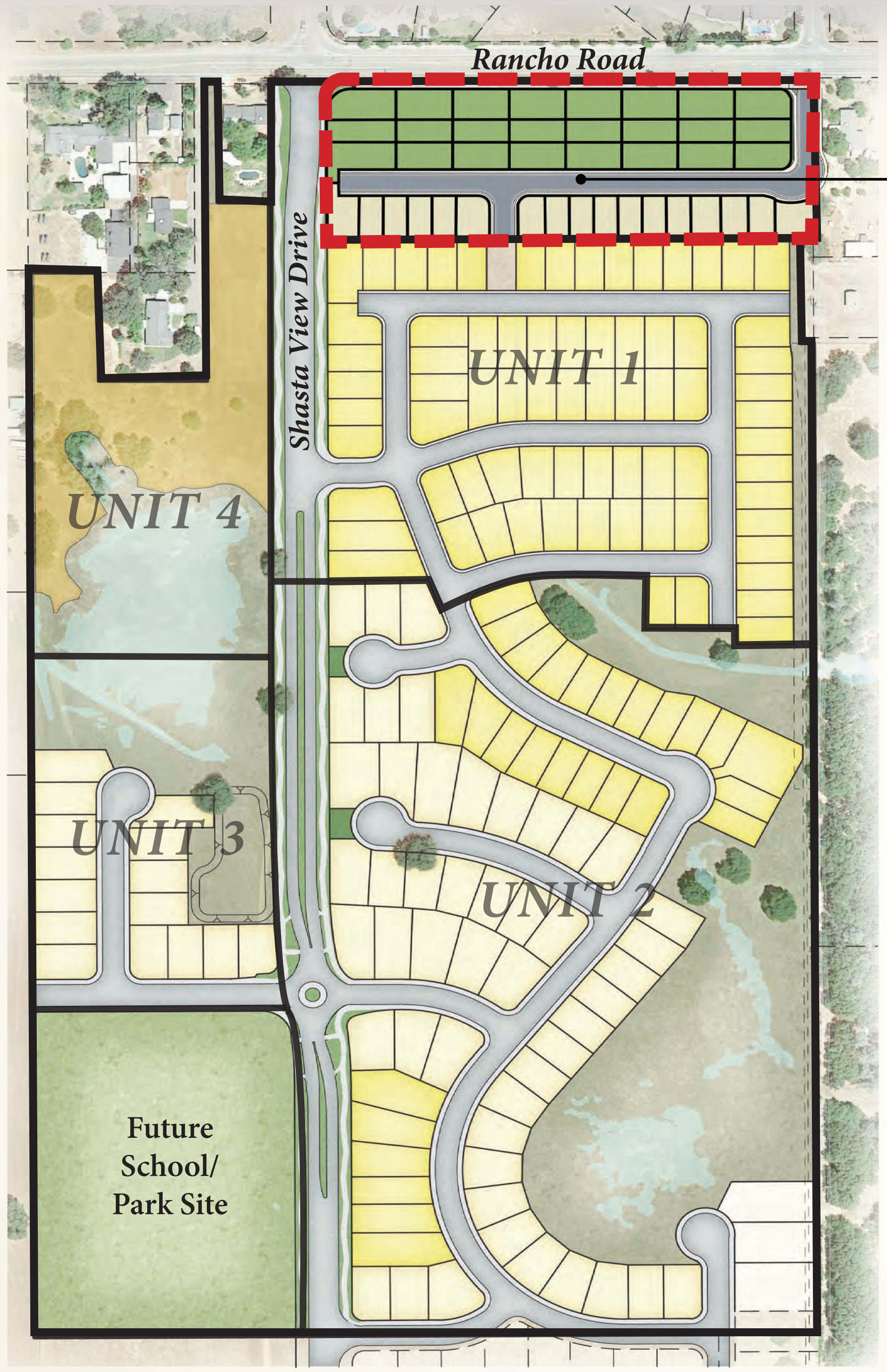


MOTORCOURT SECTION
N.T.S.

Prepared by: SHARRAH DUNLAP SAWYER INCORPORATED

Prepared for: SIERRA PACIFIC INDUSTRIES LAND & TIMBER; PALOMAR YOUR ULTIMATE HOME

PROJECT SETTING



SILVERSTONE

N.T.S.

SHASTINA RANCH MASTER PLAN

Prepared by: SHARRAH DUNLAP SAWYER INCORPORATED

Prepared for: SIERRA PACIFIC INDUSTRIES LAND & TIMBER; PALOMAR YOUR ULTIMATE HOME

ARCHITECTURE - 1567 S.F.

CEMENT PLASTER FINISH

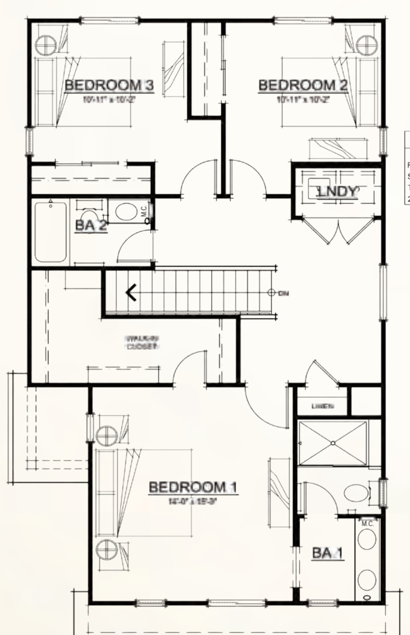
MISSION FRONT ELEVATION

1x3 BATTS o/ SMOOTH HARDIE PANEL

ILLUMINATED ADDRESS, TYP.

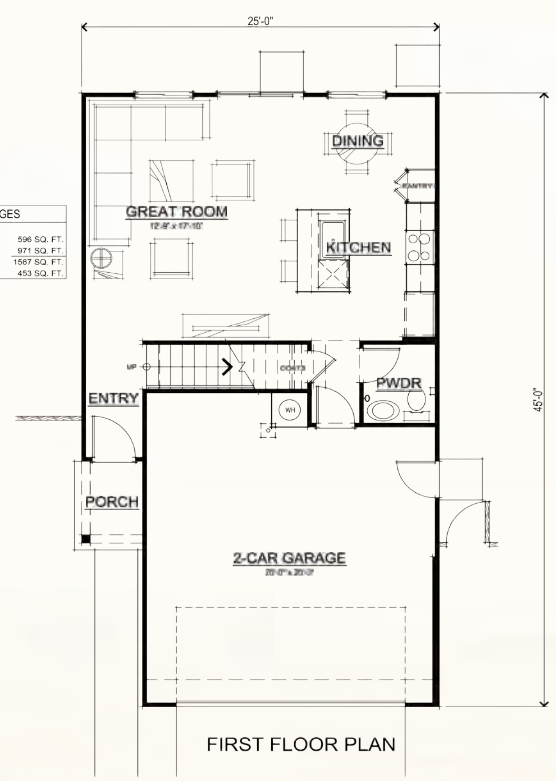
CEMENT PLASTER FINISH

FARMHOUSE FRONT ELEVATION



SECOND FLOOR PLAN

SQUARE FOOTAGES	
FIRST FLOOR	596 SQ. FT.
SECOND FLOOR	971 SQ. FT.
TOTAL LIVING	1567 SQ. FT.
2-CAR GARAGE	453 SQ. FT.



FIRST FLOOR PLAN

CEDARMILL HARDIE LAP SIDING

CEMENT PLASTER FINISH

STONE VENEER

CRAFTSMAN FRONT ELEVATION

Prepared by:

SHARRAH DUNLAP SAWYER INCORPORATED

Prepared for:

SIERRA PACIFIC INDUSTRIES LAND & TIMBER

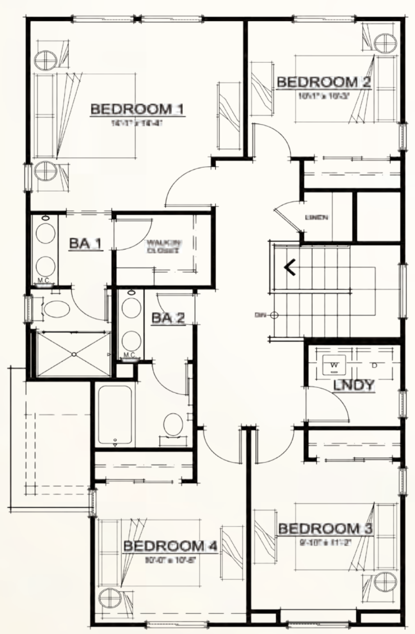
PALOMAR YOUR ULTIMATE HOME

Note: Architecture provided by D.R. Horton. Final design subject to change.

ARCHITECTURE - 1615 S.F.

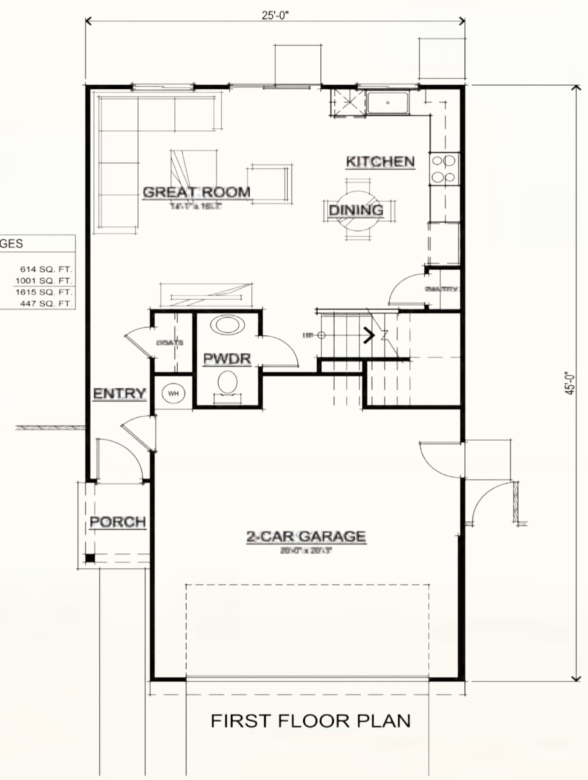
MISSION FRONT ELEVATION

FARMHOUSE FRONT ELEVATION



SECOND FLOOR PLAN

SQUARE FOOTAGES	
FIRST FLOOR	614 SQ. FT.
SECOND FLOOR	1001 SQ. FT.
TOTAL LIVING	1615 SQ. FT.
2-CAR GARAGE	447 SQ. FT.



FIRST FLOOR PLAN

CRAFTSMAN FRONT ELEVATION

Prepared by:

SHARRAH DUNLAP SAWYER INCORPORATED

Prepared for:

SIERRA PACIFIC INDUSTRIES LAND & TIMBER

PALOMAR YOUR ULTIMATE HOME

Note: Architecture provided by D.R. Horton. Final design subject to change.

ARCHITECTURE - 1631 S.F.

CEMENT PLASTER FINISH

DECORATIVE TILE VENT

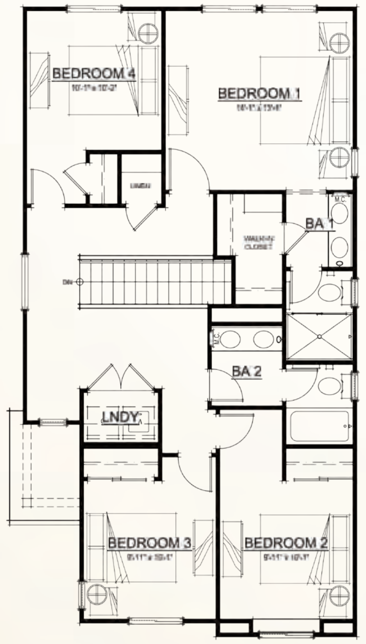
MISSION FRONT ELEVATION

1x3 BATTS o/ SMOOTH HARDIE PANEL

ILLUMINATED ADDRESS, TYP.

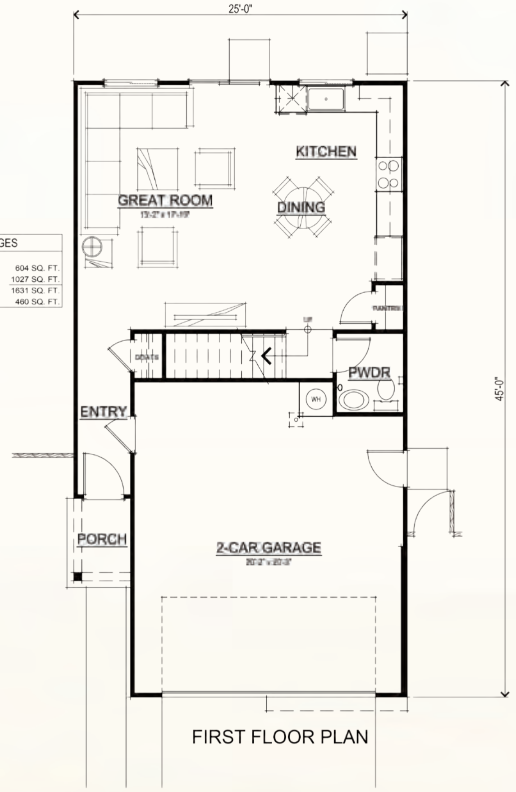
CEMENT PLASTER FINISH

FARMHOUSE FRONT ELEVATION



SECOND FLOOR PLAN

SQUARE FOOTAGES	
FIRST FLOOR	604 SQ. FT.
SECOND FLOOR	1027 SQ. FT.
TOTAL LIVING	1631 SQ. FT.
2-CAR GARAGE	460 SQ. FT.



FIRST FLOOR PLAN

CEDARMILL HARDIE LAP SIDING

CEMENT PLASTER FINISH

STONE VENEER

CRAFTSMAN FRONT ELEVATION

Prepared by: SHARRAH DUNLAP SAWYER INCORPORATED

Prepared for: SIERRA PACIFIC INDUSTRIES LAND & TIMBER; PALOMAR YOUR ULTIMATE HOME

Note: Architecture provided by D.R. Horton. Final design subject to change.

gallaway ENTERPRISES

117 Meyers Street, Suite 120, Chico CA 95928

BIOLOGICAL RESOURCE ASSESSMENT

Aquatic and Terrestrial Wildlife, and Botanical Resources

Maryann Faire Project

October 2018

Prepared for:

Palomar Builders, Inc.
Attn: Jeb Allen
2960 Innsbruck Drive
Redding, CA 96003

Prepared by:

Gallaway Enterprises
117 Meyers Street, Suite 120
Chico CA 95928
530-332-9909
www.gallawayenterprises.com

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Appendix C………………………………………………………………………………………….……… Observed Species Lists

Appendix D…………………………………………………………….………………………. Site Photos Taken October 4, 2018

BIOLOGICAL RESOURCE ASSESSMENT

Maryann Faire Project

Project Location:

City of Redding, California
Section 21 Township 31N Range 4W
Enterprise Quadrangle

INTRODUCTION

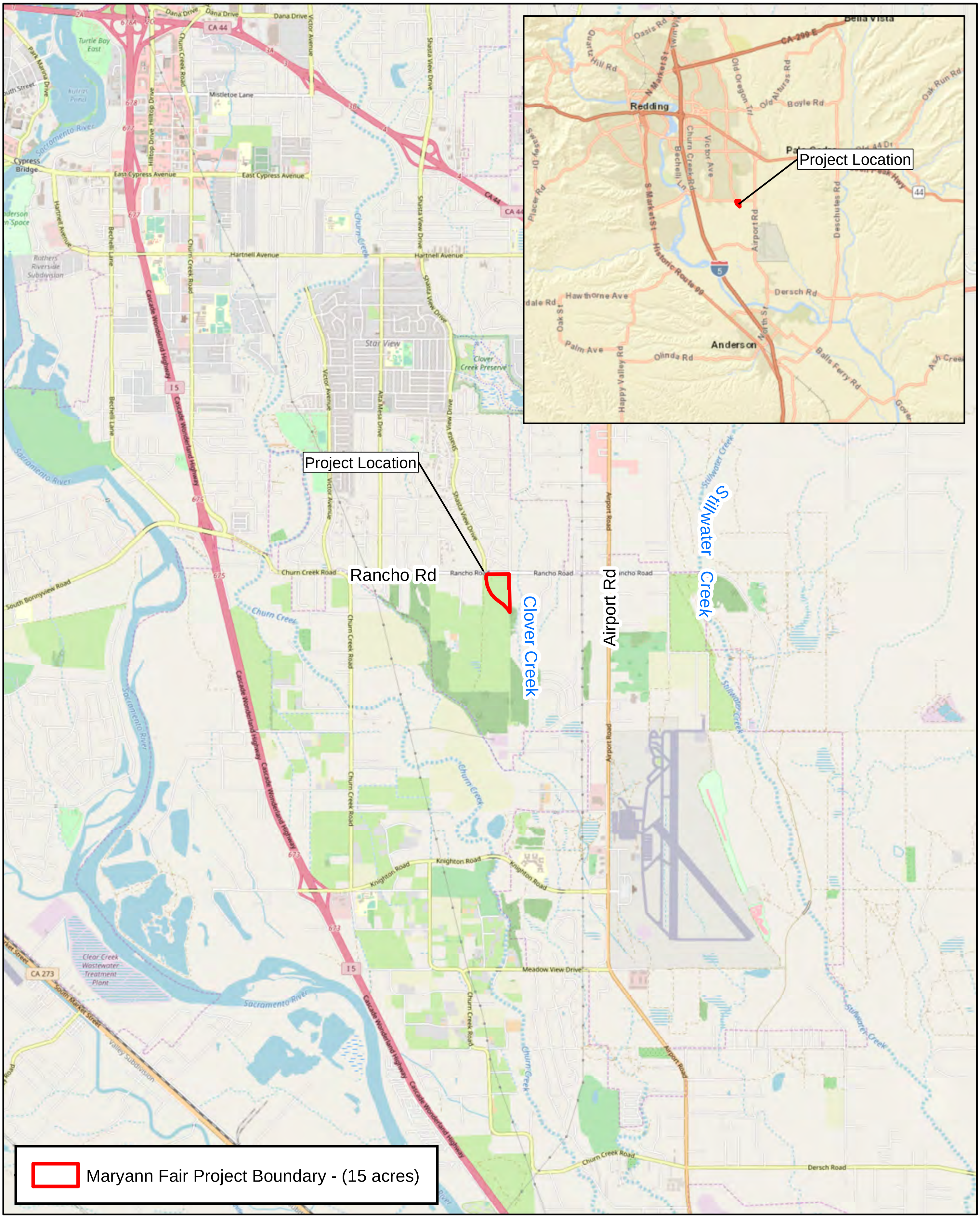
Purpose and Overview

The purpose of this biological resource assessment (BRA) is to document the endangered, threatened, sensitive and rare species, and their habitats that occur or may occur in the biological survey area (BSA) of the Maryann Faire Project (Project) located in the City of Redding, Shasta County, California (**Figures 1 & 2**)**.** The Project area is approximately 15 acres in size. The proposed Project involves the construction of a dual-use residential subdivision and commercial development.

The BSA is the area where the focus of biological surveys is conducted (**Figure 3**). Gallaway Enterprises conducted a habitat assessment and a protocol-level rare plant survey in the BSA to evaluate site conditions and potential for rare and listed species to occur. Other primary references consulted include species lists and information gathered using the United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC), California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB), the California Native Plant Society's (CNPS) list of rare and endangered plants, and literature review. The results of the BRA are the findings of surveys, habitat assessments, and recommendations for avoidance and minimization measures.

Project Location and Environmental Setting

The Project is located in the City of Redding, Shasta County, California, Latitude 40.53376, Longitude -122.31575, within the United States Geological Survey (USGS) 7.5' "Enterprise, CA" quadrangle, within Section 21, Township 31N, Range 4W. The Project site is located within the northernmost extent of the Central Valley in Redding, California. The site is currently composed primarily of annual grassland habitat with scattered oak trees. However, the site was historically dominated by oak woodland. The site has been and is currently used for cattle and horse grazing. An existing dirt road crosses through the northwestern corner of the Project site. One wetland swale occurs in the southern portion of the Project site. Open grazing land and oak woodland occur to the south and south east of the Project site. Rural residential buildings occur to the east and west of the Project site with a dense residential subdivision occurring to the north of the site.



NORTH

1:50,000

0 0.25 0.5 Miles

Data Sources: ESRI, Shasta County,USGS

Maryann Faire Project
Regional Location
Figure 1

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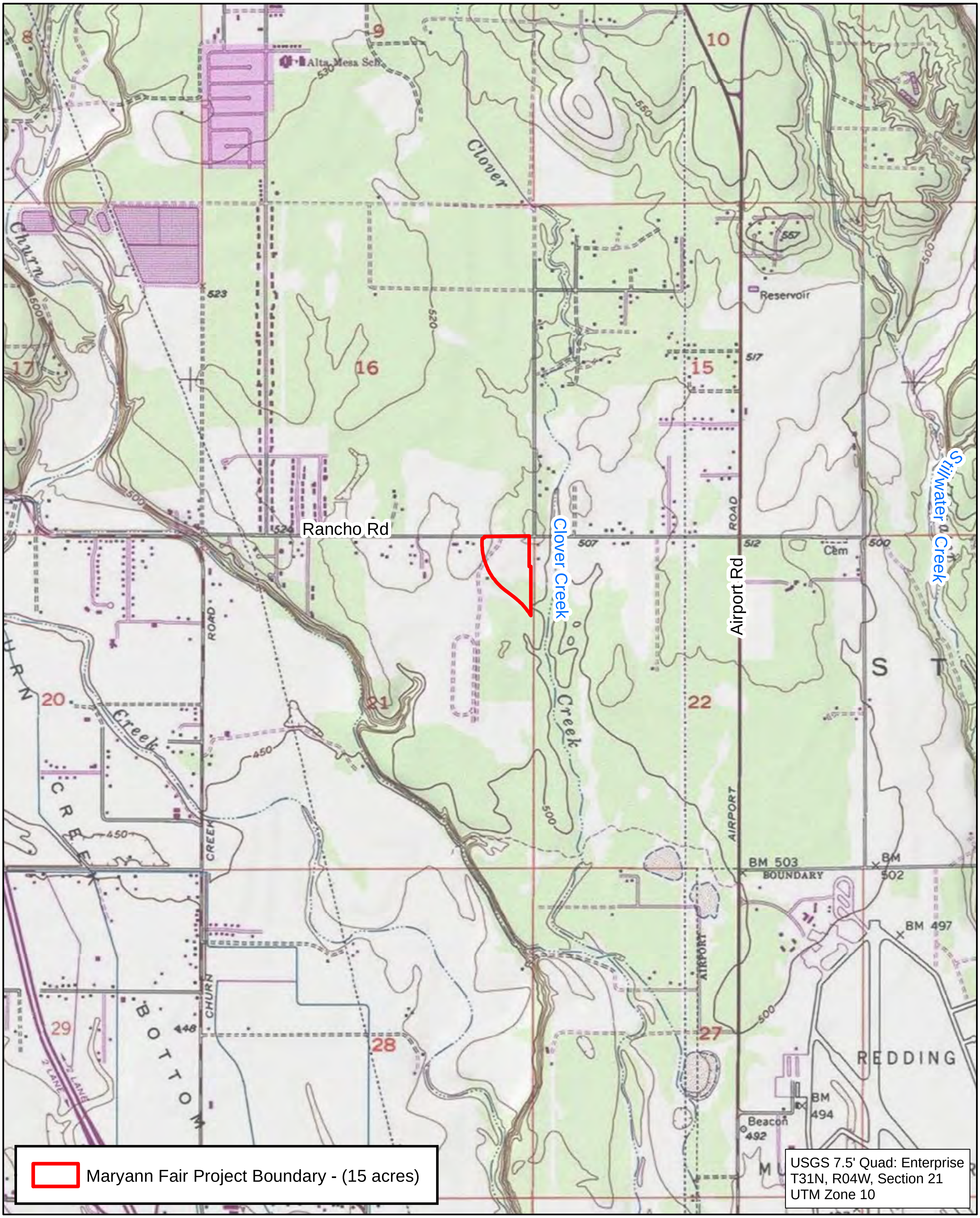
GE: #17-187 Map Date: 10/30/18



NORTH

1:24,000

0 500 1,000 Feet

Data Sources: ESRI, Shasta County,USGS

Maryann Faire Project
Project Location
Figure 2

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GE: #17-187 Map Date: 10/30/18

NORTH

1:2,500

0 100 200 Feet

Data Sources: ESRI, Shasta County, City of Redding Imagery 3/17/16

Maryann Faire Project
Biological Survey Area
Figure 3

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GE: #17-187 Map Date: 10/30/18

The average annual precipitation is 33.68 inches and the average annual temperature is 62.45° F (Western Regional Climate Center 2018) in the region where the Project site is located. The Project site occurs at an elevation of approximately 505 feet above sea level. The site is sloped between 0 and 3 percent. Soils within the site were loams with a restrictive layer ranging from 20 to more than 80 inches deep.

Biological Survey Area

For the purposes of this BRA, the BSA is the area in which biological surveys are conducted. The BSA includes all areas to be affected directly or indirectly by the Project and not merely the immediate area within the Project boundary.

Project Description

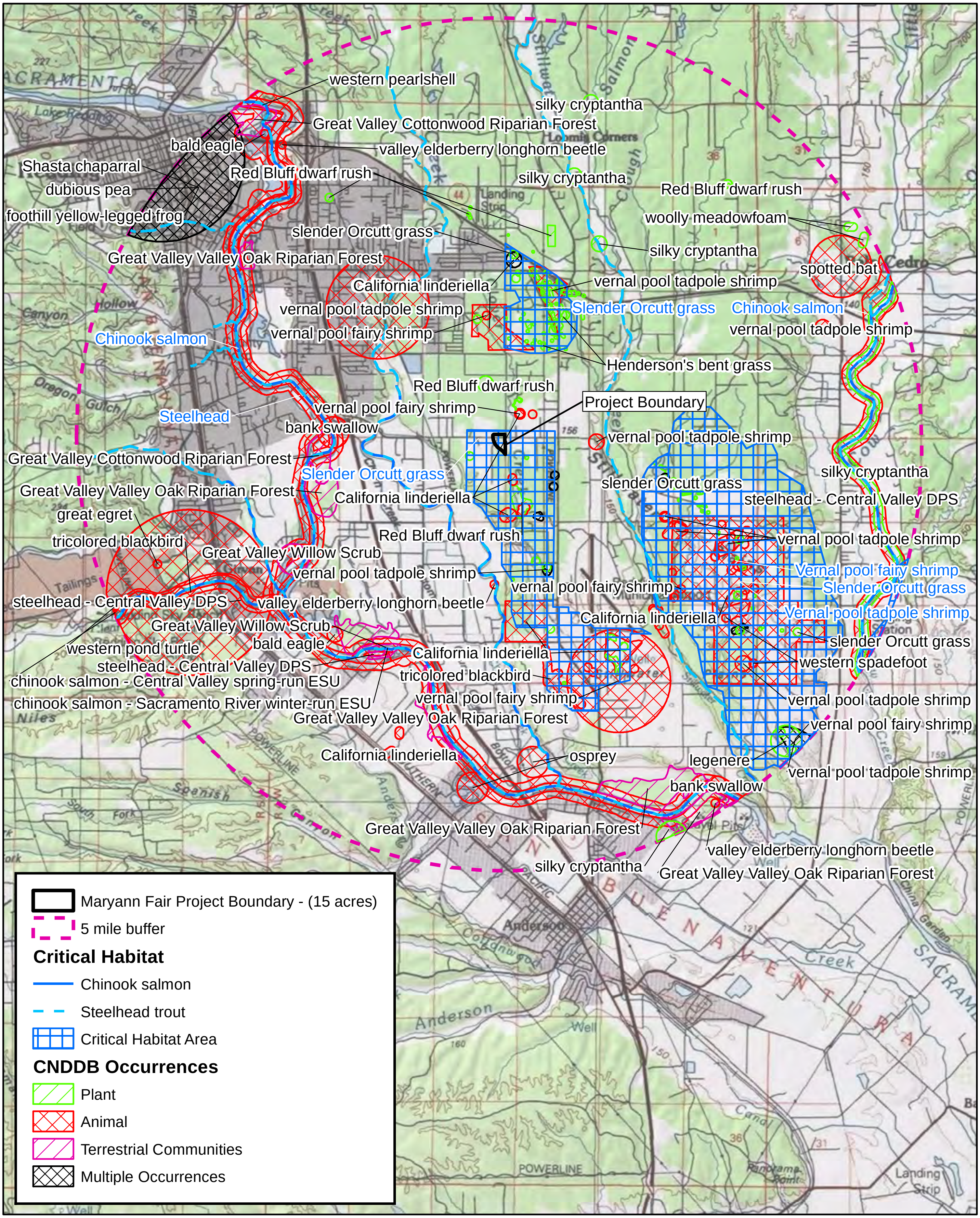
The proposed Project is to construct a residential subdivision over 10 acres of the site and a commercial development over 5 acres of the site abutting Rancho Road.

METHODS

References Consulted

Gallaway Enterprises obtained lists of special-status species that occur in the vicinity of the BSA. The CNDDB Geographic Information System (GIS) database was also consulted and showed special-status species within a five (5) mile radius of the BSA (**Figure 4**). Other primary sources of information regarding the occurrence of federally or state listed threatened, endangered, proposed and candidate species, and their habitats within the BSA used in the preparation of this BRA are:

- The USFWS Official Species List for the BSA, October 30, 2018, (**Appendix A**);
- The results of a species record search of the CDFW CNDDB, RareFind 5, for the 7.5 minute USGS "Enterprise" quadrangle (**Appendix A**);
- The review of the CNPS Inventory of Rare and Endangered Vascular Plants of California for the 7.5 minute USGS "Enterprise" quadrangle (**Appendix A**);
- USFWS Critical Habitat Portal, October 30, 2018; and
- Results from the field survey conducted by Gallaway Enterprises on October 4, 2018.



NORTH

1:95,000

0 0.25 0.5 Miles

Data Sources: ESRI, Shasta County,USGS

Maryann Faire Project
CNDDB Occurrences and Critical Habitat
Figure 4

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GE: #17-187 Map Date: 10/30/18

Special-Status Species

Special-status species that have potential to occur in the BSA are those that fall into one of the following categories:

- Listed as threatened or endangered, or are proposed or candidates for listing under the California Endangered Species Act (CESA, 14 California Code of Regulations 670.5) or the Federal Endangered Species Act (ESA, 50 Code of Federal Regulations 17.12);
- Listed as a Species of Special Concern (SSC) by CDFW or protected under the California Fish and Game Code (i.e Fully Protected Species);
- Ranked by the CNPS as 1A, 1B, or 2;
- Protected under the Migratory Bird Treaty Act (MBTA);
- Protected under the Bald and Golden Eagle Protection Act; or
- Species that are otherwise protected under policies or ordinances at the local or regional level as required by the California Environmental Quality Act (CEQA, §15380).

Critical Habitat

The ESA requires that critical habitat be designated for all species listed under the ESA. Critical habitat is designated for areas that provide essential habitat elements that enable a species survival and which are occupied by the species during the species listing under the ESA. Areas outside of the species range of occupancy during the time of its listing can also be determined as critical habitat if the agency decides that the area is essential to the conservation of the species. The USFWS Critical Habitat Portal was accessed on October 30, 2018 to determine if critical habitat occurs within the BSA. Appropriate Federal Registers were also used to confirm the presence or absence of critical habitat.

Sensitive Natural Communities

Sensitive Natural Communities (SNCs) are monitored by CDFW with the goal of preserving these areas of habitat that are rare or ecologically important. Many SNCs are designated because they represent a historical landscape and are typically preserved as valued components of California's diverse habitat assemblage.

Waters of the United States

A delineation of waters of the United States was conducted by Gallaway Enterprises on October 4, 2018. One wetland, a seasonal swale has been preliminarily determined to occur on the Project site (**Appendix B; Wetland Delineation Map**).

Biological and Botanical Surveys

A field survey was conducted on October 4, 2018 by Gallaway Enterprises senior botanist, Elena Gregg. A habitat assessment and a protocol-level rare plant survey were conducted to determine the presence of special-status species and their habitats within the BSA.

Habitat Assessment

A habitat assessment of the BSA was conducted on October 4, 2018. The purpose of the habitat assessment was to determine if suitable habitat occurs within the BSA for special-status species. The habitat assessment was conducted by walking the entire BSA and recording specific habitat types and elements. If habitat was observed for special-status species it was then evaluated for quality based on vegetation composition and structure, physical features (e.g. soils, elevation), micro-climate, surrounding area, presence of predatory species and available resources (e.g. prey items, nesting substrates), and land use patterns. A list of wildlife species observed utilizing or moving through the BSA is provided as **Appendix C**.

Plant Surveys

A protocol-level rare plant survey was conducted on October 4, 2018 for slender Orcutt grass (*Orcuttia tenuis*). Slender Orcutt grass was found on the adjacent property to the west during surveys conducted on June 14, 2016. This population of slender Orcutt grass was visited as a reference population by Mrs. Gregg on October 4, 2018 prior to conducting the protocol-level survey within the BSA. Within this reference population, slender Orcutt grass had gone to seed but was visible and identifiable (see picture of reference site in **Appendix D**). Additionally, a general plant survey and a habitat evaluation for rare plant species that were not blooming or otherwise identifiable on the date surveyed was conducted on October 4, 2018. The surveys and habitat evaluation were conducted by walking all accessible areas of the BSA and taking inventory of observed botanical species. A list of plant species observed during the protocol-level survey is provided as **Appendix C**.

RESULTS

Vegetation Communities

Annual Grassland

Annual grassland habitat was present within the BSA in the upland portions of the site abutting the drainages. The annual grassland within the southwestern portion of the BSA had been mowed prior to the September site visit. The dominant species observed in the annual grassland within the BSA included Spanish lotus (*Acmispon americanus*), wall hare barley (*Hordeum murinum*), wild oats (*Avena fatua*), medusahead (*Elymus caput-medusae*), soft chess (*Bromus hordeaceous*), yellow star thistle (*Centaurea solstitialis*), rose clover (*Trifolium hirtum*), and Fitch's spikeweed (*Centromadia fitchii*). This habitat type provides foraging ground for a variety of wildlife species and breeding habitat for terrestrial reptiles and ground nesting mammals and birds.

Oak Woodland

The southern portion of the BSA is located in historical mixed oak woodland. The majority of historical oak woodland was removed in the mid to late 1960's, leaving only a sparse, open tree canopy of valley oaks (*Quercus lobata*) within the BSA. The understory is composed of annual herbaceous grasses and forbs. Wildlife species that forage on acorns benefit tremendously from this habitat type and find mature stands optimal for breeding if other habitat requirements and resources are met. Species that are commonly associated with oak woodlands include acorn woodpecker (*Melanerpes formicivorus*), California ground squirrel (*Otospermophilus beecheyi*), and western gray squirrel (*Sciurus griseus*).

Aquatic Habitat

Seasonal Swale

One seasonal swale occurs within the annual grassland habitat along the southern boundary of the BSA. This seasonal swale comprises approximately 0.05 acre of the BSA. Seasonal swales are depressional features that function as low drainage pathways that typically connect to and help feed wetland or other drainage features. This swale continues offsite to the east where it flows directly into Clover Creek. Pictures of the seasonal swale present on the site taken during the field visit are provided as **Appendix D**.

Non-vegetated Habitat

Barren

Barren habitat is typified by non-vegetated soil, rock, paved roads and gravel. There is one dirt access road that crosses through the northwestern corner of BSA. This dirt access road is largely void of vegetation. The barren habitat type provides low quality habitat to wildlife.

Critical Habitat

USFWS designated critical habitat for slender Orcutt grass occurs within the BSA. The unit of designated critical habitat, as described under the federal register, 71 FR 7287, is unit 2B (**Figure 4**). Not all USFWS mapped critical habitat for slender Orcutt grass is actually suitable vernal pool habitat (i.e vernal pools and associated uplands). USFWS critical habitat mapping is not precise enough to account for existing non-habitat elements within the mapped unit, such as grasslands, roadways, oak woodlands and other similar elements. Therefore, field surveys and desktop analysis were used to determine and calculate critical habitat that will be directly impacted and eliminate non-habitat elements.

Sensitive Natural Communities

There are no areas mapped as a SNC and none occur within the BSA

Waters of the United States

Approximately 0.05 acres of waters of the US that fall under the United States Army Corps of Engineers'

(Corps) jurisdiction were identified within the BSA. The jurisdictional waters include one seasonal swale. No additional waters were identified within the BSA. A draft wetland delineation report and map have been prepared and will be submitted to the Corps for verification. The draft delineation of waters of the US map is provided in **Appendix B.**

Special-Status Species

A summary of special-status species assessed for potential occurrence within the BSA based on the USFWS IPaC species list, CNDDB query for the 7.5 minute USGS "Enterprise" quadrangle, and the CNPS list of rare and endangered plants within the 7.5 minute USGS "Enterprise" quadrangle, and their potential to occur within the BSA are described in **Table 1**. Potential for occurrence was determined by reviewing database queries from federal and state agencies and evaluating habitat characteristics. Species were not included in the special-status species summary table if the habitat requirements for the species or the species' range does not occur in the BSA (ex. Shasta crayfish (*Pacifastacus fortis*) only occur in water bodies within the Pit River and Fall River watershed, and the BSA is not within the Pit River or Fall River watershed).

Table 1. Special-status Species and Sensitive Natural Communities and Their Potential to Occur in the BSA of the Maryann Faire Project, Redding, CA.

Common Name (*Scientific Name*)	Status Fed/State/CNPS	Associated Habitats	Potential for Occurrence
SENSITIVE NATURAL COMMUNITIES			
There are no sensitive natural communities within the BSA as described by CDFW.			
PLANTS			
Henderson's bent grass (*Agrostis hendersonii*)	_/_/3.2	Vernal pools, vernally moist areas, often gravelly substrate. Blooms: Apr-Jun.	None. No vernal pool habitat or gravelly substrate is present in the BSA.
Legenere (*Legenere limosa*)	_/_/1B.1	Vernal pool, Wetland. Blooms: Apr-Jun.	None. No vernal pool habitat is present in the BSA.
Red Bluff dwarf rush (*Juncus leiospermus var. leiospermus*)	_/_/1B.1	Shallow vernal pools and vernally mesic habitat. Blooms: Mar-Jun.	Low. Sub-marginal habitat is present in the BSA.
Silky cryptantha (*Cryptantha crinita*)	_/_/1B.2	On cobble bars of streams with open canopy. (BP: Apr – May)	None. There is no stream habitat or cobble substrate in the swale present within the BSA.
Slender Orcutt grass (*Orcuttia tenuis*)	FT/SE/1B.1	Vernal pool, often in gravelly substrate. Blooms: May-Sep(Oct).	None. There is no vernal pool habitat is present in the BSA.

Common Name *(Scientific Name)*	**Status** Fed/State/CNPS	**Associated Habitats**	**Potential for Occurrence**
INVERTEBRATES			
Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)	FT/_/_	Blue elderberry shrubs usually associated with riparian areas.	None. No blue elderberry shrubs occur within the BSA.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT/_/_	Vernal pools and seasonally ponded areas.	None. There is no vernal pool habitat within the BSA. The seasonal swale contains flowing water which is not suitable habitat for this species.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FE/_/_	Deep vernal pools.	None. There is no vernal pool habitat within the BSA. The seasonal swale contains flowing water which is not suitable habitat for this species.
FISH			
There are no streams within the BSA.			
AMPHIBIANS			
California Red-legged Frog (*Rana draytonii*)	FT/SSC/_	Ponds in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover.	None. There is no suitable breeding or summer habitat within the BSA and CRLFs have been extirpated from the Central Valley since 1960 (USFWS 2002).
Foothill yellow-legged frog (*Rana boylii*)	_/SC/_	Streams with consistent flow, slow side waters with cobble and boulders for oviposition.	None. There is no suitable breeding or summer habitat within the BSA. There are also no nearby CNDDB occurrences.
Western spadefoot (*Spea hammondii*)	_/SSC/_	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland.	None. There is no suitable habitat within the BSA that ponds for pong enough duration or is stagnate for long enough to support this species.
REPTILES			
Western pond turtle (*Emys marmorata*)	_/SSC/_	Perennial bodies of water with deep pools, locations for haul out, and locations for oviposition.	None. There are no ponds or perennial waters within the BSA.

Common Name *(Scientific Name)*	Status Fed/State/CNPS	Associated Habitats	Potential for Occurrence
BIRDS			
Bald Eagle (*Haliaeetus leucocephalus*)	_/SE, FP/_	Coast, large lakes and river systems with open forests with large trees and snags near permanent water.	None. The nearest CNDDB occurrence is within 5 miles of the BSA; however, there is no suitable nesting or foraging habitat within the BSA.
Tricolored blackbird (*Agelaius tricolor*)	FC/ ST/_	Fresh emergent wetlands, blackberry brambles, agricultural fields and grasslands	None. There is no nesting habitat within the BSA.

CODE DESIGNATIONS	
FE = Federally-listed Endangered **FT** = Federally-listed Threatened **FC** = Federal Candidate Species **SE** = State-listed Endangered **ST** = State-listed Threatened **SC** = State Candidate for Listing as Threatened or Endangered **SR** = State-listed Rare **SSC** = State Species of Special Concern **FP** =CDFW Fully Protected Species **SNC** = CDFW Sensitive Natural Community	**CRPR 1B** = Rare or Endangered in California or elsewhere **CRPR 2** = Rare, Threatened or Endangered in California, more common elsewhere **CRPR 3** = More information is needed **CRPR 4** = Plants with limited distribution, not considered rare, threatened or endangered **0.1** =Seriously Threatened **0.2** = Fairly Threatened **0.3** = Not very Threatened
Potential for Occurrence: Any bird or bat species could fly over the BSA, but this is not considered a potential occurrence. The categories for the potential for occurrence include: **None:** The species or natural community does not occur, and has no potential to occur in the BSA based on sufficient surveys, the lack suitable habitat, and/or the BSA is well outside of the known distribution of the species. **Low:** Potential habitat in the BSA is sub-marginal and/or the species is known to occur in the vicinity of the BSA. **Moderate:** Suitable habitat is present in the BSA and/or the species is known to occur in the vicinity of the BSA. Pre-construction surveys may be required. **High:** Habitat in the BSA is highly suitable for the species and there are reliable records close to the BSA, but the species was not observed. Pre-construction surveys required. **Known:** Species was detected in the BSA or a recent reliable record exists for the BSA.	

Endangered, Threatened and Rare Plants

A general plant survey and a habitat assessment were conducted within the BSA on October 4, 2018. Additionally, a protocol-level survey was conducted for slender Orcutt grass. There were no endangered, threatened or rare plants observed within the BSA. The habitat assessment identified a lack of suitable habitat for all but one of the special-status plant species listed in **Table 1** within the BSA. Due to the presence of a mesic depression within the BSA, the potential for Red Bluff dwarf rush to occur within the BSA is addressed below. Further, since the BSA occurs within USFWS designated critical habitat for slender Orcutt grass, this is addressed below. A list of the plant species observed during the survey is provided in **Appendix C**.

Red Bluff Dwarf Rush

Red Bluff dwarf rush is ranked as a 1B.1 plant under the CNPS. It is endemic to California and only occurs in the northern portion of the Central Valley and Sierra Nevada foothills. Red Bluff dwarf rush is a small, grass-like annual herb, ranging from 2 to 12 centimeters in height, that blooms from March through May. It can be found within vernal pools and other moist areas with similar vernal hydrology. Current threats facing Red Bluff dwarf rush is loss of habitat, changes in hydrology and invasive species.

CNDDB Occurrences

There are 3 Red Bluff dwarf rush CNDDB occurrences within 0.4 miles of the BSA, one occurring to the west (Occurrence # 40), one occurring to the northeast (Occurrence # 50) and one occurring to the southeast (Occurrence # 45). Occurrence # 40 was last observed in 2002, Occurrence # 45 was last seen in 2003 and Occurrence # 50 was last seen in 2008. All 3 occurrences are presumed to be extant (i.e. presumed to be still in existence until evidence to the contrary is received by the CNDDB) (CNDDB 2018).

Status of Red Bluff Dwarf Rush occurring in the BSA

The seasonal swale does not provide suitable habitat for Red Bluff dwarf rush due to the longer hydroperiod of this feature. There was, however, one mesic area that provides sub-marginal habitat for Red Bluff dwarf rush (see picture in **Appendix D**). However, this mesic area did not contain any of the plant species that are typical associates of Red Bluff dwarf rush. Typical associates of Red Bluff dwarf rush include vernal pool endemics however the mesic area was dominated by generalist facultative species and facultative upland species including perennial ryegrass (*Festuca perennis*), Fitch's spikeweed (*Centromadia fitchii*), and clustered clover (*Trifolium glomeratum*) indicating that this mesic area is too dry for Red Bluff dwarf rush. Additionally, a protocol level survey for Red Bluff dwarf rush was conducted in 2016 on the adjacent property to the immediate south of the BSA which contains similar mesic depressions in addition to vernal pools with negative findings. Based on the poor habitat present and the lack of observance of this species within and immediately adjacent to the BSA, Red Bluff dwarf rush is not expected to occur within the BSA and the Project is expected to have no effect on this species.

Slender Orcutt Grass Critical Habitat

Critical habitat for slender Orcutt grass has been described under the federal register, 71 FR 7287. Slender Orcutt grass is listed under the ESA as threatened and under the CESA as endangered. Not all USFWS mapped critical habitat for slender Orcutt grass is actually suitable vernal pool habitat. Slender Orcutt grass occurs in deep vernal pools that are inundated for a long period of time and often can be found in the deepest section of the pool or swale. It has also been found in habitats other than vernal pools such as stock ponds and artificial wetlands.

CNDDB Occurrences

The BSA is located entirely within unit 2B of USFWS designated critical habitat for slender Orcutt grass.

The closest CNDDB recorded occurrence of slender Orcutt grass (Occurrence # 4) is located approximately 2 miles southeast of the BSA. It was last observed in 2011 and is possibly extirpated (i.e. evidence of habitat destruction, or population extirpation has been received by the CNDDB for this site, but questions remain as to whether the element still exists) (CNDDB 2018). However, there is a population of slender Orcutt grass within 500 feet to the west of the BSA that has not yet been updated to CNDDB RareFind. This population was observed in a deep vernal pool on June 14, 2016 by Mrs. Gregg.

Status of Slender Orcutt Grass Critical Habitat occurring in the BSA

While the BSA is mapped within unit 2B of the USFWS designated slender Orcutt grass critical habitat, slender Orcutt grass was not observed within the BSA during the protocol-level survey and the one seasonal wetland present within the BSA does not contain suitable vernal pool habitat for this species. Since there is no suitable habitat for slender Orcuttt grass and the plant was not observed within the BSA, none of the necessary critical habitat elements occur within the BSA. Therefore, the Project will have no impact on slender Orcutt grass critical habitat.

Endangered, Threatened and Special Status Wildlife

A wildlife habitat assessment was conducted within the BSA on October 4, 2018. Suitable habitat was identified for several avian species protected under the MBTA. Moderately suitable habitat for bats designated as SSC was also identified within the BSA. Due to the velocity of flowing water within the seasonal swale present within the BSA, this wetland feature was determined to not contain suitable habitat for vernal pool fairy shrimp or vernal pool tadpole shrimp and therefore, there is no potential for listed vernal pool branchiopods to occur within the BSA.

Migratory Birds and Raptors

Nesting birds are protected under the MBTA (16 USC 703) and the California Fish and Game Code (CFGC) (§3503). The MBTA (16 USC §703) prohibits the killing of migratory birds or the destruction of their occupied nests and eggs except in accordance with regulations prescribed by the USFWS. The bird species covered by the MBTA includes nearly all of those that breed in North America, excluding introduced (i.e. exotic) species (50 Code of Federal Regulations §10.13). Activities that involve the removal of vegetation including trees, shrubs, grasses, and forbs or ground disturbance has the potential to affect bird species protected by the MBTA.

The CFGC (§3503.5) states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks, eagles, and falcons) or Strigiformes (owls) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Take includes the disturbance of an active nest resulting in the abandonment or loss of young. The CFGC (§3503) also states that "it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto."

CNDDB Occurrences

The majority of migratory birds and raptors protected under the MBTA and CFGC are not recorded on the CNDDB because they are abundant and widespread.

Status of Migratory Birds and Raptors occurring in the BSA

There is suitable nesting habitat for a variety of ground and tree nesting avian species throughout the BSA. A diversity of avian species has the potential to nest in the BSA based on the variety of habitat types.

Tree-roosting Bats

Bat populations are increasingly becoming at risk and have seen noticeable declines. Some species are now recognized as SSC in the State of California. Bats are nocturnal mammals that congregate in small to large roosting colonies. They prefer areas that provide adequate temperature, moisture and light regimes which include bridges, hollow trees, caves, rock crevices and exfoliating tree bark. Bats typically become active in March to October, with their maternity season occurring from April - August (breeding season), and undergo torpor from late October to early February. Knowingly harming, harassing, or killing a colony of roosting bats is viewed as a significant impact under CEQA.

CNDDB Occurrences

There are no current CNDDB occurrences of bats within 5 miles of the BSA; however, the presence of bats is not well documented and so they are not frequently recorded on the CNDDB.

Status of tree-roosting bats occurring in the BSA

The BSA provides suitable habitat for some tree-roosting bat species. The BSA is adjacent to dense oak woodland to the east and within the BSA the trees present are large with a few containing cavities from decay. Due to the presence of suitable habitat but the lack of nearby CNDDB occurrences there is a moderate potential for tree-roosting bats to utilize the trees within the BSA for roosting habitat.

REGULATORY FRAMEWORK

The following describes federal, state, and local environmental laws and policies that may be relevant if the BSA were to be developed or modified.

Federal

Waters of the United States, Clean Water Act, Section 404

The Corps and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredged or fill material into jurisdictional waters of the United States, under the Clean Water Act (§404). The term “waters of the United States” is an encompassing term that includes “wetlands” and “other waters.” Wetlands have been defined for regulatory purposes as follows: “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3, 40 CFR 230.3). Wetlands generally include swamps, marshes, bogs, and similar areas.” other waters of the United States are seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other surface water features, that exhibit an ordinary high-water mark but lack positive indicators for one or more of the three wetland parameters (i.e., hydrophytic vegetation, hydric soil, and wetland hydrology) (33 CFR 328.4).

The Corps may issue either individual permits on a case-by-case basis or general permits on a program level. General permits are pre-authorized and are issued to cover similar activities that are expected to cause only minimal adverse environmental effects. Nationwide permits are general permits issued to cover particular fill activities. All nationwide permits have general conditions that must be met for the permits to apply to a particular project, as well as specific conditions that apply to each nationwide permit.

Clean Water Act, Section 401

The Clean Water Act (§401) requires water quality certification and authorization for placement of dredged or fill material in wetlands and Other Waters of the United States. In accordance with the Clean Water Act (§401), criteria for allowable discharges into surface waters have been developed by the State Water Resources Control Board, Division of Water Quality. The resulting requirements are used as criteria in granting National Pollutant Discharge Elimination System (NPDES) permits or waivers, which are obtained through the Regional Water Quality Control Board (RWQCB) per the Clean Water Act (§402). Any activity or facility that will discharge waste (such as soils from construction) into surface waters, or from which waste may be discharged, must obtain an NPDES permit or waiver from the RWQCB. The RWQCB evaluates an NPDES permit application to determine whether the proposed discharge is consistent with the adopted water quality objectives of the basin plan.

Federal Endangered Species Act

The United States Congress passed the ESA in 1973 to protect species that are endangered or threatened with extinction. The ESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend.

Under the ESA, species may be listed as either “endangered” or “threatened.” Endangered means a species is in danger of extinction throughout all or a significant portion of its range. Threatened means a species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. All species of plants and animals, except non-native species and pest insects, are eligible for listing as endangered or threatened. The USFWS also maintains a list of “candidate” species. Candidate species are species for which there is enough information to warrant proposing them for listing, but that have not yet been proposed. “Proposed” species are those that have been proposed for listing, but have not yet been listed.

The ESA makes it unlawful to “take” a listed animal without a permit. Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” Through regulations, the term “harm” is defined as “an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.”

Migratory Bird Treaty Act

The MBTA (16 USC §703) prohibits the killing of migratory birds or the destruction of their occupied nests and eggs except in accordance with regulations prescribed by the USFWS. The bird species covered by the MBTA includes nearly all of those that breed in North America, excluding introduced (i.e. exotic) species (50 Code of Federal Regulations §10.13). Activities that involve the removal of vegetation including trees, shrubs, grasses, and forbs or ground disturbance has the potential to affect bird species protected by the MBTA. Thus, vegetation removal and ground disturbance in areas with breeding birds should be conducted outside of the breeding season (approximately March 1 through August 31 in the Central Valley). If vegetation removal or ground disturbance activities are conducted during the breeding season, then a qualified biologist must determine if there are any nests of bird species protected under the MBTA present in the construction area prior to commencement of construction. If active nests are located or presumed present, then appropriate avoidance measures (e.g. spatial or temporal buffers) must be implemented.

State of California

California Endangered Species Act

The CESA is similar to the ESA, but pertains to state-listed endangered and threatened species. The CESA requires state agencies to consult with the CDFW when preparing documents to comply with CEQA. The purpose is to ensure that the actions of the lead agency do not jeopardize the continued existence of a listed species or result in the destruction, or adverse modification of habitat essential to the continued existence of those species. In addition to formal listing under the federal and state endangered species acts, "species of special concern" receive consideration by CDFW. Species of special concern are those whose numbers, reproductive success, or habitat may be threatened.

California Fish and Game Code (§3503.5)

The CFGC (§3503.5) states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks, eagles, and falcons) or Strigiformes (all owls except barn owls) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Take includes the disturbance of an active nest resulting in the abandonment or loss of young. The CFGC (§3503) also states that "it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto."

Lake and Streambed Alteration Agreement, CFGC (§1602)

The CDFW is a trustee agency that has jurisdiction under the CFGC (§1600 et seq.). The California Fish and Game Code (§1602), requires that a state or local government agency, public utility, or private entity must notify CDFW if a proposed project will "substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds… except when the department has been notified pursuant to Section 1601." If an existing fish or wildlife resource may be substantially adversely affected by the activity, CDFW may propose reasonable measures that will allow protection of those resources. If these measures are agreeable to the parties involved, they may enter into an agreement with CDFW identifying the approved activities and associated mitigation measures.

Rare and Endangered Plants

The CNPS maintains a list of plant species native to California with low population numbers, limited distribution, or otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. Potential impacts to populations of CNPS California Rare Plant Rank (CRPR) plants receive consideration under CEQA review. The CNPS CRPR categorizes plants as follows:

- Rank 1A: Plants presumed extinct in California;
- Rank 1B: Plants rare, threatened, or endangered in California or elsewhere;
- Rank 2A: Plants presumed extirpated or extinct in California, but not elsewhere;
- Rank 2B: Plants rare, threatened, or endangered in California, but more numerous elsewhere;
- Rank 3: Plants about which we need more information; and
- Rank 4: Plants of limited distribution.

The California Native Plant Protection Act (CFGC §1900-1913) prohibits the taking, possessing, or sale within the state of any plants with a state designation of rare, threatened, or endangered as defined by CDFW. An exception to this prohibition allows landowners, under specific circumstances, to take listed plant species, provided that the owners first notify CDFW and give the agency at least 10 days to retrieve (and presumably replant) the plants before they are destroyed. Fish and game Code §1913 exempts from the 'take' prohibition "the removal of endangered or rare native plants from a canal, lateral channel, building site, or road, or other right of way."

California Environmental Quality Act Guidelines §15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines §15380(d) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled based on the definition in the ESA and the section of the CFGC dealing with rare, threatened, and endangered plants and animals. The CEQA Guidelines (§15380) allows a public agency to undertake a review to determine if a significant effect on species that have not yet been listed by either the USFWS or CDFW (e.g. candidate species, species of concern) would occur. Thus, CEQA provides an agency with the ability to protect a species from a project's potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

CONCLUSIONS AND RECOMMENDATIONS

Endangered, Threatened, and Rare Plants

Due to the low to no potential for occurrence for special-status plant species in the BSA, there are no further surveys or mitigation measures recommended. Although the BSA is within USFWS designated critical habitat for slender Orcutt grass, no critical habitat elements for this species occurs within the

BSA and this plant species was not observed within the BSA during the protocol-level survey. As such, the Project will have no effect on slender Orcutt grass critical habitat.

Endangered, Threatened, and Special-status Wildlife

Migratory Birds and Raptors

To avoid impacts to avian species protected under the MBTA and the CFGC the following are recommended avoidance and minimization measures for migratory birds and raptors:

- Project activities including site grubbing and vegetation removal shall be initiated outside of the bird nesting season (February 1 – August 31).
- If Project activities cannot be initiated outside of the bird nesting season than the following will occur:
    - A qualified biologist will conduct a pre-construction survey within 250 feet of the BSA, where accessible, within 7 days of starting Project activities.
    - If an active nest (i.e. containing egg(s) or young) is observed within the BSA or in an area adjacent to the BSA where impacts could occur, then a species protection buffer will be established. The species protection buffer will be defined by the qualified biologist based on the species, nest type and tolerance to disturbance. Construction activity shall be prohibited within the buffer zones until the young have fledged or the nest fails. Nests shall be monitored by a qualified biologist once per week and a report submitted to the CEQA lead agency weekly.

Tree-roosting Bats

To minimize impacts to tree-roosting bat species protected by the CFGC the following are recommended avoidance and minimization measures:

- If mature trees are removed or trimmed, the removal or trimming activity should be performed between September 16 and March 15 (outside of the bat maternity season). Trees should be removed at dusk to minimize impacts to tree-roosting bats.

Other Natural Resources

Waters of the United States

If activities occur within the ordinary high water mark and/or result in fill or discharge to any waters of the United States which include but are not limited to, intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, vernal pools or natural ponds, then the following will need to be obtained:

- Prior to any discharge or fill material into waters of the United States, authorization under a Nationwide Permit or Individual Permit shall be obtained from the Corps. For fill requiring a Corps permit, a water quality certification from the Regional Water Quality Board (Clean Water Act §401) shall also be obtained prior to discharge of dredged or fill material.

- Prior to any activities that would obstruct the flow of or alter the bed, channel, or bank of any perennial, intermittent or ephemeral creeks, notification of streambed alteration shall be submitted to the CDFW, and, if required, a Lake and Streambed Alteration Agreement (§1602) shall be obtained.

Mitigation requirements for the fill of waters of the United States will be implemented through an onsite restoration plan, and/or an In Lieu Fund and/or a certified mitigation bank with a Service Area that covers the Project area. These agreements, certifications and permits may be contingent upon successful completion of the CEQA process.

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LIST OF PREPARERS

Elena Gregg. Senior Botanist. B.S. in Environmental Biology and Management, University California, Davis, Davis, California. Mrs. Gregg has over 12 years of experience conducting protocol-level botanical surveys, analyzing data, and preparing reports.

Melissa Murphy. Biologist. B.S. in Environmental Science, San Diego State University. Ms. Murphy has over 7 years of experience conducting handling and capturing wildlife, conducting compliance monitoring, performing protocol level wildlife surveys, delineating jurisdictional wetlands, analyzing data, and preparing reports.

Cate Davis. GIS Analyst and Cultural Resource Specialist. Master of Arts in Anthropology with a specialization in GIS applications and land use studies, California State University, Chico. Miss. Davis has over 5 years of experience working with GIS while incorporating surveying applications, analysis of datasets, and collection of field data in order to create professional quality graphics and reports.

Appendix A

Species Lists

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: October 30, 2018
Consultation Code: 08ESMF00-2019-SLI-0221
Event Code: 08ESMF00-2019-E-00642
Project Name: Maryanne Fair

Subject: List of threatened and endangered species that may occur in your proposed project location, and/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, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) 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 Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

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 ECOS-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 ECOS-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:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

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 Tracking Number 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

Consultation Code: 08ESMF00-2019-SLI-0221

Event Code: 08ESMF00-2019-E-00642

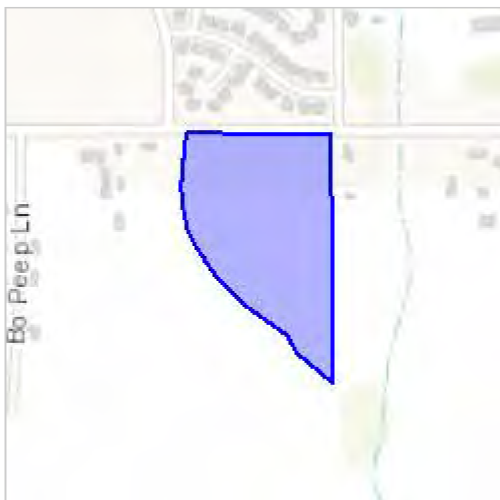
Project Name: Maryanne Fair

Project Type: DEVELOPMENT

Project Description: Commercial and residential development

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/40.53292176020744N122.31589237279681W



Counties: Shasta, CA

Endangered Species Act Species

There is a total of 8 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.

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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 is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1123	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850 Habitat assessment guidelines: https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. Your location is outside 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 is outside 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 is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Slender Orcutt Grass *Orcuttia tenuis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1063	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Slender Orcutt Grass *Orcuttia tenuis* https://ecos.fws.gov/ecp/species/1063#crithab	Final

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Enterprise (4012253))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
bald eagle *Haliaeetus leucocephalus*	ABNKC10010	Delisted	Endangered	G5	S3	FP
bank swallow *Riparia riparia*	ABPAU08010	None	Threatened	G5	S2	
California linderiella *Linderiella occidentalis*	ICBRA06010	None	None	G2G3	S2S3	
chinook salmon - Central Valley spring-run ESU *Oncorhynchus tshawytscha pop. 6*	AFCHA0205A	Threatened	Threatened	G5	S1	
chinook salmon - Sacramento River winter-run ESU *Oncorhynchus tshawytscha pop. 7*	AFCHA0205B	Endangered	Endangered	G5	S1	
dubious pea *Lathyrus sulphureus var. argillaceus*	PDFAB25101	None	None	G5T1T2	S1S2	3
foothill yellow-legged frog *Rana boylii*	AAABH01050	None	Candidate Threatened	G3	S3	SSC
Great Valley Cottonwood Riparian Forest *Great Valley Cottonwood Riparian Forest*	CTT61410CA	None	None	G2	S2.1	
Great Valley Valley Oak Riparian Forest *Great Valley Valley Oak Riparian Forest*	CTT61430CA	None	None	G1	S1.1	
Great Valley Willow Scrub *Great Valley Willow Scrub*	CTT63410CA	None	None	G3	S3.2	
Henderson's bent grass *Agrostis hendersonii*	PMPOA040K0	None	None	G2Q	S2	3.2
legenere *Legenere limosa*	PDCAM0C010	None	None	G2	S2	1B.1
Red Bluff dwarf rush *Juncus leiospermus var. leiospermus*	PMJUN011L2	None	None	G2T2	S2	1B.1
Shasta chaparral *Trilobopsis roperi*	IMGASA2030	None	None	G1	S1	
silky cryptantha *Cryptantha crinita*	PDBOR0A0Q0	None	None	G2	S2	1B.2
silver-haired bat *Lasionycteris noctivagans*	AMACC02010	None	None	G5	S3S4	
slender Orcutt grass *Orcuttia tenuis*	PMPOA4G050	Threatened	Endangered	G2	S2	1B.1
steelhead - Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	AFCHA0209K	Threatened	None	G5T2Q	S2	
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Candidate Endangered	G2G3	S1S2	SSC
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	IICOL48011	Threatened	None	G3T2	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
vernal pool fairy shrimp *Branchinecta lynchi*	ICBRA03030	Threatened	None	G3	S3	
vernal pool tadpole shrimp *Lepidurus packardi*	ICBRA10010	Endangered	None	G4	S3S4	
western pearlshell *Margaritifera falcata*	IMBIV27020	None	None	G4G5	S1S2	
western pond turtle *Emys marmorata*	ARAAD02030	None	None	G3G4	S3	SSC
western spadefoot *Spea hammondii*	AAABF02020	None	None	G3	S3	SSC

Record Count: 25

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants - 7th edition interface

v7-18mar 3-19-18

Status: search results for "+"Enterprise (647D) 4012253"" - Tue, Oct. 30, 2018 16:43 ET c

+"Enterprise (647D) 4012253" Search

Tip: `CNPS_LIST:"List 3"` (note the field name) returns only taxa on List 3. `"List 3"` by itself, matches the phrase wherever found. Browse the list of **field names**.[all tips and help.][search history]

Hits 1 to 6 of 6

Requests that specify topo quads will return only Lists 1-3.

To save selected records for later study, click the ADD button.

ADD checked items to Plant Press | check all | check none

Selections will appear in a new window.

open	save	hits	scientific	common	family	CNPS
		1	**Agrostis hendersonii**	Henderson's bent grass	Poaceae	List 3.2
		1	**Cryptantha crinita**	silky cryptantha	Boraginaceae	List 1B.2
		1	**Juncus leiospermus** var. **leiospermus**	Red Bluff dwarf rush	Juncaceae	List 1B.1
		1	**Legenere limosa**	legenere	Campanulaceae	List 1B.1
		1	**Orcuttia tenuis**	slender Orcutt grass	Poaceae	List 1B.1
		1	**Sidalcea celata**	Redding checkerbloom	Malvaceae	List 3

No more hits.

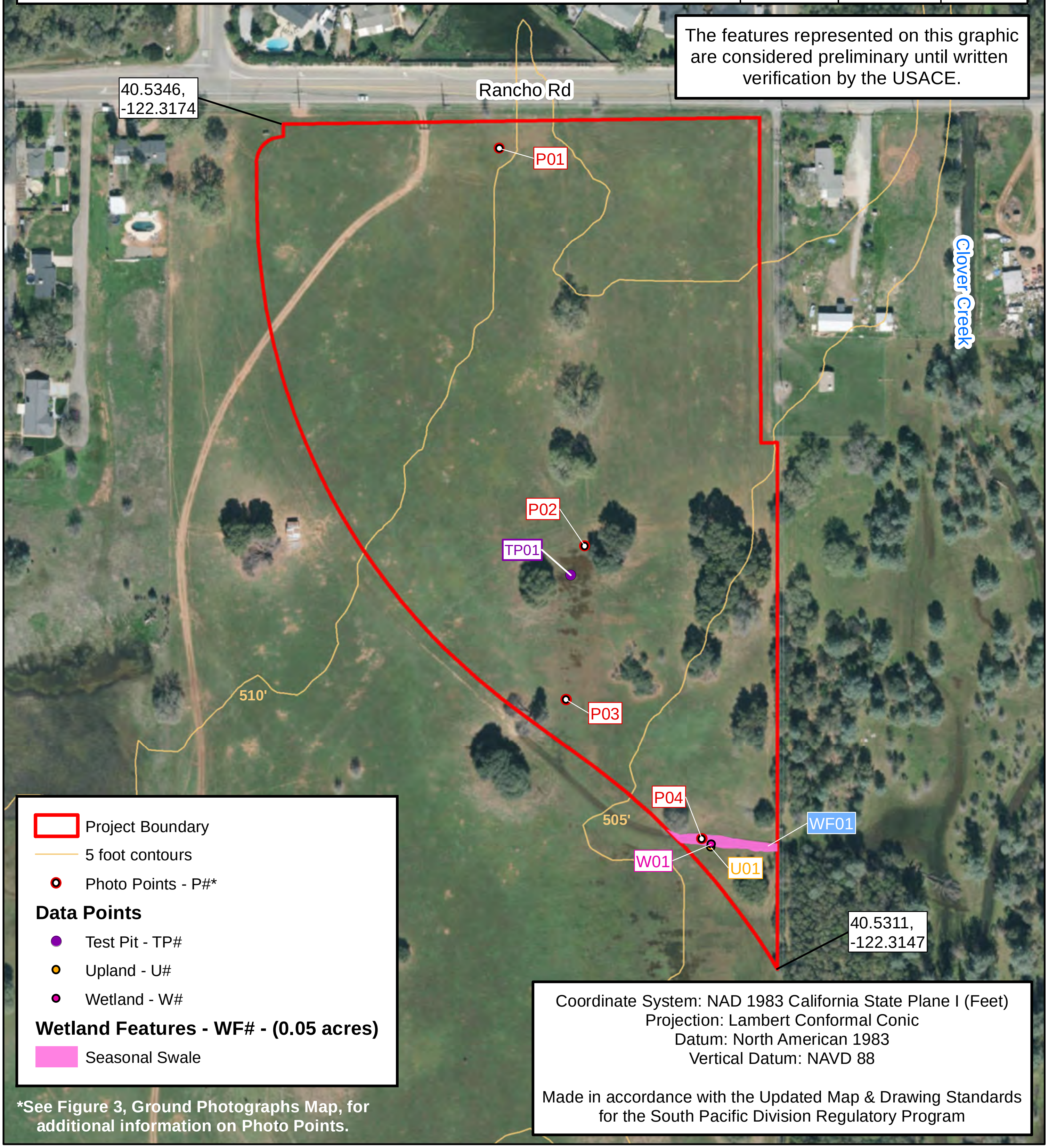
Appendix B

Draft Delineation of Waters of the United States Map

Draft Delineation of Waters of the U.S.

Adjacent Wetland Features

Label	Cowardin	Type	Designation	Location (Lat/Long)		Width (ft)	Length (ft)	Area (sq ft)	Acres
WF01	PUB4	Seasonal Swale	Neighboring	40.531649	-122.314955	NA	NA	2373.6	0.05
					Adjacent Wetland Features Totals =	**NA**		**2373.6**	**0.05**
					Total Waters of the U.S. =	**NA**		**2373.6**	**0.05**



NORTH

1:2,400 1 inch = 200 feet

0 100 200 Feet

Data Sources: ESRI, Shasta County, City of Redding Imagery 3/17/16

Maryann Faire Project
Draft Delineation of Waters of the U.S.
Figure 4

Map By: C. Davis
Delineation By: E. Gregg
GE: #17-187

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Map Date: 10/08/18

Appendix C

Observed Species Lists

Plant Species Observed October 4, 2018	
Scientific Name	**Common Name**
Acmispon americanus	Spanish lotus
Aira caryophyllea	Silver hairgrass
Avena barbata	Wild oats
Briza minor	Lesser quaking-grass
Bromus diandrus	Rip-gut brome
Bromus hordeaceus	Soft chess
Carduus pycnocephalus	Italian thistle
Centaurea solstitialis	Yellow star thistle
Centromadia fitchii	Fitch's spikeweed
Crassula tillaea	Moss pygmyweed
Croton setiger	Turkey-mullein
Cynosurus echinatus	Hedgehog dogtail
Elymus caput-medusae	Medusahead
Erodium botrys	Long-beaked stork's-bill
Erodium brachycarpum	Foothill filaree
Eryngium castrense	Coyote thistle
Euphorbia serpyllifolia	Thyme-leaved spurge
Festuca bromoides	Six-weeks fescue
Festuca perennis	Rye-grass
Gastridium phleoides	Nitgrass
Geranium dissectum	Cut-leaved geranium
Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
Hordeum murinum	Wall hare barley
Hypochaeris glabra	Smooth cat's ear
Juncus bufonius	Toadrush
Lactuca serriola	Prickly lettuce
Leontodon saxatilis	Hawkbit
Lepidium nitidum	Shinning pepperweed
Lupinus sp.	Lupine
Lythrum hyssopifolia	Hyssop loosestrife
Medicago polymorpha	Common bur-clover
Plagiobothrys sp.	Popcornflower
Poa annua	Annual bluegrass
Pogogyne zizyphoroides	Sacramento Valley pogogyne
Polypogon monspeliensis	Rabbitsfoot grass
Quercus lobata	Valley oak
Quercus wislizeni	Live oak
Rumex crispus	Curly dock
Sherardia arvensis	Field-madder
Silene gallica	Common catchfly
Sisymbrium officinale	Hedge mustard
Toxicodendron diversilobum	Poison oak
Trichostema lanceolatum	Vinegarweed
Trifolium glomeratum	Sessile-headed clover

Scientific Name	Common Name
Trifolium hirtum	Rose clover
Trifolium subterraneum	Sub clover

Wildlife Species Observed October 4, 2018	
Scientific Name	**Common Name**
Birds	
Aphelocoma californica	Scrub jay
Cathartes aura	Turkey vulture
Corvus brachyrhynchos	American crow
Melospiza melodia	Song Sparrow
Passer domesticus	House sparrow
Sturnus vulgaris	European starling
Zenaida macroura	Mourning dove
Mammals	
Otospermophilus beecheyi	California ground squirrel
Sciurus griseus	Western gray squirrel
Reptiles and Amphibians	
Sceloporus occidentalis	Western fence lizard

Appendix D

Site Photos Taken October 4, 2018

Picture of slender Orcutt grass observed at adjacent reference site

Picture of seasonal swale in the BSA looking west

Picture of mesic area within the BSA dominated by facultative upland plant species - not suitable for Red Bluff dwarf rush

DRAFT DELINEATION OF JURISDICTIONAL WATERS OF THE UNITED STATES

Maryann Faire Project

Redding, Shasta County, California

October 2018

Prepared for:
Palomar Builders, Inc.
Attn: Jeb Allen
2960 Innsbruck Drive
Redding, CA 96003

Prepared by:

Gallaway Enterprises

117 Meyers Street, Suite 120
Chico CA 95928
(530) 332-9909
www.gallawayenterprises.com

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DRAFT DELINEATION OF JURISDICTIONAL WATERS OF THE UNITED STATES,

Maryann Faire Project, Redding, Shasta County, California

Introduction and Project Location

Gallaway Enterprises conducted a delineation of waters of the United States (WOTUS) and aquatic resources for the approximately 15-acre Maryann Faire Project (Project) site located off of Rancho Road within the southeastern City Limits of Redding, California (**Figure 1 and 2**). The Project site is located within the USGS Enterprise Quadrangle, Section 21, Township 31N, Range 4W. The project currently proposed on the site is a residential development.

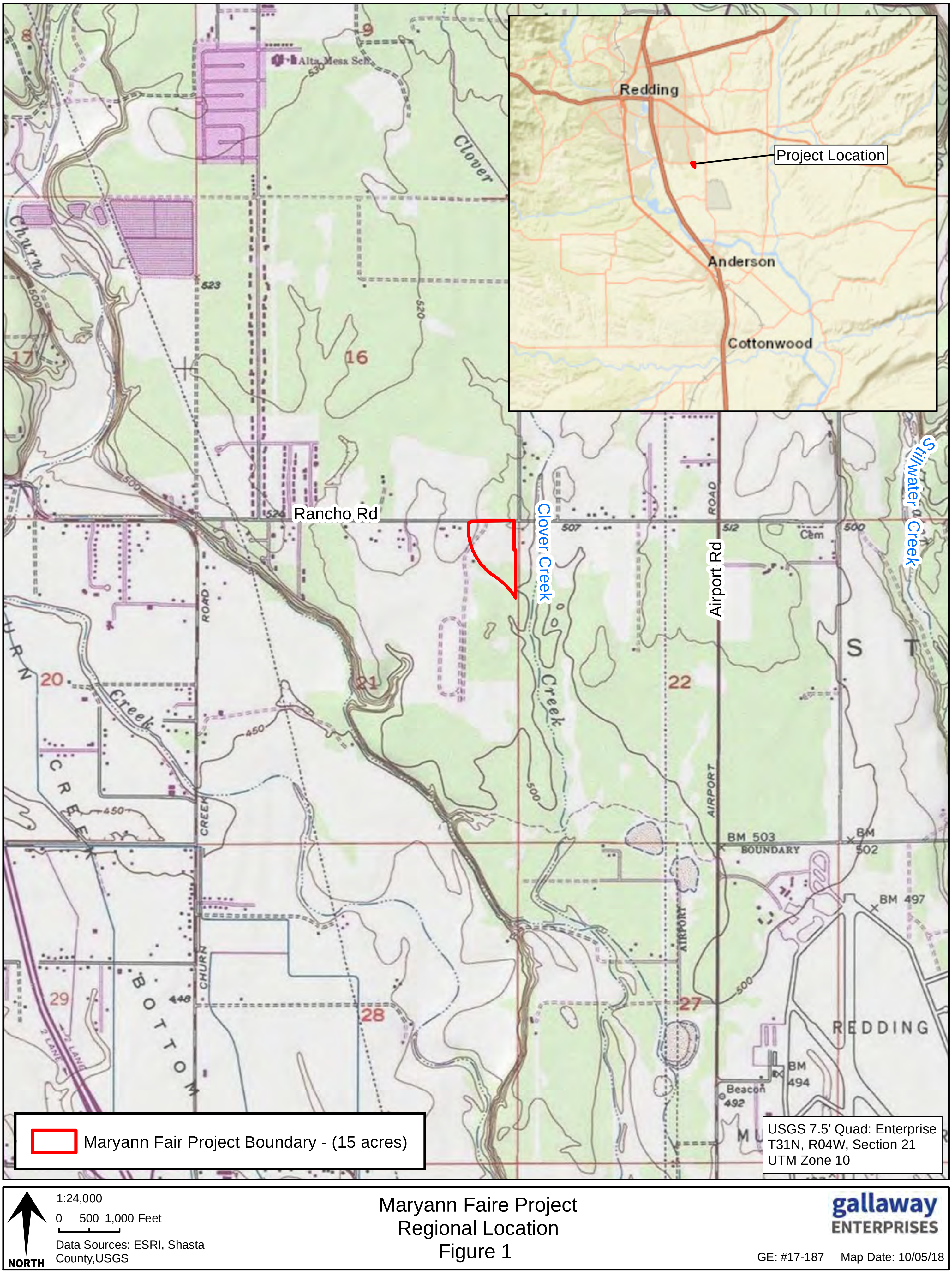
To access the site from the Redding area, take Interstate 5 south toward Sacramento. From Interstate 5 south, take exit 675 for S Bonnyview Road toward Churn Creek Road. Turn left onto S Bonnyview Road and continue straight to stay on Churn Creek Road. Turn left onto Rancho Road and continue on Rancho Road for 1 mile. The Project site occurs on the south side of Rancho Road and can be accessed via a private gate and access road.

A wetland survey was conducted on October 4, 2018 by senior botanist Elena Gregg. Waters of the United States were measured using a Trimble Geo Explorer 6000 Series GPS Receiver. The surveys involved an examination of botanical resources, soils, hydrological features, and determination of wetland characteristics based on the *United States Army Corps of Engineers Wetlands Delineation Manual* (1987); the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Arid West Manual, 2008); the *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (2007); the *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (2008); the *State of California 2016 Wetland Plant List*; and the *Clean Water Act Final Rule, Federal Register Volume 80, No-124* (Final Rule), June 29, 2015. Gallaway Enterprises have prepared this report in compliance with the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (January 2016).

Environmental Setting and Site Conditions

The Project site is located within the northernmost extent of the Central Valley in Redding, California. The site is currently composed primarily of annual grassland habitat with scattered oak trees. However, the site was historically dominated by oak woodland. The site has been and is currently used for cattle and horse grazing. An existing dirt road crosses through the northwestern corner of the Project site. One wetland swale occurs in the southern portion of the Project site. Open grazing land and oak woodland occur to the south and south east of the Project site. Rural residential buildings occur to the east and west of the Project site with a dense residential subdivision occurring to the north of the site.

The average annual precipitation is 33.68 inches and the average annual temperature is 62.45° F (WRCC 2018) in the region where the Project site is located. The Project site occurs at an elevation of approximately 505 feet above sea level. The site is sloped between 0 and 3 percent. Soils within the site were loams with a restrictive layer ranging from 20 to more than 80 inches deep.



Maryann Faire Project
Regional Location
Figure 1

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GE: #17-187 Map Date: 10/05/18

1:10,000
0 500 1,000 Feet
NORTH

Data Sources: ESRI, Shasta County, City of Redding Imagery 3/27/16

Maryann Faire Project
Project Location
Figure 2

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GE: #17-187 Map Date: 10/08/18

Survey Methodology

The entire Project site was surveyed on-foot by Gallaway Enterprises staff on October 4, 2018 to identify any potentially jurisdictional features. The survey, mapping efforts, and report production were performed according to the valid legal definitions of waters of the United States (WOTUS) in effect on October 4, 2018. The boundaries of non-tidal, non-wetland waters, when present, were delineated at the ordinary high water mark (OHWM) as defined in 33 Code of Federal Regulations (CFR) 328.3. The OHWM represents the limit of United States Army Corps of Engineers (Corps) jurisdiction over non-tidal waters (e.g., streams and ponds) in the absence of adjacent wetlands (33 CFR 328.04) (Curtis, et. al. 2011). Historic aerial photographs available on Google Earth were analyzed prior to conducting the field visit. Areas identified as having potential wetland signatures were ground-truthed in the field to determine the current conditions.

Field data were entered onto data sheets using the most current format (**Appendix A**). Wetland perimeters based on the *United States Army Corps of Engineers Wetlands Delineation Manual* (1987) and the Arid West Manual were recorded and defined according to their topographic and hydrologic orientation. Sample points were established for each wetland and corresponding upland zone. Test pit sampling was performed and/or photographs were taken in areas displaying potential wetland signatures on aerial photographs and problem areas. Test pit sampling points involved physical sampling of soils and vegetation, and investigation regarding hydrological connectivity. Only areas exhibiting the necessary wetland parameters according to the Arid West Manual on the date surveyed were mapped as wetlands. Photographs were taken to show wetland features, test pit areas, and/or areas identified as having aerial wetland signatures. The locations of the photo points are depicted in **Figure 3** and the associated photographs are provided at the end of the report.

Many of the terms used throughout this report have specific meanings relating to the federal wetland delineation process. Term definitions are based on the *Corps Wetlands Delineation Manual* (1987); the Arid West Manual; *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, (2008)* and the Final Rule. The terms defined below have specific meaning relating to the delineation of Waters of the United States as prescribed by §404 of the Clean Water Act (CWA).

Determination of Hydrophytic Vegetation

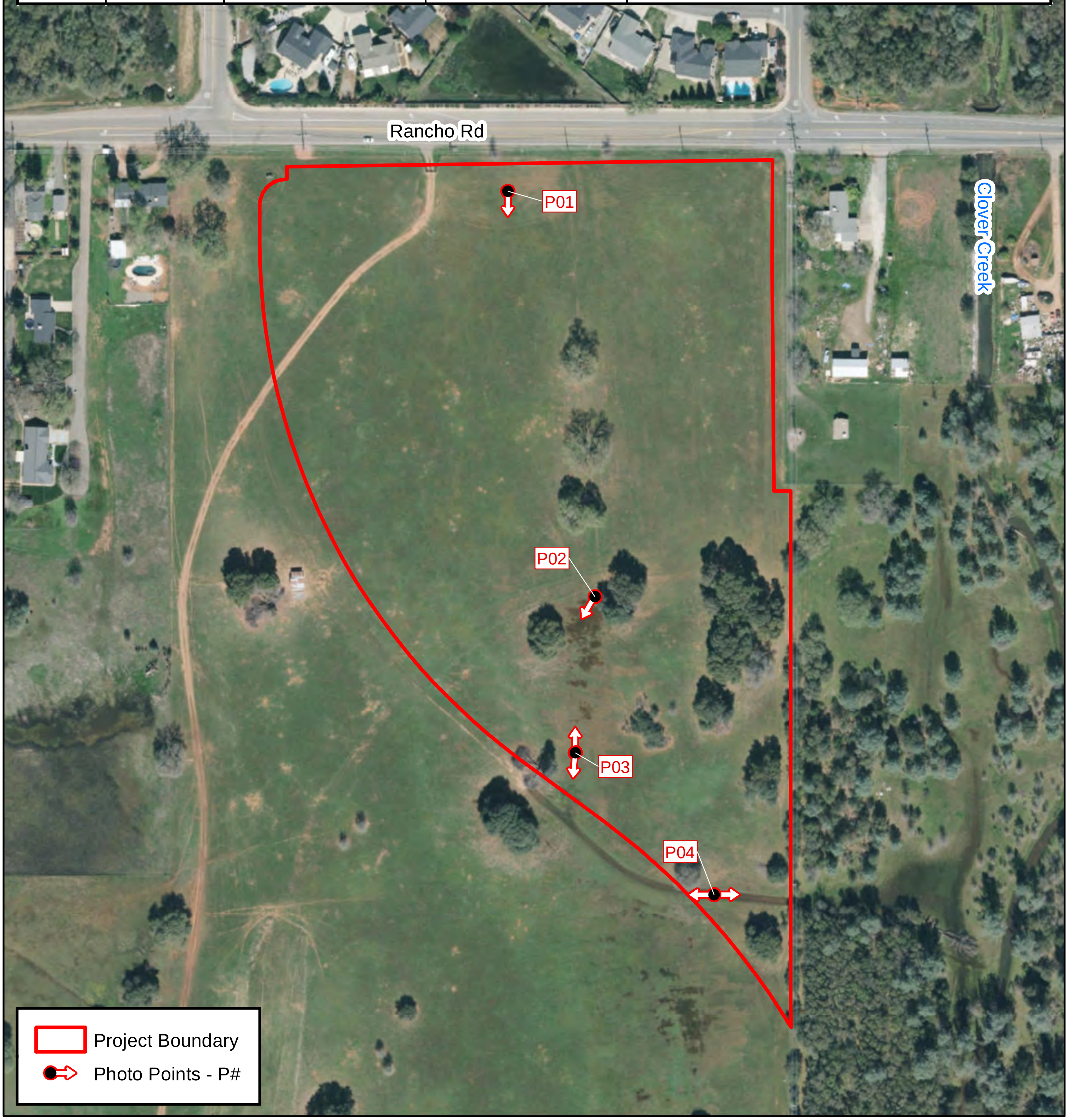
The presence of hydrophytic vegetation was determined using the methods outlined in the 1987 Corps Wetlands Delineation Manual and Arid West manual. Areas were considered to have positive indicators of hydrophytic vegetation if they pass the dominance test, meaning more than 50 percent of the dominant species are OBL, FACW, FAC. Plant species were identified to the lowest taxonomy possible. Plant indicator status was determined by reviewing the State of California 2016 Wetland Plant List for the Arid West Region. In situations where dominance can be misleading due to seasonality, the prevalence index will be used to determine hydrophytic status of the community surrounding sample sites.

Plant indicator status categories:

Obligate wetland plants (OBL) – plants that occur almost always (estimated probability 99%) in wetlands under normal conditions, but which may also occur rarely (estimated probability 1%) in non-wetlands.

Facultative wetland plants (FACW) - plants that usually occur (estimated probability 67% to 99%) in wetlands under normal conditions, but also occur (estimated probability 1% to 33%) in non-wetlands.

Ground Photographs Table				
Label	Direction	Latitude	Longitude	Comment
P01	S	40.534501	-122.316182	Upland w/ Signature
P02	SW	40.532865	-122.315714	TP01
P03	N & S	40.532234	-122.315814	Upland w/ Signature &Seasonal Swale
P04	W & E	40.531662	-122.315079	WF01



NORTH

1:2,400

0 100 200 Feet

Data Sources: ESRI, Shasta County, City of Redding Imagery 3/27/16

Maryann Faire Project
Ground Photographs Map
Figure 3

gallaway ENTERPRISES

GE: #17-187 Map Date: 10/09/18

Facultative plants (FAC) – Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands.

Facultative upland plants (FACU) – Plants that occur sometimes (estimated probability1% to 33%) in wetlands, but occur more often (estimated probability 67% to 99%) in non-wetlands.

Obligate upland plants (UPL) – Plants that occur rarely (estimated probability 1%) in wetlands, but occur almost always (estimated probability 99%) in non-wetlands under natural conditions.

Determination of Hydric Soils

Soil survey information was reviewed for the current site condition. Field samples were evaluated using the Munsell soil color chart (2009 Edition), hand texturing, and assessment of soil features (e.g. oxidized root channels, evidence of hardpan, Mn and Fe concretions). Information regarding local soil and series descriptions is provided in **Appendix B**. A few test pits (**Appendix A**) were dug within portions of the site that appeared to have wetland aerial signatures, or evidence of drainage-like topography, but did not meet the wetland test parameters upon investigation in the field.

Determination of Wetland Hydrology

Wetland hydrology was determined to be present if a site supported one or more of the following characteristics:

- Landscape position and surface topography (e.g. position of the site relative to an up-slope water source, location within a distinct wetland drainage pattern, and concave surface topography),
- Inundation or saturation for a long duration either inferred based on field indicators or observed during repeated site visits, and
- Residual evidence of ponding or flooding resulting in field indicators such as scour marks, sediment deposits, algal matting, surface soil cracks and drift lines.

The presence of water or saturated soil for approximately 12% or 14 consecutive days during the growing season typically creates anaerobic conditions in the soil, and these conditions affect the types of plants that can grow and the types of soils that develop (Wetland Training Institute 1995).

Historic aerial photographs were analyzed to look for primary and secondary wetland hydrology indicators of inundation or saturation. The historic aerial imagery reviewed was the public, readily available imagery provided on Google Earth. If aerial signatures demonstrated the presence of surface water on 5 or more of the historic aerial photographs viewed, inundation and a primary indicator of wetland hydrology was determined to be present. Saturation, a secondary indicator of wetland hydrology, was determined to be present if saturation, "darker patches within the field," were observed on 5 or more of the 9 historic aerial photographs viewed.

Determination of Ordinary High Water Mark

Gallaway utilized methods consistent with the Arid West Manual, the *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (2008), and the *Ordinary High Water Mark Identification RGL 05-05 (2005)* (RGL 05-05) to determine the presence of an OHWM. The lateral extents of non-tidal water bodies (e.g. intermittent and ephemeral streams), when present, were based on the OHWM, which is "the line on the shore established by the fluctuations of water" (Corps 2005). The OHWM is determined based on multiple observed physical characteristics of the area, which can include scour, multiple observed flow events (from current and historical aerial photos), shelving, drift, exposed root hairs, changes in substrate/particle size, presence of mature vegetation, deposition, and topography. If any other physical indicators as described in the Arid West OHWM Field Guide or RGL 05-05 are observed, these indicators are also utilized to help determine the location of the OHWM.

Jurisdictional Boundary Determination and Acreage Calculation

The wetland-upland boundary was determined based on the presence or inference of positive indicators of all mandatory criteria. Soil samples were taken within wetland and upland areas. The site was traversed on foot to identify wetland features and boundaries. The spatial data obtained during the preparation of this wetland delineation was collected using a Trimble Geo Explorer 6000 Series GPS Receiver. No readings were taken with fewer than 5 satellites. Point data locations were recorded for at least 25 seconds at a rate of 1 position per second. Area and line data were recorded at a rate of 1 position per second. All GPS data were differentially corrected for maximum accuracy. In some cases, when visual errors and degrees of precision are identified due to environmental factors negatively influencing the precision of the GPS instrument (i.e. dense tree cover, steep topography, and other factors affecting satellite connection) mapping procedures utilized available topographic and aerial imagery datasets in order to improve accuracy in feature alignment and location.

Non-Wetland and Non-Jurisdictional Boundary Determination

Areas were determined to be non-wetlands if they did not meet the three wetland test parameters (hydrophytic vegetation, hydric soil, and wetland hydrology) (33 CFR 328.4) and were determined to be potentially non-jurisdictional if they were consistent with the description of non-jurisdictional features as presented in the *Corps Jurisdictional Determination Form Instructional Guidebook* (2007) and Final Rule. There were no features determined to be non-jurisdictional since the one feature present within the Project site is a neighboring wetlands since it has a direct hydrologic connection to an offsite Tributary. There were a few areas that appeared to be potentially wet based on the review of aerial photographs, however, upon field verification they were determined to be non-wetlands. Test pits, upland data points, or photographs were collected in these areas, which confirmed that they lacked the necessary wetland test parameters.

Results

Table 1 summarizes the area calculations for the pre-jurisdictional features within the Project boundary. A complete Draft Delineation of Waters of the US map, utilizing a 1” to 200’ scale, is included as **Figure 4**.

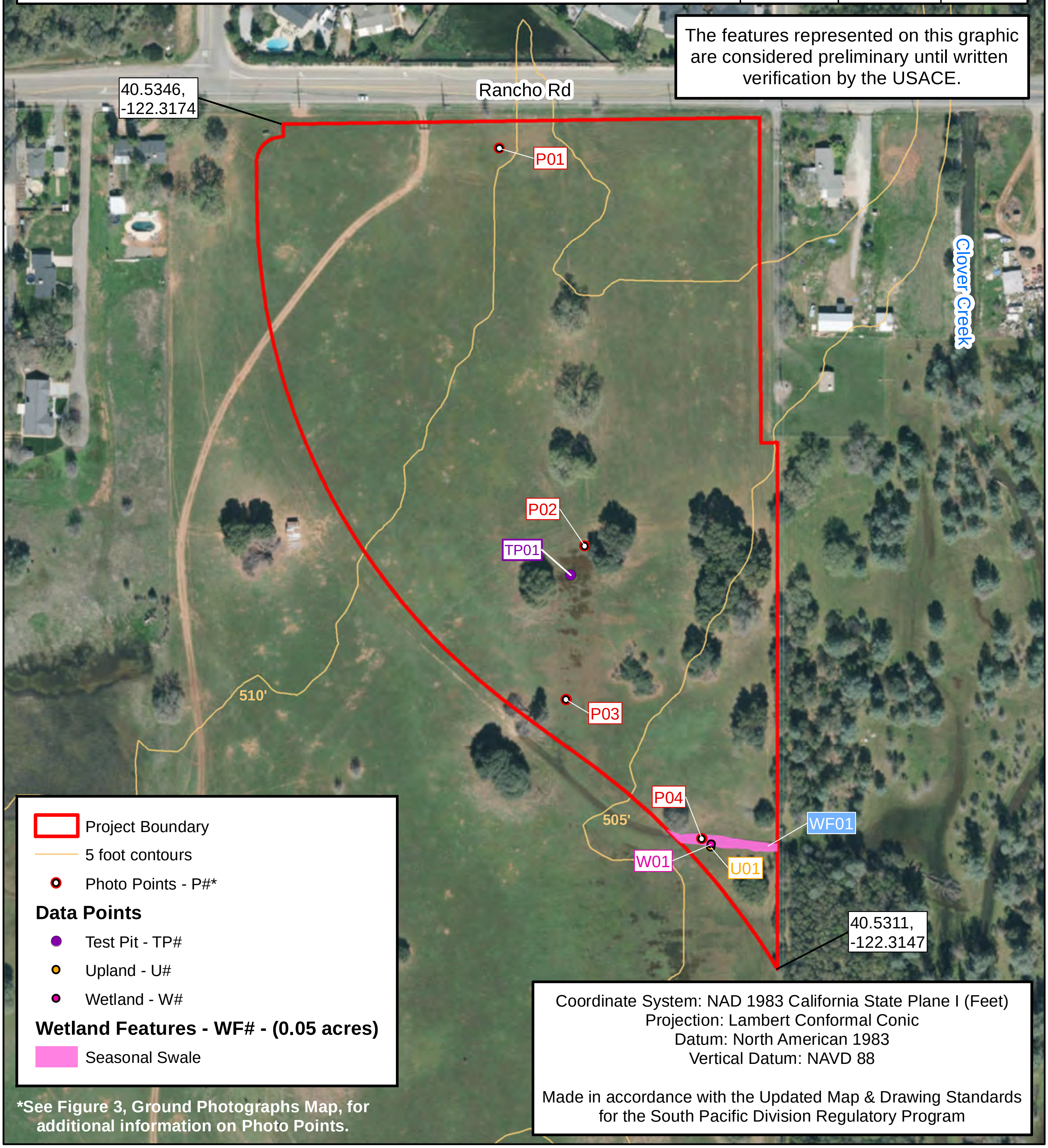
Table 1. Summary of Results from the Delineation of Waters of the United States for the Maryann Faire Project, Shasta County, CA.

Draft Delineation of Waters of the U.S.					
Tributary Features					
Label	**Cowardin**	**Type**	**Designation**	**Area (sq ft)**	**Acres**
WF01	PUB4	Seasonal Swale	Neighboring	2373.6	0.05
			Adjacent Wetland Totals =	**2373.6**	**0.05**
			Total Waters of the U.S. =	**2373.6**	**0.05**

Draft Delineation of Waters of the U.S.

Adjacent Wetland Features

Label	Cowardin	Type	Designation	Location (Lat/Long)		Width (ft)	Length (ft)	Area (sq ft)	Acres
WF01	PUB4	Seasonal Swale	Neighboring	40.531649	-122.314955	NA	NA	2373.6	0.05
					Adjacent Wetland Features Totals =	**NA**		**2373.6**	**0.05**
					Total Waters of the U.S. =	**NA**		**2373.6**	**0.05**



The features represented on this graphic are considered preliminary until written verification by the USACE.

Project Boundary
5 foot contours
Photo Points - P#*

Data Points

Test Pit - TP#
Upland - U#
Wetland - W#

Wetland Features - WF# - (0.05 acres)

Seasonal Swale

***See Figure 3, Ground Photographs Map, for additional information on Photo Points.**

Coordinate System: NAD 1983 California State Plane I (Feet)
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD 88

Made in accordance with the Updated Map & Drawing Standards for the South Pacific Division Regulatory Program

NORTH

1:2,400 1 inch = 200 feet
0 100 200 Feet

Data Sources: ESRI, Shasta County, City of Redding Imagery 3/17/16

Maryann Faire Project
Draft Delineation of Waters of the U.S.
Figure 4

Map By: C. Davis
Delineation By: E. Gregg
GE: #17-187

gallaway ENTERPRISES

Map Date: 10/08/18

Waters of the United States: Tributaries

No drainage features identified as Tributaries to a Traditional Navigable Water (Tributary) per the Final Rule occur within the Project site. The one seasonal swale present, WF01 (**Figure 4**), did not exhibit a continuous OHWM.

Waters of the United States: Adjacent Waters

One wetland was found to occur within the Project site. This wetland was characterized as a seasonal swale and exhibited all three of the wetland test parameters (**Figure 4**). Swales are low drainage pathways that typically connect to and help feed wetland or other drainage features. During a review of aerial photographs there appeared to be a potential wetland in the south central portion of the Project site. However, when ground-truthed, this area was found to lack the necessary wetland test parameters. A test pit (TP01) was taken within this area and the data was recoded on a data sheet (**Appendix A, Figure 4**). Photo points were taken at test pits and other locations throughout the Project site to depict the current site conditions (**Figure 3**).

Soils

Gallaway collected soil data at various pit locations throughout the Project site. Field observations of soil characteristics included soil color, texture, structure, and the visual assessment of soil features (e.g. the presence, or absence of redoximorphic features and the depth of restrictive layers such as hardpans). Field observations of soil characteristics at the pit sites are included in the data sheet forms presented in **Appendix A**. Gallaway's soil texture evaluations rendered predominately loams. Iron concentrations and depletions were found along root channels, pore spaces, and as soft masses in the soil matrix at varying depths within the surface horizons.

The geographic region in which the Project is found is often characterized as having a deep naturally occurring restrictive layer or duripan. Duripans restrict root growth, limit water infiltration, and cause perching of the water table in certain locations. Within the Project site, the duripan is typically found at a depth of more than 80 inches. The depth of the hand dug soil pits were dug deep enough to determine or rule out the presence/absence of hydric soil indicators. Gallaway queried the National Cooperative Soil Survey database to further evaluate the current soil conditions. A copy of the soil survey map and a description of mapped soil units for the Project site are included as **Appendix B**. One soil map unit occurs within the Project site. The map unit is listed below in **Table 2**. Based on Gallaway's review, the soil map unit identified within the Project site contains only minor amounts of hydric components (5 percent) which are typically found within depressions. A copy of the soil survey map and a description of mapped soil units for the Project are included as **Appendix B**.

Table 2. Soil Map Units, NRCS hydric soil designation, and approximate totals for the Maryann Faire Project, Shasta County, CA.

Map Unit Symbol	Map Unit Name	% Hydric Component in Map Unit	Landform of Hydric Component	% Map Unit in Survey Area
RbA	Red Bluff loam, 0 to 3 percent slopes, MLRA 17, moist	5	Depressions	100%

Vegetation

During the site visit the dominant vegetation present within the seasonal swale included annual rabbit's foot grass (*Polypogon monspeliensis*) (FACW), coyote thistle (*Eryngium castrense*) (OBL), Italian rye-grass (*Festuca perennis*) (FAC), toadrush (*Juncus bufonius*) (FACW), Mediterranean barley (*Hordeum marinum ssp. gussoneanum*) (FAC) and Fitch's spikeweed (*Centromadia fitchii*) (FACU). The upland habitat present was dominated largely by Spanish lotus (*Acmispon americanus*) (FACU), wall hare barley (*Hordeum murinum*) (FACU), wild oats (*Avena fatua*) (UPL), medusahead (*Elymus caput-medusae*) (UPL), soft chess (*Bromus hordeaceous*) (FACU), yellow star thistle (*Centaurea solstitialis*) (UPL), rose clover (*Trifolium hirtum*) (UPL), Fitch's spikeweed and scattered valley oaks (*Quercus lobata*) (FACU).

Hydrology

Precipitation and capture of runoff from developed land and residential irrigation are the main hydrological inputs for the seasonal swale (WF01) within the Project site. The seasonal swale has been man-altered and is piped offsite to the west of the Project boundary. The swale continued to flow offsite to the east where it flows directly into Clover Creek. Due to its direct connection to Clover Creek, the swale within the Project site is considered a neighboring wetland per the Final Rule. Clover Creek is a direct tributary of the Sacramento River, a TNW. No flowing or ponded water was observed within the site during the October field visit.

Site Photos – Taken October 4, 2018

P01 – Upland overview looking south

P03 – WF01 in distance looking south

P02 – TP01 looking southwest

P04 – WF01 looking west

P03 – Upland with unusual aerial signature looking north

P04 – WF01 looking east

Glossary

Adjacent: Adjacent as used in "Adjacent to traditional navigable water," is defined by the Corps and EPA as "bordering, contiguous, or neighboring, including waters separated from other "waters of the United States" by constructed dikes or barriers, natural river berms, beach dunes and the like." Adjacent waters can include wetlands, ponds, lakes, oxbows, impoundments, and other similar features.

The current regulations further identify the following three circumstances under which waters would be considered "neighboring" and, thus, jurisdictional:

(1) Waters located in whole or in part within 100 feet of the ordinary high water mark of a jurisdictional water as defined by the rule; or

(2) Waters located in whole or in part in the 100-year floodplain and that are within 1,500 feet of the ordinary high water mark of a jurisdictional water as defined by the rule; or

(3) Waters located in whole or in part within 1,500 feet of the high tide line of a traditional navigable water or the territorial seas and waters located within 1,500 feet of the ordinary high water mark of the Great Lakes.

The Corps and EPA have defined "adjacent" waters as jurisdictional by rule. However, individual waters outside of the "neighboring" boundaries as stated above have not been defined as jurisdictional by rule and are subject to case-specific analysis to determine if a significant nexus exists (80 FR 37054, 40 CFR 230.3).

Atypical situation (significantly disturbed): In an atypical (significantly disturbed) situation, recent human activities or natural events have created conditions where positive indicators for hydrophytic vegetation, hydric soil, or wetland hydrology are not present or observable.

Boulder. Rock fragments larger than 60 .4 cm (24 inches) in diameter.

Channel. "An open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water" (Langbein and Iseri 1960:5).

Channel bank. The sloping land bordering a channel. The bank has steeper slope than the bottom of the channel and is usually steeper than the land surrounding the channel.

Cobbles. Rock fragments 7.6 cm (3 inches) to 25 .4 cm (10 inches) in diameter.

Debris flow. A moving mass of rock fragments, soil, and mud where more than 50% of the particles are larger than sand-sized.

Drift. Organic debris oriented to flow direction(s) (larger than small twigs).

Ephemeral stream. An ephemeral stream has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Facultative wetland (FACW). Wetland indicator category; species usually occurs in wetlands (estimated probability 67–99%) but occasionally found in non-wetlands.

Flat. A level landform composed of unconsolidated sediments usually mud or sand. Flats may be irregularly shaped or elongate and continuous with the shore, whereas bars are generally elongate, parallel to the shore, and separated from the shore by water.

Gravel. A mixture composed primarily of rock fragments 2mm (0 .08 inch) to 7.6 cm (3 inches) in diameter. Usually contains much sand.

Growing season The frost-free period of the year (see U.S. Department of Interior, National Atlas 1970:110-111 for generalized regional delineation).

Herbaceous. With the characteristics of an herb; a plant with no persistent woody stem above ground.

Hydric soil. Soil is hydric that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic (oxygen-depleted) conditions in its upper part (i.e., within the shallow rooting zone of herbaceous plants).

Hydrophyte, **hydrophytic.** Any plant growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Intermittent stream. An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Jurisdictional Wetland. Sites that meet the definition of wetland provided below and that fall under COE regulations pursuant to Section 404 of the CWA are considered jurisdictional wetlands.

Litter. Organic debris oriented to flow direction(s) (small twigs and leaves).

Man-induced wetlands. A man-induced wetland is an area that has developed at least some characteristics of naturally occurring wetlands due to either intentional or incidental human activities.

Normal circumstances. This term refers to the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed.

Obligate wetland (OBL). Wetland indicator category; species occurs almost always (estimated probability 99%) under natural conditions in wetlands.

Perennial stream. A perennial stream has flowing water year-round during atypical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Ponded. Ponding is a condition in which free water covers the soil surface (e.g., in a closed depression) and is removed only by percolation, evaporation, or transpiration.

Reach. A segment of a stream channel.

Scour. Soil and debris movement.

Sheetflow. Overland flow occurring in a continuous sheet; a relatively high-frequency, low-magnitude event.

Shrub. A woody plant which at maturity is usually less than 6 m(20 feet) tall and generally exhibits several erect, spreading, or prostrate stems and has a bushy appearance ; e.g., speckled alder (*Alnus rugosa*) or buttonbush (*Cephalanthus occidentalis*).

Stone. Rock fragments larger than 25 .4 cm (10 inches) but less than 60 .4 cm (24 inches).

Traditional Navigable Waters (TNWs)."[a]ll waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide." These waters are referred to in this guidance as traditional navigable waters. The traditional navigable waters include all of the "navigable waters of the United States," as defined in 33 C.F.R. Part 329 and by numerous decisions of the federal courts, plus all other waters that are navigable-in-fact (for example, the Great Salt Lake, UT, and Lake Minnetonka, MN). Thus, the traditional navigable waters include, but are not limited to, the "navigable waters of the United States" within the meaning of Section 10 of the Rivers and Harbors Act of 1899 (also known as "Section 10 waters").

Tree. A woody plant which at maturity is usually 6 m (20 feet) or more in height and generally has a single trunk, unbranched for 1 m or more above the ground, and a more or less definite crown; e.g., red maple (*Acer rubrum*), northern white cedar (*Thuja occidentalis*).

Tributaries. This is the encompassing term for water features with indicators of flow, including a bed, banks and an ordinary high water mark, and that contribute flow downstream as defined in the 2015 final Clean Water Rule (80 FR 37054). Flow in the tributary can be perennial, intermittent, or ephemeral.

Waters of the United States. This is the encompassing term for areas under federal jurisdiction pursuant to Section 404 of the CWA. Waters of the United States are divided into "traditional navigable waters," "interstate waters," "territorial seas," "impoundments of jurisdictional waters," "tributaries," "adjacent waters" and waters subject to case-specific significant nexus (80 FR 37054, 40 CFR 230.3).

Watershed (drainage basin). An area of land that drains to a single outlet and is separated from other watersheds by a divide.

Wetland. Wetlands are defined as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (40 CFR 230.3). To be considered under federal jurisdiction, a wetland must support positive indicators for hydrophytic vegetation, hydric soil, and wetland hydrology.

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Appendix A: Wetland Field Data Forms

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Maryann Faire | City/County: Redding, Shasta County | Sampling Date: 10-4-18

Applicant/Owner: Palomar Builders, Inc. | State: CA | Sampling Point: TP 01

Investigator(s): E. Gregg | Section, Township, Range: Section 21, Township 31N, Range 4W

Landform (hillslope, terrace, etc.): terrace | Local relief (concave, convex, none): concave | Slope (%): 0.3

Subregion (LRR): C - Mediterranean California | Lat: 40.532746 | Long: -122.31579 | Datum: NAD 83

Soil Map Unit Name: Red Bluff loam, 0 to 3 percent slopes, moist | NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks: Area was mounded with various shallow depressions.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Centromadia fitchii*	30	Yes	FACU
2. *Trifolium glomeratum*	15	Yes	Not Listed
3. *Festuca perennis*	5	No	FAC
4. *Elymus caput-medusae*	5	No	UPL
5. *Hordeum marinum ssp. gussoneanum*	5	No	FAC
6.			
7.			
8.			
Total Cover:	60 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 40 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	10	x 3 =	30
FACU species	30	x 4 =	120
UPL species	20	x 5 =	100
Column Totals:	60 (A)		250 (B)

Prevalence Index = B/A = 4.17

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ( ) **No** (●)

Remarks:

SOIL

Sampling Point: TP 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	5YR 3/4	97	2.5YR 4/8	3	C	PL	loam	
5-10	5YR 3/4	65	2.5YR 4/8	5	C	PL	clay loam	few Mn stains present
			5YR 5/2	30	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils: [3]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present. unless distributed or problematic

Restrictive Layer (if present):

Type: n/a

Depth (inches): n/a

Hydric Soil Present? Yes ○ No ●

Remarks: Soil pit dug deep enough to determine the presence/absence of hydric indicators. No hydric soil indicators met - soil indicator F8 not met since 5% redox concentrations were only present in a 1 inch layer in the upper 6 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ●	Depth (inches):
Water Table Present?	Yes ○	No ●	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ●	Depth (inches):

Wetland Hydrology Present? Yes ○ No ●

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology was present. The vast majority of aerial imagery did not show inundation or saturation in this area.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Maryann Faire City/County: Redding, Shasta County Sampling Date: 10-4-18

Applicant/Owner: Palomar Builders, Inc. State: CA Sampling Point: W 01

Investigator(s): E. Gregg Section, Township, Range: Section 21, Township 31N, Range 4W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0.3

Subregion (LRR): C - Mediterranean California Lat: 40.531641 Long: -122.315028 Datum: NAD 83

Soil Map Unit Name: Red Bluff loam, 0 to 3 percent slopes, moist NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○
Hydric Soil Present?	Yes ◉	No ○
Wetland Hydrology Present?	Yes ◉	No ○

Is the Sampled Area within a Wetland? **Yes** ◉ **No** ○

Remarks: Area was seasonal swale that continued off-site to the east.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Polypogon monspeliensis*	30	Yes	FACW
2. *Hordeum marinum ssp. gussoneanum*	20	Yes	FAC
3. *Eryngium castrense*	20	Yes	OBL
4. *Centromadia fitchii*	15	No	FACU
5. *Juncus bufonius*	10	No	FACW
6. *Festuca perennis*	5	No	FAC
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ___ % % Cover of Biotic Crust ___ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	40	x 2 =	80
FAC species	25	x 3 =	75
FACU species	15	x 4 =	60
UPL species		x 5 =	0
Column Totals:	100 (A)		235 (B)

Prevalence Index = B/A = 2.35

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ◉ **No** ○

Remarks:

SOIL

Sampling Point: W 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 5/2	90	2.5YR 4/8	10	C	PL	loam	few Mn stains present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils: [3]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present. unless distributed or problematic

Restrictive Layer (if present):

Type: n/a

Depth (inches): n/a

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks: Soil pit dug deep enough to determine the presence/absence of hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☒ Sediment Deposits (B2) (**Nonriverine**)
- ☒ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Maryann Faire City/County: Redding, Shasta County Sampling Date: 10-4-18

Applicant/Owner: Palomar Builders, Inc. State: CA Sampling Point: U 01

Investigator(s): E. Gregg Section, Township, Range: Section 21, Township 31N, Range 4W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0.3

Subregion (LRR): C - Mediterranean California Lat: 40.531629 Long: -122.315031 Datum: NAD 83

Soil Map Unit Name: Red Bluff loam, 0 to 3 percent slopes, moist NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( )	No (●)
Hydric Soil Present?	Yes ( )	No (●)
Wetland Hydrology Present?	Yes ( )	No (●)

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Area was flat to almost slightly convex.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Centromadia fitchii*	30	Yes	FACU
2. *Hordeum marinum ssp. gussoneanum*	30	Yes	FAC
3. *Trifolium glomeratum*	20	Yes	Not Listed
4. *Bromus hordeaceus*	20	Yes	FACU
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ___ % % Cover of Biotic Crust ___ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	25.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	30	x 3 =	90
FACU species	50	x 4 =	200
UPL species	20	x 5 =	100
Column Totals:	100 (A)		390 (B)

Prevalence Index = B/A = 3.90

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: U 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	5YR 3/4	97	2.5YR 4/8	5	C	PL	loam	
5-10	5YR 3/4	65	2.5YR 4/8	5	C	PL	clay loam	few Mn stains present
			5YR 5/2	30	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils: [3]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present. unless distributed or problematic

Restrictive Layer (if present):

Type: n/a

Depth (inches): n/a

Hydric Soil Present? Yes ○ No ◉

Remarks: Soil pit dug deep enough to determine the presence/absence of hydric indicators. No hydric soil indicators met - soil indicator F8 not met since the area was not a closed depression.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology was present.

Appendix B: NRCS Soils Map and Soil Series Descriptions

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Shasta County Area, California

October 22, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


122° 19' 5" W
122° 18' 50" W
557750
557800
557850
557900
557950
558000
558050
558100
40° 32' 5" N
40° 31' 50" N
4487350
4487300
4487250
4487200
4487150
4487100
4487050
4487000
4486950
4486900
Rancho
RbA
Soil Map may not be valid at this scale.
Map Scale: 1:2,280 if printed on A portrait (8.5" x 11") sheet.
Meters
0 30 60 120 180
Feet
0 100 200 400 600
N
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 13, Sep 12, 2018

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

Date(s) aerial images were photographed: May 26, 2015—Jun 26, 2015

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
RbA	Red Bluff loam, 0 to 3 percent slopes, MLRA 17, moist	14.9	100.0%
Totals for Area of Interest		**14.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Shasta County Area, California

RbA—Red Bluff loam, 0 to 3 percent slopes, MLRA 17, moist

Map Unit Setting

National map unit symbol: 2t7r0
Elevation: 450 to 1,110 feet
Mean annual precipitation: 29 to 57 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Red bluff, moist, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Red Bluff, Moist

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: loam
Bt1 - 6 to 18 inches: clay loam
Bt2 - 18 to 28 inches: clay loam
Bt3 - 28 to 44 inches: clay loam
Bt4 - 44 to 57 inches: clay
Bt5 - 57 to 67 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: ACID TERRACE (R017XD089CA)
Hydric soil rating: No

Minor Components

Redding

Percent of map unit: 5 percent
Hydric soil rating: No

Perkins

Percent of map unit: 5 percent
Hydric soil rating: No

Moda

Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

Unnamed

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

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gallaway ENTERPRISES

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

October 12, 2023

Tiffany Lightle
City of Redding
Development Services Department
777 Cypress Avenue
Redding, CA 96001

Re: Biological Resources Memorandum for the Project Boundary of the Rancho Road Development Project – 6.62 acres (GE# 22-109)

In October 2018, Gallaway Enterprises initiated technical biological studies for what was at the time titled the Maryann Faire Project; and in 2022, the Project was titled Rancho Road Development Project (Project), a 6.62-acre survey area that overlaps the northern portion of the Maryann Faire Project, located in the City of Redding, Shasta County, California. The Project survey area is located at the intersection of Rancho Road and Shasta View Drive within the City of Redding, Shasta County, California. The survey area occurs within the United States Geologic Survey (USGS) "Enterprise" Quadrangle, within Section 21, Township 31N, Range 4W.

Biological assessments and surveys were conducted by Gallaway Enterprises staff for the Maryann Faire Project on October 4, 2018 and additional assessments of the conditions for the new survey area were conducted on July 22 and August 10, 2022, respectively. A review of the survey area's previous and current conditions are now being conducted in October 2023 to assess the suitability of habitat for Crotch's bumble bee and all recently listed special-status species not previously analyzed in the BRA or in the September 2022 memorandum.

Current Site Conditions

During the 2022 site visits, Project grading activities were underway with small areas of annual grassland having not yet been graded around the borders of the survey area. Review of aerial photography from October 2023 shows the survey area to be approximately two-thirds graded land on the west side and approximately one-third annual grassland on the east side. All graded land within the survey area is not currently suitable habitat for any special-status species.

Recently Added Special-Status Species

CDFW has requested an analysis of the site for suitable Crotch's bumble bee habitat, as well as suitable habitat for all recently added special-status species. Species included in the BRA are listed on the CNDDB, IPaC, CNPS, or NMFS species lists. These species lists are used to identify special-status species observations and habitat within the region. Species considered in the analysis for the BRA include state and federally listed or candidate listed species, CDFW species of special concern (SSC), and CNPS rare plants with a rank of 1, 2, or 3.

Crotch's Bumble Bee

Crotch's bumble bee (*Bombus crotchii*) was recently listed as candidate endangered in California. Crotch bumble bee was not/and is currently not included on the species lists within the "Redding", "Cottonwood", "Enterprise", "Palo Cedro", "Olinda", or "Balls Ferry" United States Geological Survey quadrangles. The nearest CNDDB occurrence (#4) is mapped within the vicinity of Red Bluff approximately 25 miles from the BSA in Tehama County and is from 1956. According to the IUCN Red List, Crotch bumble bee is thought to be possibly extinct from this region. Suitable bee habitat requires the availability of nectar and pollen from floral resources throughout the duration of the colony period (spring, summer, and fall) (Xerces Society 2018). Two potential food sources were observed within the BSA during the botanical assessment in July 2022. Some floral resources are in bloom from February to October within the BSA; however, they are not sufficient to support Crotch's bumble bee populations. The BSA is highly disturbed, with the majority of the site composed of barren habitat and the remaining habitat composed primarily of grassland species. Additionally, grading and compacting of the ground within the BSA precludes potential Crotch's bumble bee burrow sites. There is no suitable habitat for Crotch's bumble bee within the BSA.

Conclusion

There is no potential for Crotch's bumble to occur within the BSA.

Foothill Yellow-legged Frog

No new special-status wildlife species were added since species lists were last generated in August 2022; however, foothill yellow-legged frog (*Rana boylii*) was designated as a distinct population segment (DPS) within the region of the BSA, and is now listed as foothill yellow-legged frog - north coast DPS (Rana boylii pop. 1). There is no suitable habitat for foothill yellow-legged frog within the BSA.

Conclusion

Foothill yellow-legged frog (*Rana boylii*) was designated as foothill yellow-legged frog - north coast DPS (*Rana boylii pop. 1*). The lack of suitable habitat for foothill yellow-legged with the BSA has not changed since August 2022.

Dubious Pea

An updated CNPS species list was not generated in August 2022, so species added since the 2018 CNPS list were analyzed for the "Enterprise" United States Geological Survey quadrangle. Dubious pea (*Lathyrus sulphureus var. argillaceus*) was the only new special-status plant species. Dubious Pea has a CNPS rare plant rank of 3. It is found in cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest habitat. The BSA is currently composed of barren and grassland habitat. The BSA does not contain suitable habitat for dubious pea.

Conclusion

There is no potential for dubious pea to occur within the BSA.

If you have any questions, please do not hesitate to contact Kevin Sevier at (530) 332-9909 or kevin@gallawayenterprises.com.

Alexander Smither
Biologist

Attachments: A) Species Lists

Attachment A

Species Lists

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Redding (4012254) OR Enterprise (4012253) OR Palo Cedro (4012252) OR Olinda (4012244) OR Cottonwood (4012243) OR Balls Ferry (4012242))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Ahart's paronychia *Paronychia ahartii*	PDCAR0L0V0	None	None	G3	S3	1B.1
American bumble bee *Bombus pensylvanicus*	IIHYM24260	None	None	G3G4	S2	
Baker's navarretia *Navarretia leucocephala ssp. bakeri*	PDPLM0C0E1	None	None	G4T2	S2	1B.1
bald eagle *Haliaeetus leucocephalus*	ABNKC10010	Delisted	Endangered	G5	S3	FP
bank swallow *Riparia riparia*	ABPAU08010	None	Threatened	G5	S3	
big-scale balsamroot *Balsamorhiza macrolepis*	PDAST11061	None	None	G2	S2	1B.2
Boggs Lake hedge-hyssop *Gratiola heterosepala*	PDSCR0R060	None	Endangered	G2	S2	1B.2
California linderiella *Linderiella occidentalis*	ICBRA06010	None	None	G2G3	S2S3	
chinook salmon - Central Valley spring-run ESU *Oncorhynchus tshawytscha pop. 11*	AFCHA0205L	Threatened	Threatened	G5T2Q	S2	
chinook salmon - Sacramento River winter-run ESU *Oncorhynchus tshawytscha pop. 7*	AFCHA0205B	Endangered	Endangered	G5T1Q	S2	
dubious pea *Lathyrus sulphureus var. argillaceus*	PDFAB25101	None	None	G5T1T2Q	S1S2	3
foothill yellow-legged frog - north coast DPS *Rana boylii pop. 1*	AAABH01051	None	None	G3T4	S4	SSC
great egret *Ardea alba*	ABNGA04040	None	None	G5	S4	
Great Valley Cottonwood Riparian Forest *Great Valley Cottonwood Riparian Forest*	CTT61410CA	None	None	G2	S2.1	
Great Valley Mixed Riparian Forest *Great Valley Mixed Riparian Forest*	CTT61420CA	None	None	G2	S2.2	
Great Valley Valley Oak Riparian Forest *Great Valley Valley Oak Riparian Forest*	CTT61430CA	None	None	G1	S1.1	
Great Valley Willow Scrub *Great Valley Willow Scrub*	CTT63410CA	None	None	G3	S3.2	
green sturgeon - southern DPS *Acipenser medirostris pop. 1*	AFCAA01031	Threatened	None	G2T1	S1	
Henderson's bent grass *Agrostis hendersonii*	PMPOA040K0	None	None	G2Q	S2	3.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
hoary bat *Lasiurus cinereus*	AMACC05032	None	None	G3G4	S4	
kneecap lanx *Lanx patelloides*	IMGASL7030	None	None	G2?	S2	
legenere *Legenere limosa*	PDCAM0C010	None	None	G2	S2	1B.1
maverick clover *Trifolium piorkowskii*	PDFAB40410	None	None	G2	S2	1B.2
North American porcupine *Erethizon dorsatum*	AMAFJ01010	None	None	G5	S3	
nugget pebblesnail *Fluminicola seminalis*	IMGASG3110	None	None	G2	S3	
Oregon shoulderband *Helminthoglypta hertleini*	IMGASC2280	None	None	G3Q	S1S2	
osprey *Pandion haliaetus*	ABNKC01010	None	None	G5	S4	WL
Pacific lamprey *Entosphenus tridentatus*	AFBAA02100	None	None	G4	S3	SSC
pallid bat *Antrozous pallidus*	AMACC10010	None	None	G4	S3	SSC
pink creamsacs *Castilleja rubicundula var. rubicundula*	PDSCR0D482	None	None	G5T2	S2	1B.2
Red Bluff dwarf rush *Juncus leiospermus var. leiospermus*	PMJUN011L2	None	None	G2T2	S2	1B.1
Shasta chaparral *Trilobopsis roperi*	IMGASA2030	None	None	G2	S1	
silky cryptantha *Cryptantha crinita*	PDBOR0A0Q0	None	None	G2	S2	1B.2
silver-haired bat *Lasionycteris noctivagans*	AMACC02010	None	None	G3G4	S3S4	
slender Orcutt grass *Orcuttia tenuis*	PMPOA4G050	Threatened	Endangered	G2	S2	1B.1
spotted bat *Euderma maculatum*	AMACC07010	None	None	G4	S3	SSC
steelhead - Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	AFCHA0209K	Threatened	None	G5T2Q	S2	
Sulphur Creek brodiaea *Brodiaea matsonii*	PMLIL0C0H0	None	None	G1	S1	1B.1
Tehama chaparral *Trilobopsis tehamana*	IMGASA2040	None	None	G2	S1	
Townsend's big-eared bat *Corynorhinus townsendii*	AMACC08010	None	None	G4	S2	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Threatened	G1G2	S2	SSC
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	IICOL48011	Threatened	None	G3T3	S3	
vernal pool fairy shrimp *Branchinecta lynchi*	ICBRA03030	Threatened	None	G3	S3	
vernal pool tadpole shrimp *Lepidurus packardi*	ICBRA10010	Endangered	None	G3	S3	
watershield *Brasenia schreberi*	PDCAB01010	None	None	G5	S3	2B.3
western pearlshell *Margaritifera falcata*	IMBIV27020	None	None	G5	S1S2	
western pond turtle *Emys marmorata*	ARAAD02030	None	None	G3G4	S3	SSC
western red bat *Lasiurus frantzii*	AMACC05080	None	None	G4	S3	SSC
western spadefoot *Spea hammondii*	AAABF02020	None	None	G2G3	S3S4	SSC
woolly meadowfoam *Limnanthes floccosa ssp. floccosa*	PDLIM02043	None	None	G4T4	S3	4.2
Yuma myotis *Myotis yumanensis*	AMACC01020	None	None	G5	S4	

Record Count: 51

CNPS Rare Plant Inventory

California Native Plant Society

Search Results

8 matches found. Click on scientific name for details

Search Criteria: Quad is one of [**4012253**]

SCIENTIFIC NAME	COMMON NAME	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	CA RARE PLANT RANK
Orcuttia tenuis	slender Orcutt grass	annual herb	May-Sep(Oct)	FT	CE	1B.1
Legenere limosa	legenere	annual herb	Apr-Jun	None	None	1B.1
Agrostis hendersonii	Henderson's bent grass	annual herb	Apr-Jun	None	None	3.2
Eriogonum tripodum	tripod buckwheat	perennial deciduous shrub	May-Jul	None	None	4.2
Cryptantha crinita	silky cryptantha	annual herb	Apr-May	None	None	1B.2
Sidalcea celata	Redding checkerbloom	perennial herb	Apr-Aug	None	None	3
Juncus leiospermus var. leiospermus	Red Bluff dwarf rush	annual herb	Mar-Jun	None	None	1B.1
Lathyrus sulphureus var. argillaceus	dubious pea	perennial herb	Apr-May	None	None	3

Showing 1 to 8 of 8 entries

Suggested Citation:

California Native Plant Society, Rare Plant Program. 2023. Rare Plant Inventory (online edition, v9.5). Website https://www.rareplants.cnps.org [accessed 11 October 2023].

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: October 11, 2023
Project Code: 2024-0003899
Project Name: Shasta View/Rancho Road Development Project

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: 2024-0003899
Project Name: Shasta View/Rancho Road Development Project
Project Type: New Constr - Above Ground
Project Description: Redding, CA
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@40.5344155,-122.31622340290691,14z

Counties: Shasta County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 7 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.

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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

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* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1063	Threatened

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Slender Orcutt Grass *Orcuttia tenuis* https://ecos.fws.gov/ecp/species/1063#crithab	Final

IPAC USER CONTACT INFORMATION

Agency:	Private Entity
Name:	Alexander Smither
Address:	117 Meyers Street
Address Line 2:	Suite 120
City:	Chico
State:	CA
Zip:	95928
Email	alex@gallawayenterprises.com
Phone:	5303329909

Attachment E

Cultural Resources Inventory Survey

NOTE TO REVIEWER: Information contained in the Cultural Resources Inventory Survey (Gallaway Enterprises, Inc., 2022) 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.

CITY OF REDDING
777 Cypress Avenue, Redding, CA 96001
PO BOX 496071, Redding, CA 96049-6071
cityofredding.org

April 24, 2023

James Hayward, Sr., Cultural Resource Program Manager
Redding Rancheria
2000 Redding Rancheria Road
Redding, CA 96001

Subject: Tribal Cultural Resources under the California Environmental Quality Act, AB 52. Formal Notification of Determination of Decision to Undertake a Project, and Notice of Consultation Opportunity, Pursuant to Public Resources Code § 21080.3.1.

Dear Mr. Hayward:

This letter is formal notification of six proposed projects located in Redding, California, for which the City of Redding (City) is the California Environmental Quality Act (CEQA) Lead Agency. As the CEQA Lead Agency, the City has determined that the CEQA documentation is in the form of an initial study that may result in a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report for a project. The City encourages the Redding Rancheria Tribe's comments and interest in the proposed projects. Pursuant to § 21080.3.1 (d), the City respectfully requests that the Redding Rancheria Tribe repond with a written request for consultation within 30 days of receipt of this letter.

Below please find descriptions of the proposed projects and their points of contact. Attached are project location maps, pursuant to Public Resources Code § 21080.3.1 (d).

Zinco Subdivision

Project Proponent: Zinco Holding, LLC

Project Location: 3150 and 3250 Jordan Lane

Project Description: Subdivision Map Application S-2022-02416 proposes to create 16 new parcels in place of 2 existing parcels on a 4.42 acre site in an "RS-3" Residential Single-Family District.

Project Planner: Danny Castro, Assistant Planner
777 Cypress Avenue Redding, CA 96001
(530) 225-4471
dcastro@cityofredding.org

The River Subdivision

Project Proponent: L&S Redding Development, LLC

Project Location: 2980 Wyndham Lane

Project Description: Subdivision Map Application S-2023-00582 proposes to create 20 new parcels in place of 1 existing parcel on a 10.69 acre site in an "RS-3.5" Residential Single-Family District.

Project Planner: Danny Castro, Assistant Planner
777 Cypress Avenue Redding, CA 96001
(530) 225-4471
dcastro@cityofredding.org

Canby Apartments

Project Proponent: Danco Communities

Project Location: 930 and 990 Canby Road

Project Description: Site Development Permit Application SDP-2023-00085 proposes to construct a community building and 120 multifamily residential units in ten separate two- and three-story structures.

Project Planner: Danny Castro, Assistant Planner
777 Cypress Avenue Redding, CA 96001
(530) 225-4471
dcastro@cityofredding.org

Silverstone Subdivision, Unit #5

Project Proponent: Sierra Pacific Land & Timber

Project Location: 2923 Rancho Road

Project Description: Subdivision Map Application S-2023-00027 proposes to create 41 new parcels on a 5.41-acre site in an "RS-3-PD" Residential Single-Family District and Planned Development Overlay.

Project Planner: Tiffany Lightle, Associate Planner
777 Cypress Avenue Redding, CA 96001
(530) 245-7112
tlightle@cityofredding.org

Glenrock Way Subdivision

Project Proponent: Scott and Laura Herndon

Project Location: 3232 Nicolet Lane

Project Description: Subdivision Map Application S-2021-02014 proposes to create 23 new parcels on a 9.35-acre site in an "RS-2" Residential Single-Family District.

Project Planner: Tiffany Lightle, Associate Planner
777 Cypress Avenue Redding, CA 96001
(530) 245-7112
tlightle@cityofredding.org

<u>Center of Hope Apartments, Unit #2</u>

Project Proponent:	Center of Hope Apartments II, LP
Project Location:	1303 Industrial Street
Project Description:	Use Permit Application UP-2022-01555 proposes to construct 49 multifamily residential units and professional office space in three separate three-story structures.
Project Planner:	Tiffany Lightle, Associate Planner 777 Cypress Avenue Redding, CA 96001 (530) 245-7112 tlightle@cityofredding.org

Sincerely,

Danny Castro
Assistant Planner
Development Services

DC:es

Attachments:
Location Maps

CITY OF REDDING
777 Cypress Avenue, Redding, CA 96001
PO BOX 496071, Redding, CA 96049-6071
cityofredding.org

April 24, 2023

Kelli Hayward
Wintu Tribe of Northern California
PO Box 995
Shasta Lake, CA 96019

Subject: Tribal Cultural Resources under the California Environmental Quality Act, AB 52. Formal Notification of Determination of Decision to Undertake a Project, and Notice of Consultation Opportunity, Pursuant to Public Resources Code § 21080.3.1.

Dear Ms. Hayward:

This letter is formal notification of six proposed projects located in Redding, California, for which the City of Redding (City) is the California Environmental Quality Act (CEQA) Lead Agency. As the CEQA Lead Agency, the City has determined that the CEQA documentation is in the form of an Initial Study that may result in a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report for a project. The City encourages the Wintu Tribe of Northern California's comments and interest in the proposed projects. Pursuant to § 21080.3.1 (d), the City respectfully requests that the Wintu Tribe of Northern California repond with a written request for consultation within 30 days of receipt of this letter.

Below please find descriptions of the proposed projects and their points of contact. Attached are project location maps, pursuant to Public Resources Code § 21080.3.1 (d).

Zinco Subdivision

Project Proponent: Zinco Holding, LLC

Project Location: 3150 and 3250 Jordan Lane

Project Description: Subdivision Map Application S-2022-02416 proposes to create 16 new parcels in place of 2 existing parcels on a 4.42 acre site in an "RS-3" Residential Single-Family District.

Project Planner: Danny Castro, Assistant Planner
777 Cypress Avenue Redding, CA 96001
(530) 225-4471
dcastro@cityofredding.org

The River Subdivision

Project Proponent: L&S Redding Development, LLC

Project Location: 2980 Wyndham Lane

Project Description: Subdivision Map Application S-2023-00582 proposes to create 20 new parcels in place of 1 existing parcel on a 10.69 acre site in an "RS-3.5" Residential Single-Family District.

Project Planner: Danny Castro, Assistant Planner
777 Cypress Avenue Redding, CA 96001
(530) 225-4471
dcastro@cityofredding.org

Canby Apartments

Project Proponent: Danco Communities

Project Location: 930 and 990 Canby Road

Project Description: Site Development Permit Application SDP-2023-00085 proposes to construct a community building and 120 multifamily residential units in ten separate two- and three-story structures.

Project Planner: Danny Castro, Assistant Planner
777 Cypress Avenue Redding, CA 96001
(530) 225-4471
dcastro@cityofredding.org

Silverstone Subdivision, Unit #5

Project Proponent: Sierra Pacific Land & Timber

Project Location: 2923 Rancho Road

Project Description: Subdivision Map Application S-2023-00027 proposes to create 41 new parcels on a 5.41-acre site in an "RS-3-PD" Residential Single-Family District and Planned Development Overlay.

Project Planner: Tiffany Lightle, Associate Planner
777 Cypress Avenue Redding, CA 96001
(530) 245-7112
tlightle@cityofredding.org

Glenrock Way Subdivision

Project Proponent: Scott and Laura Herndon

Project Location: 3232 Nicolet Lane

Project Description: Subdivision Map Application S-2021-02014 proposes to create 23 new parcels on a 9.35-acre site in an "RS-2" Residential Single-Family District.

Project Planner: Tiffany Lightle, Associate Planner
777 Cypress Avenue Redding, CA 96001
(530) 245-7112
tlightle@cityofredding.org

<u>Center of Hope Apartments, Unit #2</u>

Project Proponent: Center of Hope Apartments II, LP

Project Location: 1303 Industrial Street

Project Description: Use Permit Application UP-2022-01555 proposes to construct 49 multifamily residential units and professional office space in three separate three-story structures.

Project Planner: Tiffany Lightle, Associate Planner
777 Cypress Avenue Redding, CA 96001
(530) 245-7112
tlightle@cityofredding.org

Sincerely,

Danny Castro
Assistant Planner
Development Services

DC:es

Attachments:
Location Maps

N W E S	**GIS DIVISION** INFORMATION TECHNOLOGY DEPARTMENT	**LOCATION MAP**	MTG. DATE:
	DATE PRODUCED: JANUARY 20, 2023	S-2022-02416 ZINCO HOLDING, LLC 3150 & 3250 JORDAN LANE AP# 114-050-005 & -006	ITEM:
	0 200 400 Feet		ATTACHMENT:

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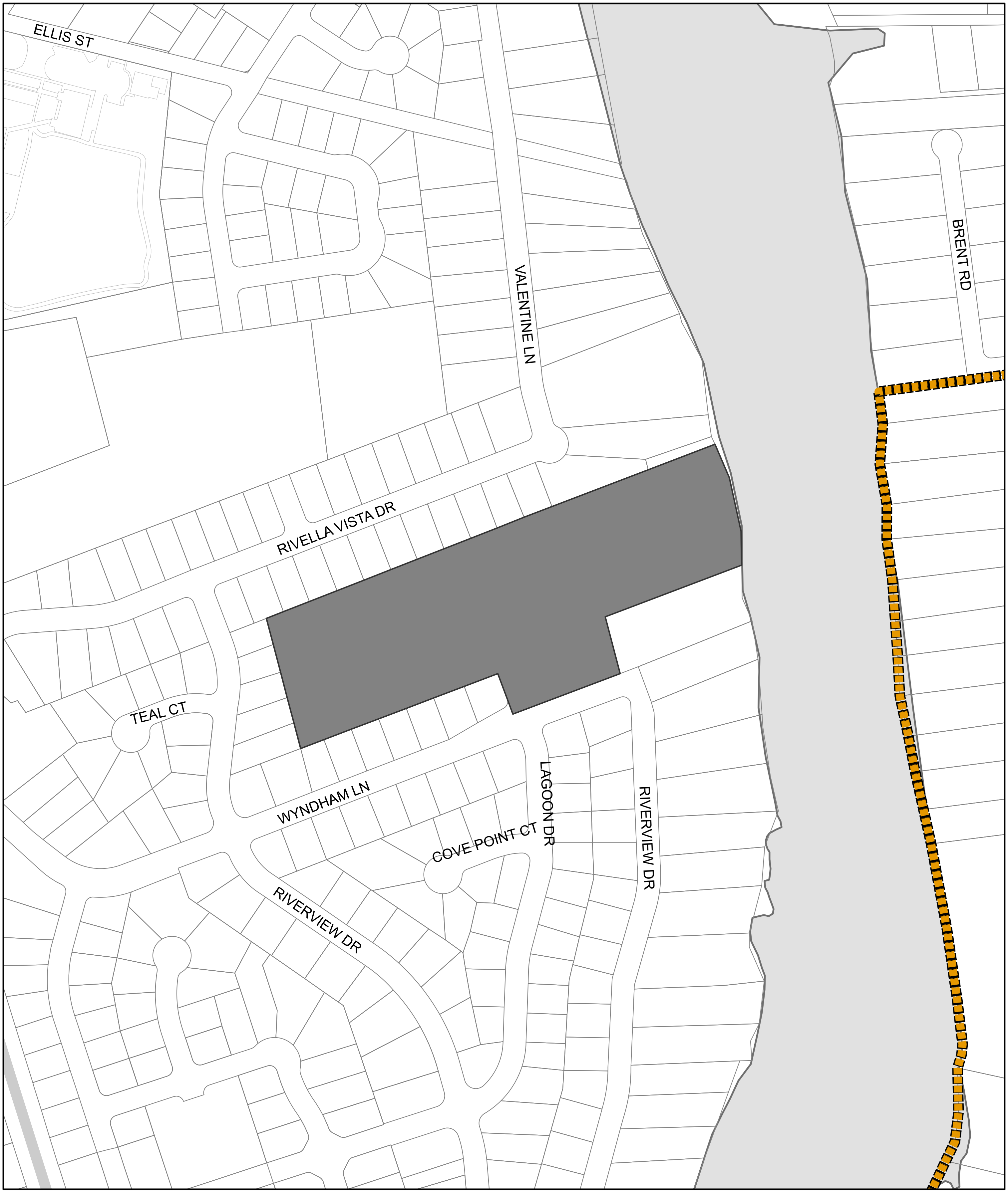

GIS DIVISION
INFORMATION TECHNOLOGY DEPARTMENT

DATE PRODUCED:
APRIL 12, 2023

0 200 400 Feet

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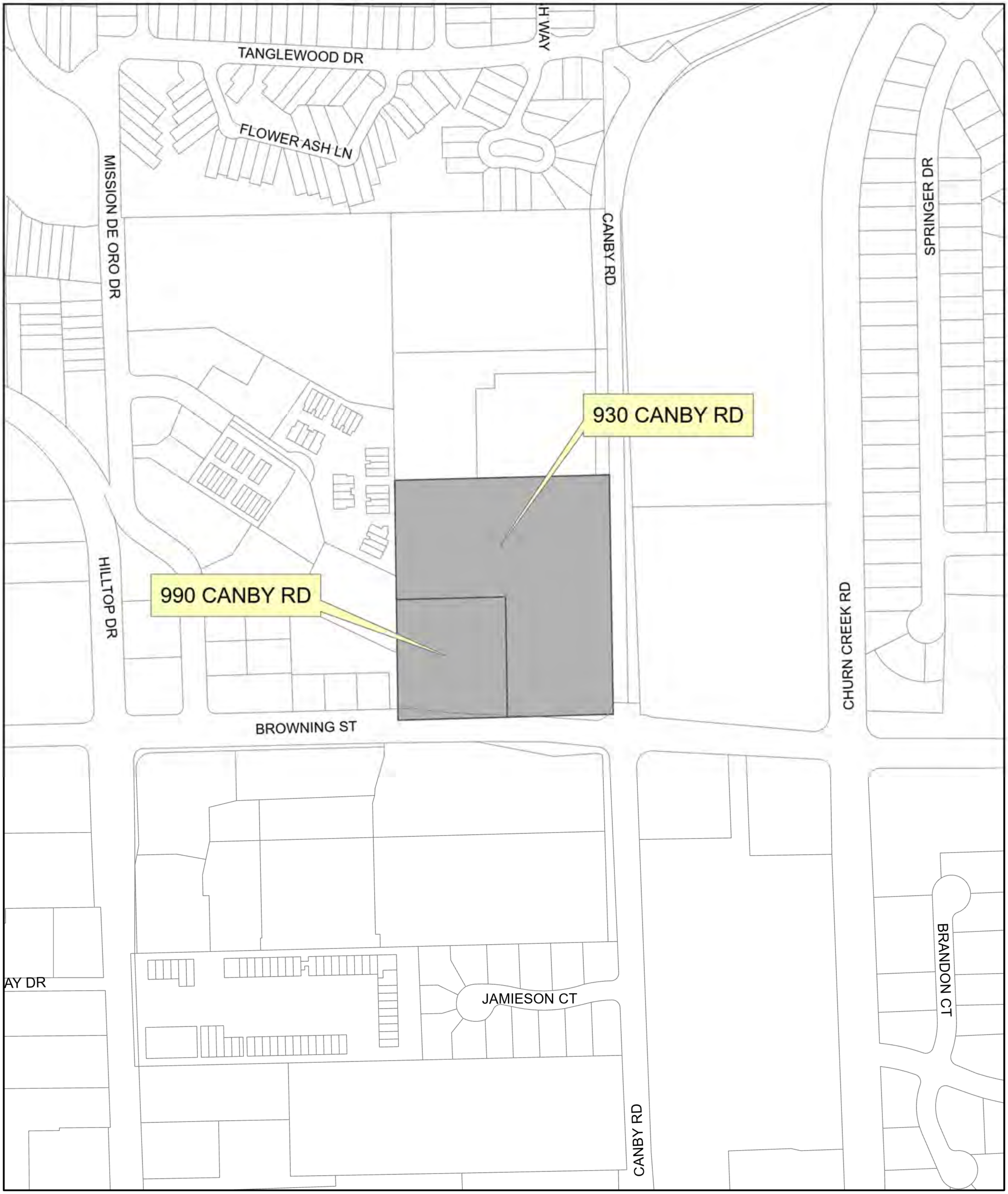
LOCATION MAP

S-2023-00582
THE RIVER SUBDIVISION
2980 WYNDHAM LANE
AP# 048-500-048

MTG. DATE:

ITEM:

ATTACHMENT:



N W E S	**GIS DIVISION** INFORMATION TECHNOLOGY DEPARTMENT	**LOCATION MAP**	MTG. DATE:
	DATE PRODUCED: JANUARY 20, 2023	SDP-2023-00085 DANCO COMMUNITIES 930 & 990 CANBY ROAD AP# 117-200-005 & -006	ITEM: ATTACHMENT:
	0 200 400 Feet		

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GIS DIVISION
INFORMATION TECHNOLOGY DEPARTMENT

DATE PRODUCED:
JANUARY 20, 2023

0 200 400 Feet

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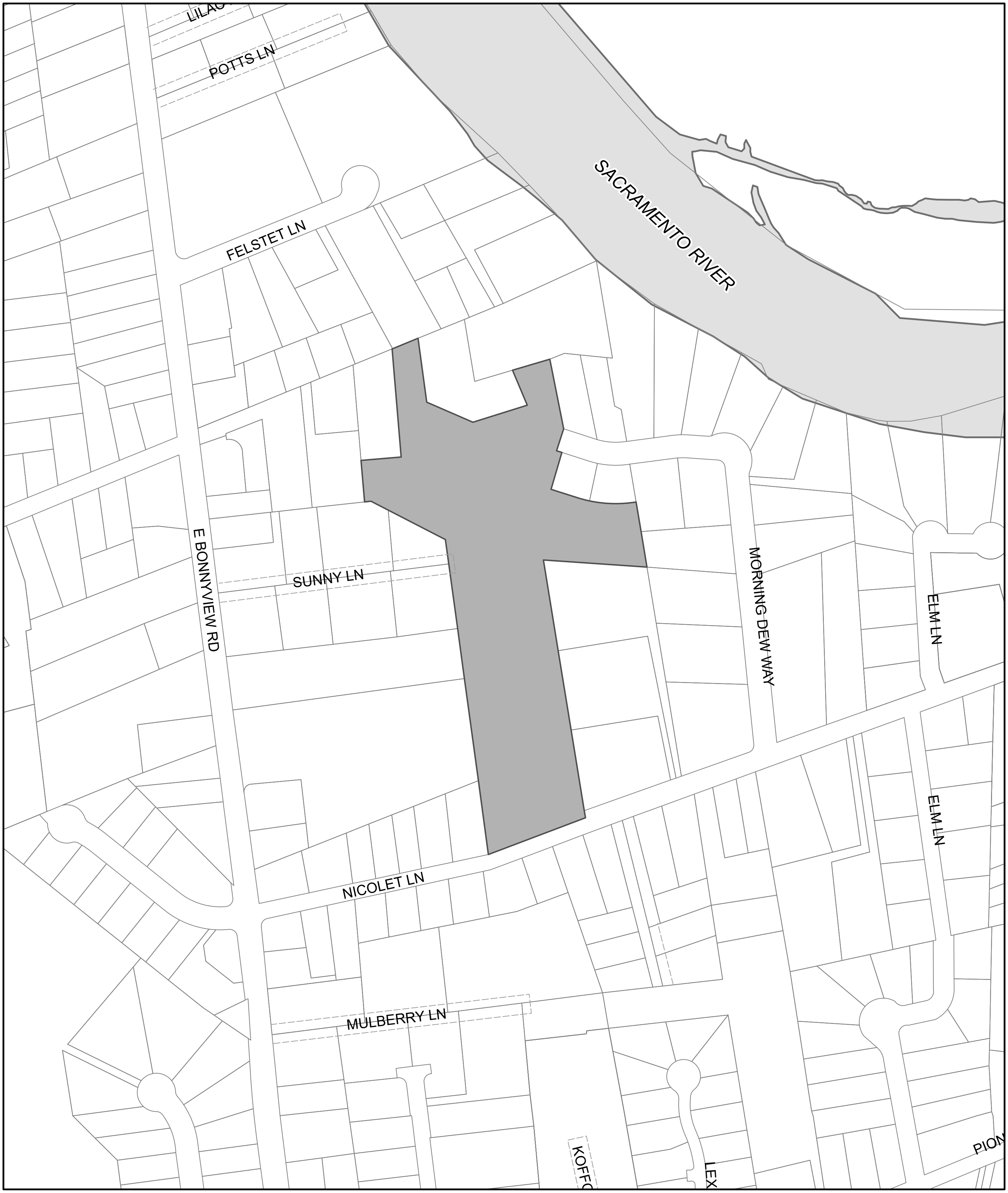
LOCATION MAP

S-2023-00027
SIERRA PACIFIC LAND TIMBER
2923 RANCHO ROAD
AP# 054-910-080

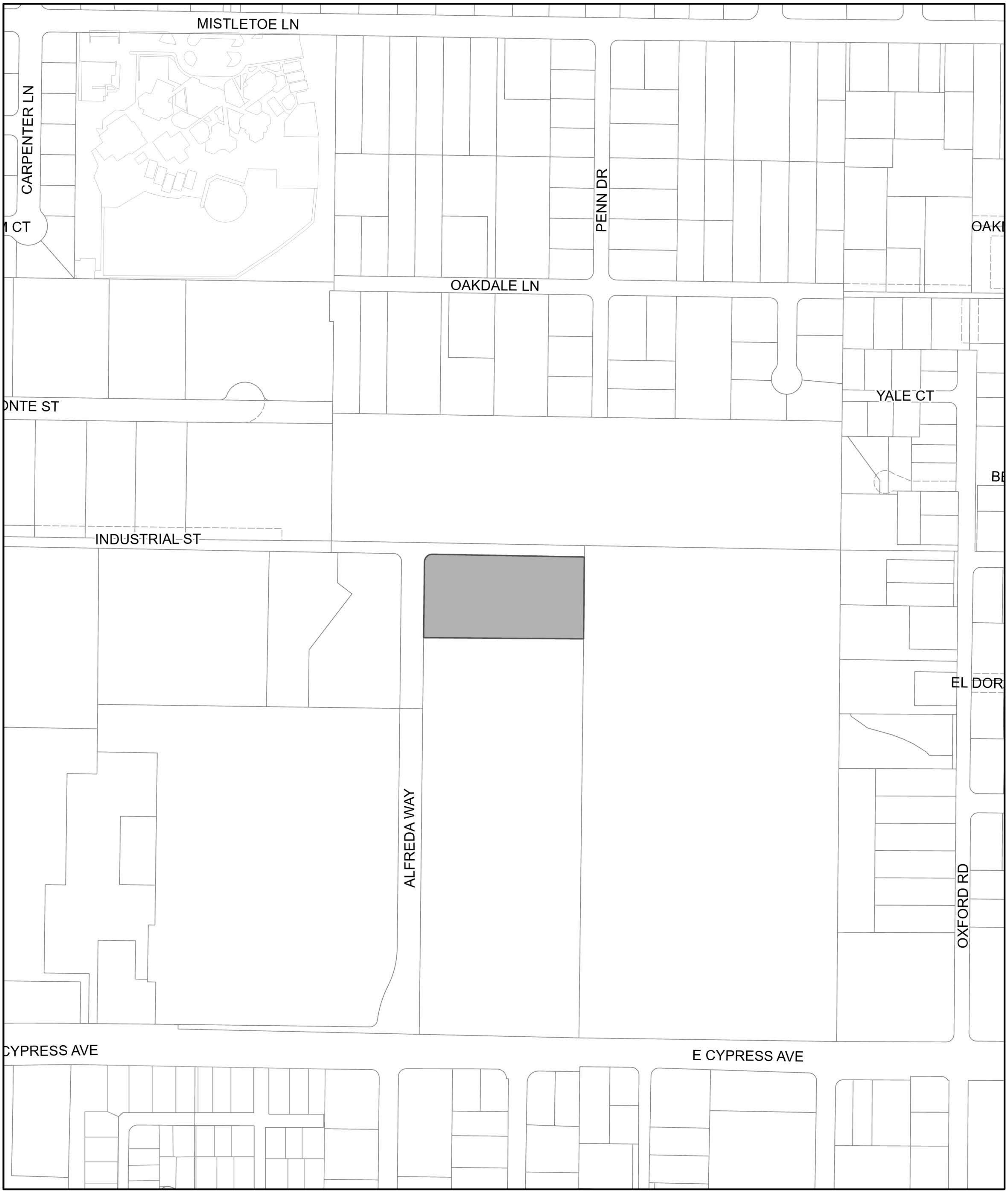
MTG. DATE:

ITEM:

ATTACHMENT:



N W E S	**GIS DIVISION** INFORMATION TECHNOLOGY DEPARTMENT	**LOCATION MAP**	MTG. DATE:
	DATE PRODUCED: DECEMBER 22, 2021	S-2021-02014 SCOTT & LAURA HERNDON 3232 NICOLET LANE AP# 048-590-006	ITEM:
	0 200 400 Feet		ATTACHMENT:
P:\Planning\ProProjects\SDD\SDD-2021-02014.aprx			



N W E S	**GIS DIVISION** INFORMATION TECHNOLOGY DEPARTMENT	**LOCATION MAP**	MTG. DATE:
	DATE PRODUCED: AUGUST 19, 2022	UP-2022-01555 CENTER OF HOPE APARTMENTS II, LP 2303 ALFREDA WAY AP# 067-110-060	ITEM:
	0 200 400 Feet		ATTACHMENT:
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SILVERSTONE UNIT 5

APN 054-910-080
REDDING, CA

ENTITLEMENT STORM DRAINAGE ANALYSIS

Prepared by

SHARRAH DUNLAP SAWYER, INC.
320 HARTNELL AVE.
REDDING CA, 96002
PHONE: 530-221-1792
FAX: 530-221-8369
WWW.SDSENGINEERING.COM

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

Gregory A. Dunbar, P.E.
Civil Engineer

12/29/22
Date

REGISTERED PROFESSIONAL ENGINEER
GREGORY A. DUNBAR
No. 56522
EXP. 6/30/23
CIVIL
STATE OF CALIFORNIA

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Pre-Developed Basin Runoff Calculations
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Post-Developed Basin Runoff Calculations

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Stage-Storage-Discharge Calculations
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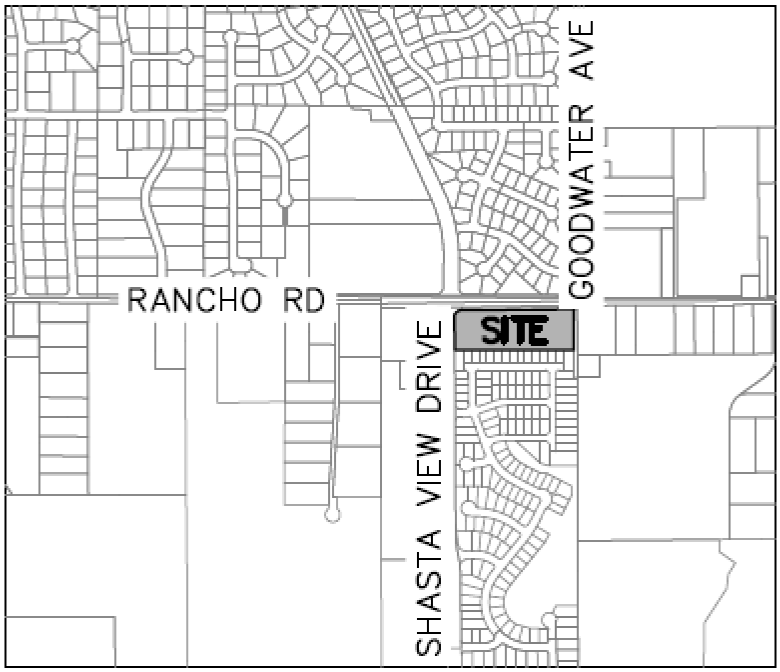
Table 819.2B *Highway Design Manual*

EXECUTIVE SUMMARY

This report provides a preliminary analysis to show that Silverstone Unit 5 can detain the post-developed runoff to pre-developed flows, tributary to Clover Creek. The site is on Shasta County Parcel APN 054-910-080, located southeast of the intersection of Rancho Road and Shasta View Drive. The proposed development is a single family residential subdivision.



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-development peak flows for the 2-, 10-, 25-, and 100-year design storm events. This report compares the pre-development condition, when the lot was undeveloped, against the post-development condition when construction is complete. In order to meet requirements, the post-development flows must be equal to, or less than, the pre-development flows.

The total site area is less than 10 acres. Per CORCS 200.00, the rational method is used to calculate, route, and compare the runoff from the site. A 100-year design storm is used to size the detention basin to ensure there are no adverse impacts downstream. The Intensity-Depth-Frequency curve for this location was calculated using the data in the City of Redding HEC-1 Processor Documentation (January 16, 2006). 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 the rainfall intensity equations, intensity graph, and soils data

PRE-DEVELOPMENT CONDITION

The site is located southeast of the intersection of Rancho Road and Shasta View Drive in Redding, California. The site is currently a vacant lot with natural grass covering the ground. The undeveloped land has a rational ‘C’ value of 0.38 in the 10-year event. This ‘C’ value is derived from Table 819.2A from the Caltrans Highway Design Manual (HDM). The average fall across the entire site is approximately 2%. Per the NRCS Web Soil Survey data, the soil is a hydrologic type ‘C’ loamy soil that provides slow infiltration. The site has fair grass cover and a low amount of surface storage. The parcel and a southern part of Rancho Road is the only area tributary to the site. Stormwater travels south into a low spot before being collected by existing storm drainage infrastructure, constructed by Silverstone Unit 1. See Appendix ‘B’ for the pre-developed basin map and calculation.

POST-DEVELOPMENT CONDITION

Silverstone Unit 5 proposes to develop a single family residential subdivision. The site (POST1) will be collected by the on site infrastructure and will be deposited into an underground detention basin. The site drains to the center of the parcel before entering the detention basin. In case of a larger than 100 year event, storm water will build up at the southeast elbow before spilling into clover creek. The rational ‘C’ value range for single family residential subdivisions is 0.30-0.50 in Table 819.2B in the Caltrans HDM. A ‘C’ value of 0.50 was chosen for this project. See Appendix ‘B’ for the post-developed basin map and calculations.

DETENTION BASIN

The proposed detention basin is an underground rock pocket that extends west of the orifice location. The orifice will be a 13” plate mounted on end of an 18” pipe, located in a structure to the north of the right-of-way. See the post-development basin map in Appendix ‘B’ for the location of the orifice.

Per MS4 requirements, the 2-year peak flow rate must not exceed pre-development flow rates in the post-development condition. The Drainage Summary Table (below) shows that the peak flow rate in the 2-year storm has not increased.

HY8

When the water surface elevation is less than 506.11’, the 13” diameter opening is assumed to be acting like a partially submerged circular weir since the downstream pipe is flowing in an open channel condition and the water surface elevation in the detention basin is 7.5” above the top of the 13” opening. We use HY8, a culvert analysis tool, to model the condition of a partially submerged circular weir. HY8 runs the same backwater calculations used to hand calculate the correlation between the flow and the stage. See Appendix C for the HY8 report and the Stage Storage Discharge Calculations.

Silverstone Unit 5 Detention Basin: DRAINAGE SUMMARY					
Top elevation: 506.40 Bottom elevation: 504.40		100-year WSE: 506.10		Orifice size: 13" Diameter Circle Orifice invert: 504.40	
	Pre-development (Q_{PRE1})	Storm Drain Flow (Q_{IN})	Post-Undetained (Q_{UNDET})	Detention Discharge (Q_{OUT})	Post-Development (Q_{OUT} + Q_{UNDET})
2-year	3.0	6.0	0.4	1.8	2.2
10-year	4.2	8.3	0.5	2.4	2.9
25-year	5.4	10.8	0.6	3.3	3.9
100-year	7.6	15.8	0.9	4.8	5.7

CONCLUSION

The discharge from the detention facility is shown not to exceed the pre-development flows within Clover Creek in the 2-, 10-, 25-, and 100-year events. The proposed design is sufficient to maintain or reduce existing flows from the site in accordance with City Council Policy 1806, and City of Redding Engineering Division requirements for protection of floodplains and downstream drainage concerns.

APPENDIX A
SITE DATA

Map Scale: 1:2,680 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 35, 70, 140, 210

Feet: 0, 100, 200, 400, 600

N

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 Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 18, Sep 2, 2022

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CeA	Churn gravelly loam, 0 to 3 percent slopes	C	2.6	7.6%
CfA	Churn gravelly loam, deep, 0 to 3 percent slopes	C	2.5	7.1%
RbA	Red Bluff loam, 0 to 3 percent slopes, MLRA 17, moist	C	29.5	85.3%
Totals for Area of Interest			**34.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Rainfall Intensity Equations For the Redding Area

Depth-Duration-Frequency Data (in inches)
Per The City of Redding HEC-1 Processor Documentation (January 16, 2006)

			Table 1a Redding 5 SSE 510 ft					Table 1b Shasta Dam 1075 ft				
Duration Days	Duration Minutes	Duration Hours	2 YR	5 YR	10 YR	25 YR	100 YR	2 YR	5 YR	10 YR	25 YR	100 YR
-	5	0.08	0.31	0.36	0.40	0.46	0.58	0.46	0.54	0.60	0.70	0.89
-	10	0.17	0.41	0.48	0.54	0.61	0.76	0.63	0.74	0.82	0.96	1.21
-	15	0.25	0.49	0.56	0.63	0.72	0.90	0.76	0.89	0.98	1.15	1.46
-	30	0.5	0.64	0.74	0.84	0.95	1.19	1.03	1.21	1.34	1.58	1.99
-	60	1	0.85	0.98	1.11	1.26	1.57	1.41	1.66	1.84	2.15	2.73
-	120	2	1.13	1.3	1.47	1.67	2.09	1.93	2.27	2.51	2.95	3.73
-	180	3	1.33	1.53	1.73	1.97	2.46	2.32	2.73	3.02	3.54	4.47
-	360	6	1.76	2.03	2.29	2.60	3.25	3.17	3.73	4.12	4.83	6.11
-	720	12	2.33	2.69	3.03	3.45	4.31	4.33	5.09	5.64	6.61	8.36
1	1440	24	3.08	3.56	4.01	4.56	5.71	5.93	6.96	7.71	9.03	11.43

Calculated Intensity-Duration-Frequency Data

Elev	510 ft						
Duration Days	Duration Minutes	Duration Hours	2 YR in/hr	5 YR in/hr	10 YR in/hr	25 YR in/hr	100 YR in/hr
-	5	0.08	3.72	4.32	4.80	5.52	6.96
-	10	0.17	2.46	2.88	3.24	3.66	4.56
-	15	0.25	1.96	2.24	2.52	2.88	3.60
-	30	0.5	1.28	1.48	1.68	1.90	2.38
-	60	1	0.85	0.98	1.11	1.26	1.57
-	120	2	0.57	0.65	0.74	0.84	1.05
-	180	3	0.44	0.51	0.58	0.66	0.82
0.25	360	6	0.29	0.34	0.38	0.43	0.54
0.5	720	12	0.19	0.22	0.25	0.29	0.36
1	1440	24	0.13	0.15	0.17	0.19	0.24

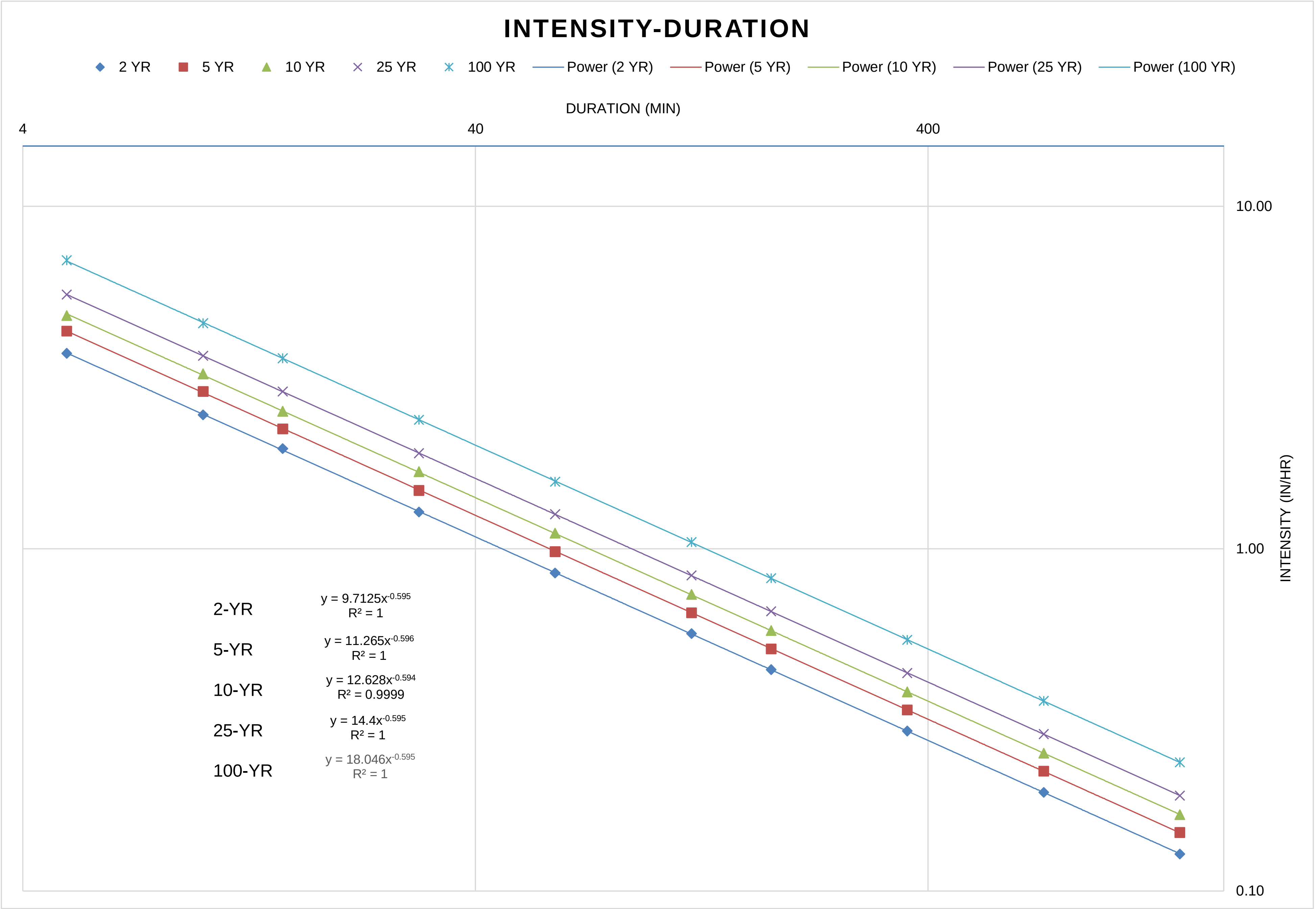
Intensity (in/hr)=IF(C26<=1075,IF(C26>=425,((C26-425)/(1075-425))*((G8/C8)-(D8/C8))+(D8/C8),"ERROR"),"ERROR")			
C26=Input Elevation	C8=Duration in Hours	D8=Inches at Redding 5 SSE	G8=inches at Shasta Dam

Intensity Equations

Intensity Equation: $i = FCT \cdot t^{PWR}$
t=Time in **Minutes**

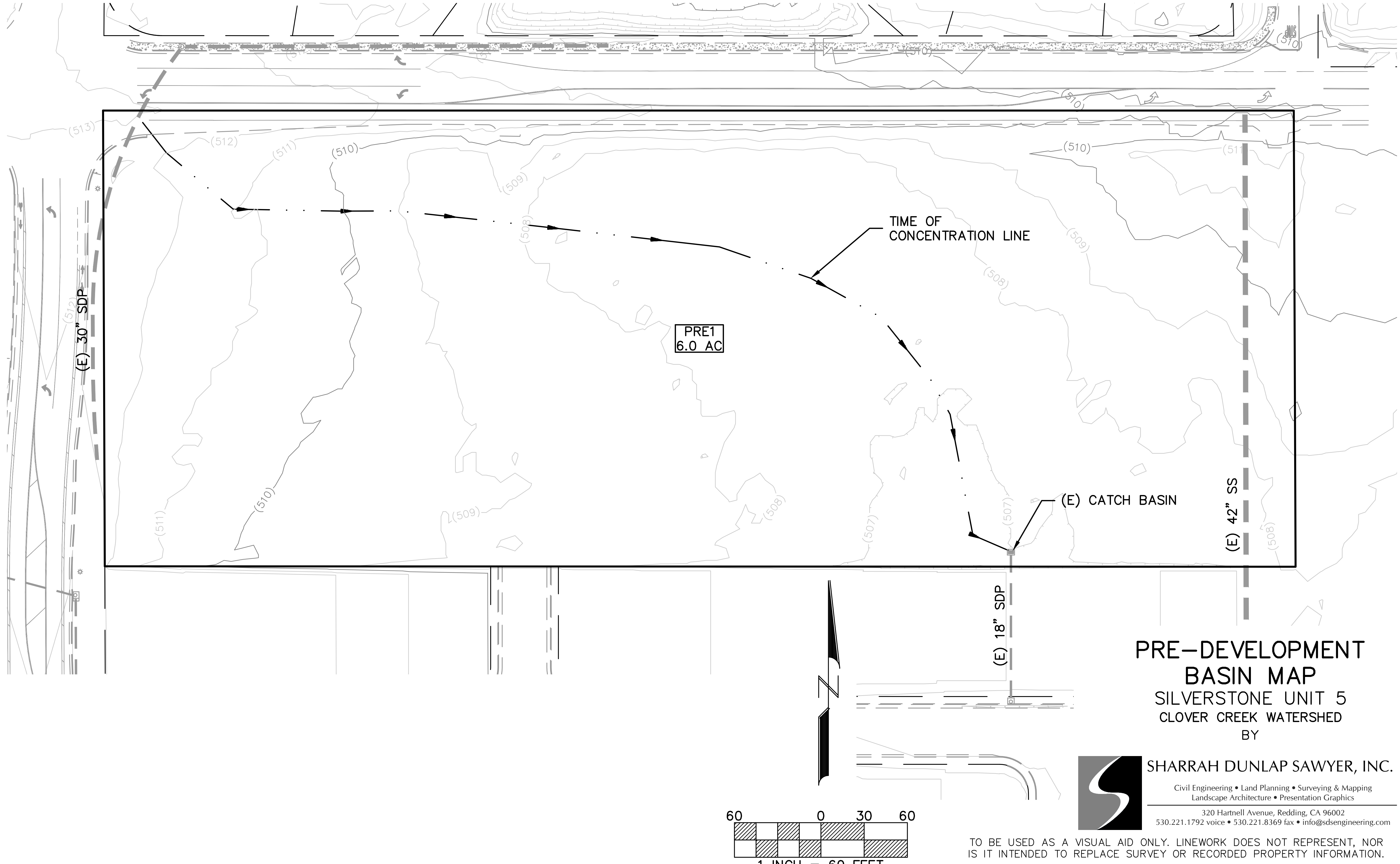
	FCT Value	PWR Value
2 YR	9.71	-0.59
5 YR	11.27	-0.60
10 YR	12.63	-0.59
25 YR	14.40	-0.59
100 YR	18.05	-0.60

FCT=ROUND(EXP(INDEX(LINEST(LN(<Intensity (y) Values>),LN(<Duration (x) Values>)),1,2)),2)
PWR=ROUND(INDEX(LINEST(LN(<Intensity (y) Values>),LN(<IDuration (x) Values>)),1),2)


INTENSITY-DURATION
2 YR
5 YR
10 YR
25 YR
100 YR
Power (2 YR)
Power (5 YR)
Power (10 YR)
Power (25 YR)
Power (100 YR)
DURATION (MIN)
4
40
400
10.00
1.00
0.10
INTENSITY (IN/HR)
2-YR
$y = 9.7125x^{-0.595}$
$R^2 = 1$
5-YR
$y = 11.265x^{-0.596}$
$R^2 = 1$
10-YR
$y = 12.628x^{-0.594}$
$R^2 = 0.9999$
25-YR
$y = 14.4x^{-0.595}$
$R^2 = 1$
100-YR
$y = 18.046x^{-0.595}$
$R^2 = 1$

APPENDIX B

BASIN CALCULATIONS



PRE-DEVELOPMENT BASIN MAP

SILVERSTONE UNIT 5

CLOVER CREEK WATERSHED

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 • 530.221.8369 fax • info@sdsengineering.com

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DATE: DECEMBER, 2022 SCALE: 1"=60' SHEET 1 OF 1

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Stormwater Runoff for Undeveloped Areas

Basin: PRE1

Calculate composite post-development runoff coefficient using formula:

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

C-values obtained from Table 819.2A (Caltrans Highway Design Manual)		"C" values		
Surface Type		10-yr	25-yr	100-yr
Relief	Flat (~2% Average)	0.10		
Soil Infiltration	RbA (Type 'C' Loam)	0.12		
Vegetal Cover	Grassland	0.08		
Surface Storage	Low	0.08	10-yr x 1.1	10-yr x 1.25
Total Basin Area =	6.1 ac	0.38	0.42	0.48

Stormwater Runoff for Developed Areas

Basin: PRE1

Calculate composite post-development runoff coefficient using formula:

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

C-values obtained using Table 819.2B (Caltrans Highway Design Manual)			"C" values		
Surface Type	Areas	%	10-yr	25-yr	100-yr
Undeveloped Area	5.8 ac	96.7%	0.38	0.42	0.48
Road	0.2 ac	3.3%	0.90	0.99	1.00
Total Basin Area =	6.0 ac	100.0%	0.40	0.44	0.49

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

COR Hydro Manual pg. C-14	Estimated	Calculated		
Tco_2 = 24.1 min	i_2 = 1.49 in/hr	1.49 in/hr	L = 426 ft	Length of Flowpath
Tco_{10} = 21.2 min	i_{10} = 2.08 in/hr	2.08 in/hr	S = 0.013 ft/ft	Average Slope of Flowpath
Tco_{25} = 19.9 min	i_{25} = 2.47 in/hr	2.47 in/hr	n = 0.30	parks/medians/pasture, Table C-9
Tco_{100} = 18.0 min	i_{100} = 3.19 in/hr	3.19 in/hr	Elev = 510 ft	Site Elevation
			Tco_{min} = 5.0 min	

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 = 321 ft	Length of Flowpath
$V_{shallow}$ = 0.7 ft/s	S_{ave} = 0.002 ft/ft	Average Longitudinal Slope
	κ = 0.491	Unpaved
$Tc_{Shallow}$ = L / (60 V) = 7.6 min	α = 33	Unit Conversion (33)

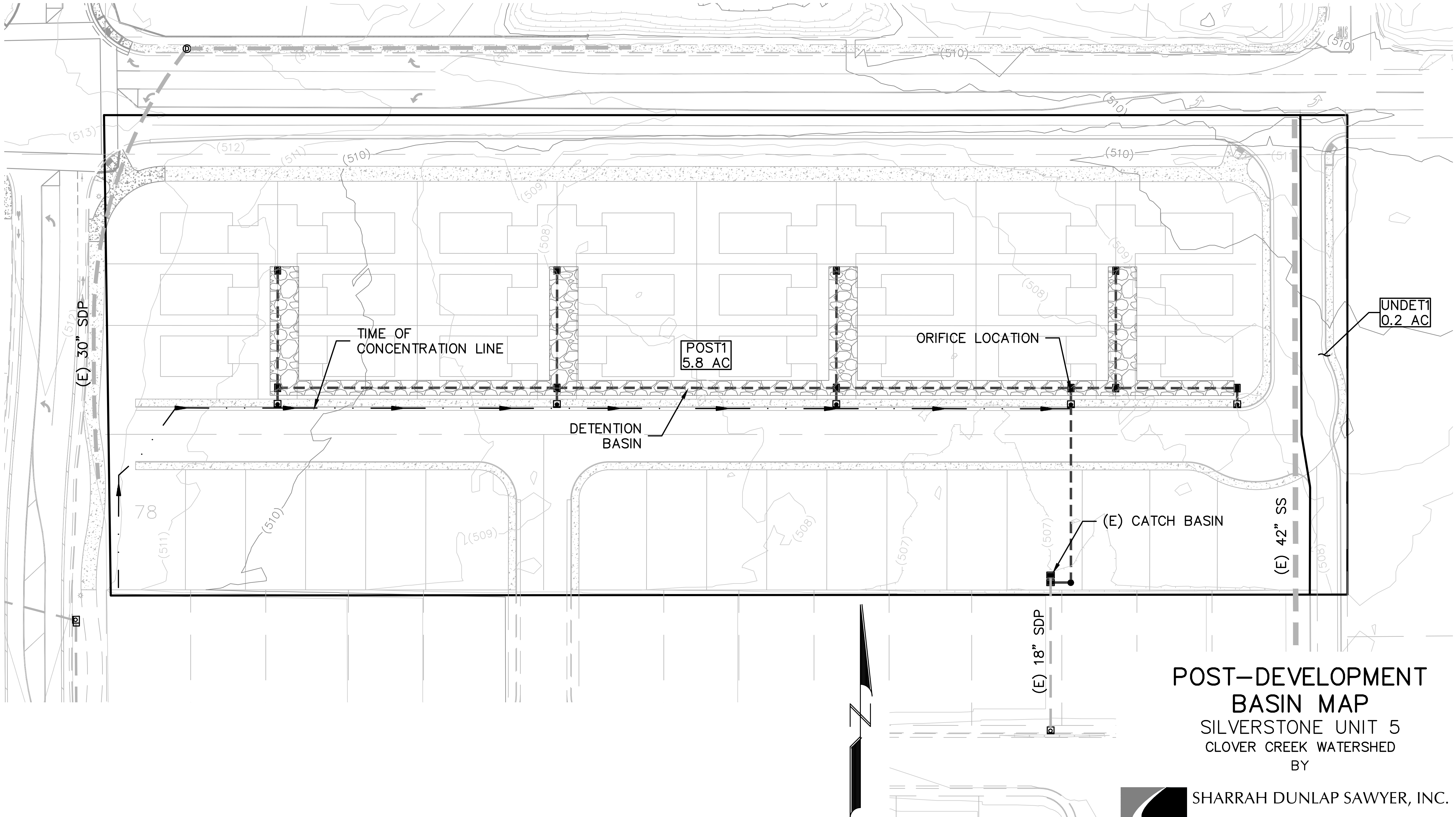
Total Rainfall Intensity i = FCT * (Tc) ^ PWR

Rainfall intensity equation compiled from data obtained from The City of Redding HEC-1 Processor Documentation (January 16, 2006).

ΣTc_2 = 31.7 min	ΣTc_{10} = 28.8 min	ΣTc_{25} = 27.5 min	ΣTc_{100} = 25.6 min
FCT = 9.71	FCT = 12.63	FCT = 14.40	FCT = 18.05
PWR = -0.59	PWR = -0.59	PWR = -0.59	PWR = -0.60
i_2 = 1.26 in/hr	i_{10} = 1.74 in/hr	i_{25} = 2.04 in/hr	i_{100} = 2.58 in/hr

Basin Runoff Flow Q = C * i * A

2-year	C_2= 0.40	i_2= 1.26 in/hr	A_2= 6.0 ac	**Q_2 = 3.0 cfs**
10-year	C_{10}= 0.40	i_{10}= 1.74 in/hr	A_{10}= 6.0 ac	**Q_{10} = 4.2 cfs**
25-year	C_{25}= 0.44	i_{25}= 2.04 in/hr	A_{25}= 6.0 ac	**Q_{25} = 5.4 cfs**
100-year	C_{100}= 0.49	i_{100}= 2.58 in/hr	A_{100}= 6.0 ac	**Q_{100} = 7.6 cfs**



POST–DEVELOPMENT BASIN MAP

SILVERSTONE UNIT 5

CLOVER CREEK WATERSHED

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60 0 30 60
1 INCH = 60 FEET

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DATE: DECEMBER, 2022 SCALE: 1"=60' SHEET 1 OF 1

RTT P:\proj\p\22142\Dwg\22142tm-det.dwg JOB#:22.0142

Stormwater Runoff for Developed Areas

Basin: POST1

Calculate composite post-development runoff coefficient using formula:

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

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

Surface Type	Areas	%	"C" values 10-yr	25-yr	100-yr
Developed Residential	5.8 ac	100.0%	0.50	0.55	0.63
Total Basin Area =	5.8 ac	100.0%	0.50	0.55	0.63

Time of Concentration (Overland) — i = FCT * (Tc) ^ PWR — $Tco = (0.66\ L^{0.5}\ n^{0.52}) / (S^{0.31}\ i^{0.38})$

COR Hydro Manual pg. C-14

	Estimated	Calculated		
Tco_2 = 11.0 min	i_2 = 2.36 in/hr	2.36 in/hr	L = 80 ft	Length of Flowpath
Tco_{10} = 9.7 min	i_{10} = 3.31 in/hr	3.31 in/hr	S = 0.010 ft/ft	Average Slope of Flowpath
Tco_{25} = 9.1 min	i_{25} = 3.91 in/hr	3.91 in/hr	n = 0.40	Residential landscaping, Table C-9
Tco_{100} = 8.2 min	i_{100} = 5.11 in/hr	5.11 in/hr	Elev = 510 ft	Site Elevation
			Tco_{min} = 5.0 min	

Time of Concentration (Shallow Concentrated Flow) — **N/A** — Tcg = (L / V)

L = — Length of Flowpath

Time of Concentration (Gutter Flow) — Tcg = (L / V)

COR Hydro Manual pg. C-15

$V_{gutter} = (1.12/n)\ S_x^{0.67}\ S^{0.5}\ T^{0.67}$

V_{gutter} = 1.7 ft/s

Tc_{gutter} = L / (60 V) = 0.9 min

L =	95 ft	Length of Flowpath
S_{ave} =	0.006 ft/ft	Average Longitudinal Slope
Sx =	0.02 ft/ft	Cross Slope
T =	12 ft	Spread of Flow
n =	0.020	Concrete Gutter

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

COR Hydro Manual pg. C-15

$V_{mann} = (1.49/n)\ R^{0.67}\ S^{0.5}$

R= A / P = 0.50 ft

V_{mann} = 5.1 ft/s

Tc_{mann} = L / (60 V)= 1.7 min

L =	530 ft	Length of Flowpath
S_{ave} =	0.005 ft/ft	Average Longitudinal Slope
n =	0.013	Cast Iron
A =	1.5 sf	Area of Flow
P =	3 ft	Wetted Perimeter

Total Rainfall Intensity — i = FCT * (Tc) ^ PWR

Rainfall intensity equation compiled from data obtained from The City of Redding HEC-1 Processor Documentation (January 16, 2006).

ΣTc_2 = 13.6 min	ΣTc_{10} = 12.3 min	ΣTc_{25} = 11.7 min	ΣTc_{100} = 10.8 min
FCT = 9.71	FCT = 12.63	FCT = 14.40	FCT = 18.05
PWR = -0.59	PWR = -0.59	PWR = -0.59	PWR = -0.60
i_2 = 2.08 in/hr	i_{10} = 2.87 in/hr	i_{25} = 3.37 in/hr	i_{100} = 4.33 in/hr

Basin Runoff Flow — Q = C * i * A

2-year	C_2= 0.50	i_2= 2.08 in/hr	A_2= 5.8 ac	**Q_2 = 6.0 cfs**
10-year	C_{10}= 0.50	i_{10}= 2.87 in/hr	A_{10}= 5.8 ac	**Q_{10} = 8.3 cfs**
25-year	C_{25}= 0.55	i_{25}= 3.37 in/hr	A_{25}= 5.8 ac	**Q_{25} = 10.8 cfs**
100-year	C_{100}= 0.63	i_{100}= 4.33 in/hr	A_{100}= 5.8 ac	**Q_{100} = 15.8 cfs**

Stormwater Runoff for Developed Areas

Basin: UNDET1

Calculate composite post-development runoff coefficient using formula:

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

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

Surface Type	Areas	%	"C" values 10-yr	25-yr	100-yr
Developed Residential	0.2 ac	100.0%	0.50	0.55	0.63
Total Basin Area =	0.2 ac	100.0%	0.50	0.55	0.63

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

COR Hydro Manual pg. C-14

	Estimated	Calculated		
Tco_2 = 1.8 min	i_2 = 4.71 in/hr	6.86 in/hr	L = 50 ft	Length of Flowpath
Tco_{10} = 1.5 min	i_{10} = 6.49 in/hr	9.94 in/hr	S = 0.005 ft/ft	Average Slope of Flowpath
Tco_{25} = 1.5 min	i_{25} = 7.73 in/hr	11.34 in/hr	n = 0.02	Pavement - smooth, Table C-9
Tco_{100} = 1.1 min	i_{100} = 17.05 in/hr	17.05 in/hr	Elev = 510 ft	Site Elevation
			Tco_{min} = 5.0 min	

Time of Concentration (Gutter Flow) Tcg = (L / V)

COR Hydro Manual pg. C-15

$V_{gutter} = (1.12/n)\ S_x^{0.67}\ S^{0.5}\ T^{0.67}$

V_{gutter} = 1.5 ft/s

Tc_{gutter} = L / (60 V) = 3.0 min

L = 270 ft	Length of Flowpath
S_{ave} = 0.005 ft/ft	Average Longitudinal Slope
Sx = 0.02 ft/ft	Cross Slope
T = 12 ft	Spread of Flow
n = 0.020	Concrete Gutter

Total Rainfall Intensity i = FCT * (Tc) ^ PWR

Rainfall intensity equation compiled from data obtained from The City of Redding HEC-1 Processor Documentation (January 16, 2006).

ΣTc_2 = 5.0 min	ΣTc_{10} = 5.0 min	ΣTc_{25} = 5.0 min	ΣTc_{100} = 5.0 min
FCT = 9.71	FCT = 12.63	FCT = 14.40	FCT = 18.05
PWR = -0.59	PWR = -0.59	PWR = -0.59	PWR = -0.60
i_2 = 3.76 in/hr	i_{10} = 4.89 in/hr	i_{25} = 5.57 in/hr	i_{100} = 6.87 in/hr

Basin Runoff Flow Q = C * i * A

2-year	C_2= 0.50	i_2= 3.76 in/hr	A_2= 0.2 ac	**Q_2 = 0.4 cfs**
10-year	C_{10}= 0.50	i_{10}= 4.89 in/hr	A_{10}= 0.2 ac	**Q_{10} = 0.5 cfs**
25-year	C_{25}= 0.55	i_{25}= 5.57 in/hr	A_{25}= 0.2 ac	**Q_{25} = 0.6 cfs**
100-year	C_{100}= 0.63	i_{100}= 6.87 in/hr	A_{100}= 0.2 ac	**Q_{100} = 0.9 cfs**

APPENDIX C

DETENTION CALCULATIONS

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 1 - Summary of Culvert Flows at Crossing: Crossing 1

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
505.34	Step-1	2.00	2.00	0.00	1
505.61	Step-2	3.00	3.00	0.00	1
505.86	Step-3	4.00	4.00	0.00	1
506.11	100-yr	4.80	4.80	0.00	1
507.45	Overtopping	7.27	7.27	0.00	Overtopping

Table 2 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)
Step-1	2.00	2.00	505.34	0.703	0.944	7-H2c	-1.000	0.589	0.589	0.690	3.912
Step-2	3.00	3.00	505.61	0.977	1.212	7-H2c	-1.000	0.728	0.728	0.870	4.569
Step-3	4.00	4.00	505.86	1.301	1.463	7-H2t	-1.000	0.840	0.880	1.070	5.004
100-yr	4.80	4.80	506.11	1.626	1.709	4-FFf	-1.000	0.911	1.080	1.270	5.240

Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
2.00	504.89	0.69	2.50
3.00	505.07	0.87	2.81
4.00	505.27	1.07	2.96
4.80	505.47	1.27	3.00

****

Straight Culvert

Inlet Elevation (invert): 504.40 ft,   Outlet Elevation (invert): 504.39 ft

Culvert Length: 0.03 ft,   Culvert Slope: 0.3333

****

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 100.00 ft

Inlet Elevation: 504.40 ft

Outlet Station: 100.03 ft

Outlet Elevation: 504.39 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 1.08 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - Crossing 1

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 504.20 ft

Roadway Data for Crossing: Crossing 1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 0.03 ft

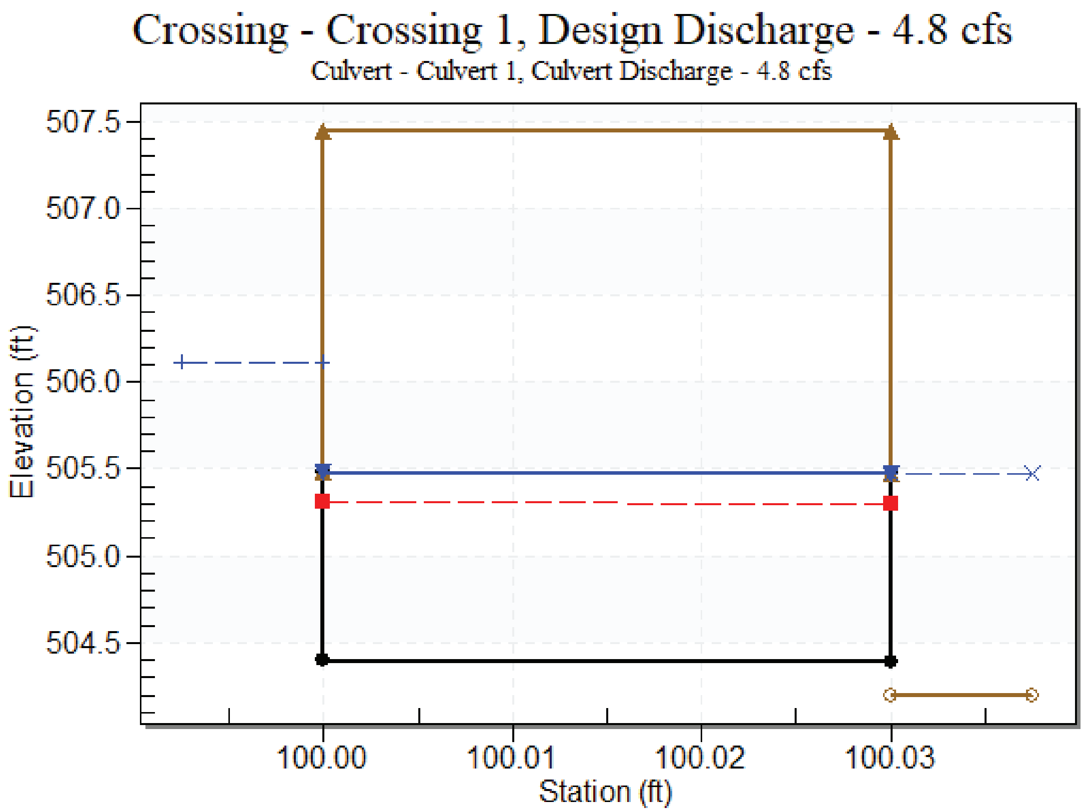
Crest Elevation: 507.45 ft

Roadway Surface: Paved

Roadway Top Width: 0.03 ft

Project Units: U.S. Customary Units

Water Surface Profile Plot for Culvert: Culvert 1



Stage-Storage Required

Silverstone Unit 5 Detention Basin

The following calculations are performed per the U.S. Department of Transportation Federal Highway Administration *Hydraulic Design Series No. 2, Second*

Required Volume of Storage $V_s = 60\ (Q_{IN} - Q_{DET})\ T_c$

2-year	**10-year**	**25-year**	**100-year**	
$Q_{PRE} = Q_{PRE1}$ = 3.0 cfs	Q_{PRE} = 4.2 cfs	Q_{PRE} = 5.4 cfs	Q_{PRE} = 7.6 cfs	Pre-Development Flow
$Q_{IN} = Q_{POST1}$ = 6.0 cfs	Q_{IN} = 8.3 cfs	Q_{IN} = 10.8 cfs	Q_{IN} = 15.8 cfs	Post-Development Flow
Q_{UNDET} = 0.4 cfs	Q_{UNDET} = 0.5 cfs	Q_{UNDET} = 0.6 cfs	Q_{UNDET} = 0.9 cfs	Undetained Post-Development Flow
$Q_{ALL} = Q_{PRE} - Q_{UNDET}$ = 2.6 cfs	Q_{ALL} = 3.7 cfs	Q_{ALL} = 4.8 cfs	Q_{ALL}= 6.7 cfs	Allowable peak flow discharge
Q_{OUT} = 1.8 cfs	Q_{OUT} = 2.4 cfs	Q_{OUT} = 3.3 cfs	Q_{OUT} = 4.8 cfs	Peak discharge of designed detention
Tc = 13.6 min	Tc = 12.3 min	Tc = 11.7 min	Tc = 10.8 min	Post-development time of concentration
Vs = 3,427 ft^3	Vs = 4,354 ft^3	Vs = 5,265 ft^3	Vs = 7,128 ft^3	Required Volume of Storage

Stage-Storage Detention Basin

Assuming no infiltration and ground is saturated at start of storm, bottom of detention volume starts at outflow invert

Underground rock pocket porosity = 35%

Silverstone Unit 5 Detention Basin: STAGE-STORAGE-DISCHARGE							
Elev (ft)	Incremental Depth (ft)	Area (ft^2)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Storage Volume (ft^3)	Detention Discharge (cfs)	
504.40	0.00	12,000	0	0	0	0.0	
505.23	0.83	12,000	9,960	9,960	3,486	1.8	2-YR
505.34	0.11	12,000	1,320	11,280	3,948	2.0	
505.44	0.10	12,000	1,200	12,480	4,368	2.4	10-YR
505.61	0.17	12,000	2,040	14,520	5,082	3.0	
505.68	0.07	12,000	840	15,360	5,376	3.3	25-YR
505.86	0.18	12,000	2,160	17,520	6,132	4.0	
506.10	0.24	12,000	2,880	20,400	7,140	4.8	100-YR
506.11	0.01	12,000	120	20,520	7,182	4.8	

Silverstone Unit 5 Detention Basin: DRAINAGE SUMMARY					
Top elevation: 506.40 Bottom elevation: 504.40		100-year WSE: 506.10		Orifice size: 13" Diameter Circle Orifice invert: 504.40	
	Pre-development (Q_{PRE1})	Storm Drain Flow (Q_{IN})	Post-Undetained (Q_{UNDET})	Detention Discharge (Q_{OUT})	Post-Development ($Q_{OUT} + Q_{UNDET}$)
2-year	3.0	6.0	0.4	1.8	2.2
10-year	4.2	8.3	0.5	2.4	2.9
25-year	5.4	10.8	0.6	3.3	3.9
100-year	7.6	15.8	0.9	4.8	5.7

Channel Report

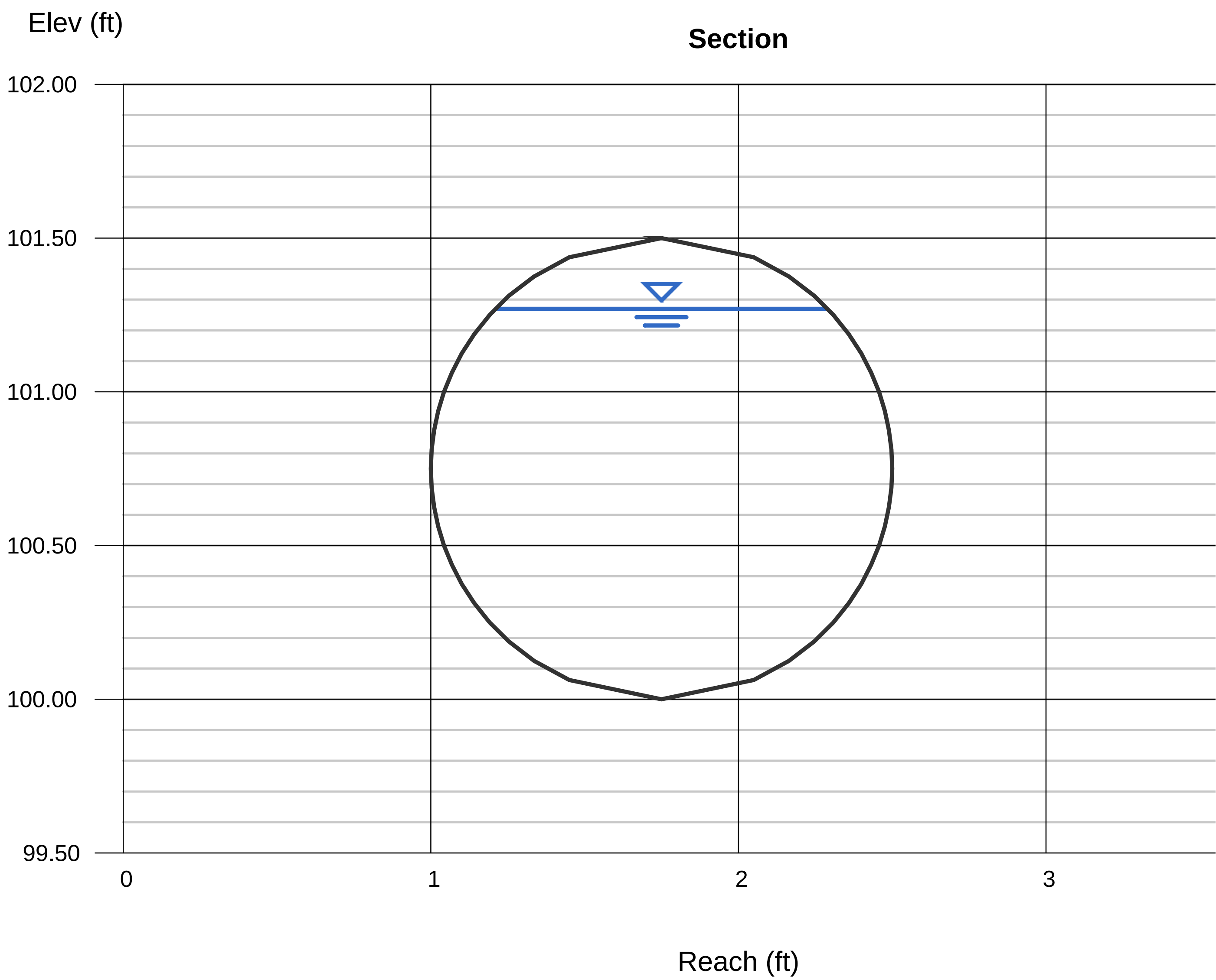
(E)18 IN. SDP - 4.8 CFS

Circular
Diameter (ft) = 1.50

Invert Elev (ft) = 100.00
Slope (%) = 0.20
N-Value = 0.013

Calculations
Compute by: Known Q
Known Q (cfs) = 4.80

Highlighted
Depth (ft) = 1.27
Q (cfs) = 4.800
Area (sqft) = 1.60
Velocity (ft/s) = 3.00
Wetted Perim (ft) = 3.51
Crit Depth, Yc (ft) = 0.84
Top Width (ft) = 1.08
EGL (ft) = 1.41

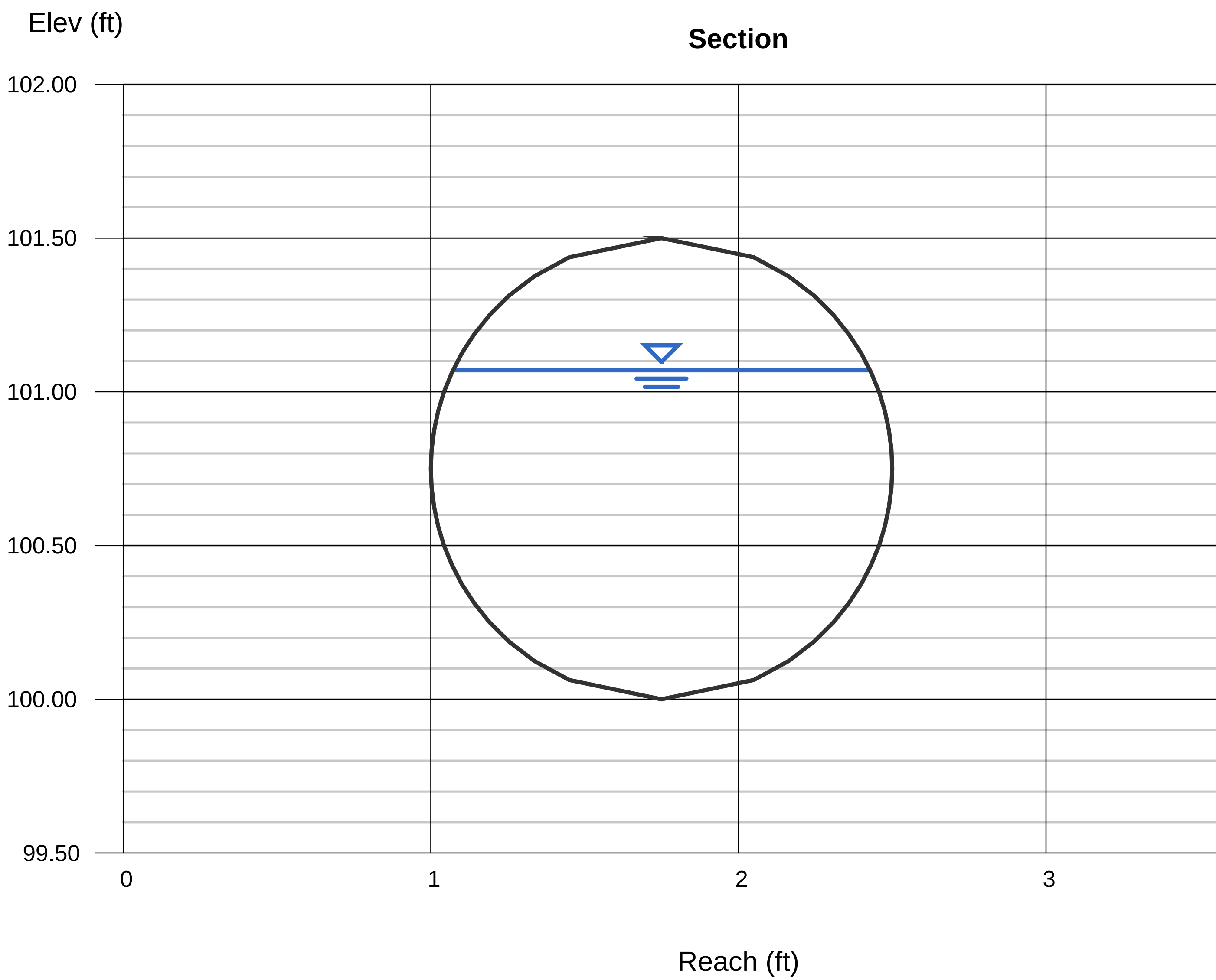


Channel Report

(E)18 IN. SDP - 4 CFS

Circular	
Diameter (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.20
N-Value	= 0.013
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 4.00

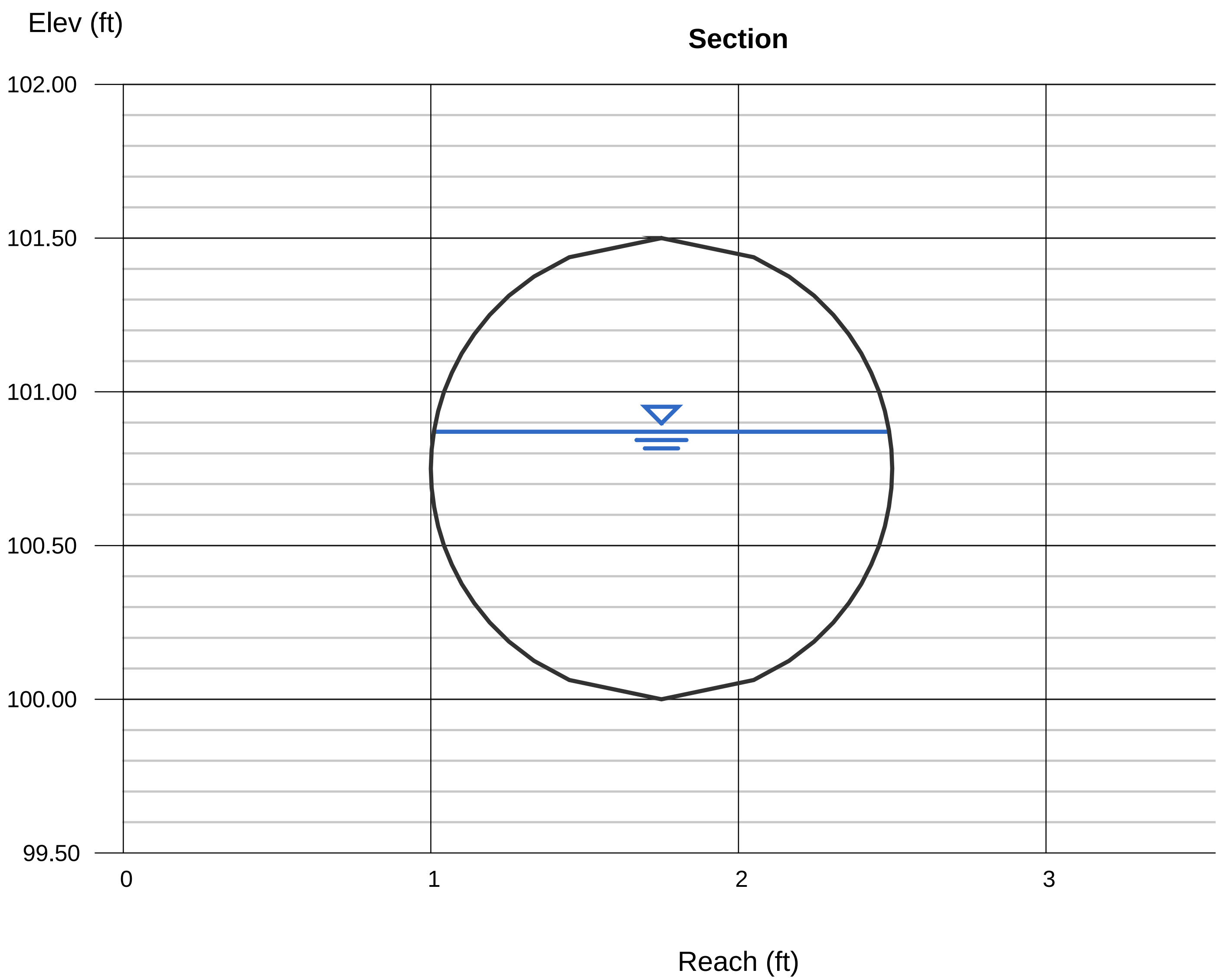
Highlighted	
Depth (ft)	= 1.07
Q (cfs)	= 4.000
Area (sqft)	= 1.35
Velocity (ft/s)	= 2.96
Wetted Perim (ft)	= 3.02
Crit Depth, Yc (ft)	= 0.77
Top Width (ft)	= 1.35
EGL (ft)	= 1.21



Channel Report

(E)18 IN. SDP - 3 CFS

Circular		**Highlighted**	
Diameter (ft)	= 1.50	Depth (ft)	= 0.87
		Q (cfs)	= 3.000
		Area (sqft)	= 1.07
Invert Elev (ft)	= 100.00	Velocity (ft/s)	= 2.81
Slope (%)	= 0.20	Wetted Perim (ft)	= 2.60
N-Value	= 0.013	Crit Depth, Yc (ft)	= 0.66
		Top Width (ft)	= 1.48
Calculations		EGL (ft)	= 0.99
Compute by:	Known Q		
Known Q (cfs)	= 3.00		



Channel Report

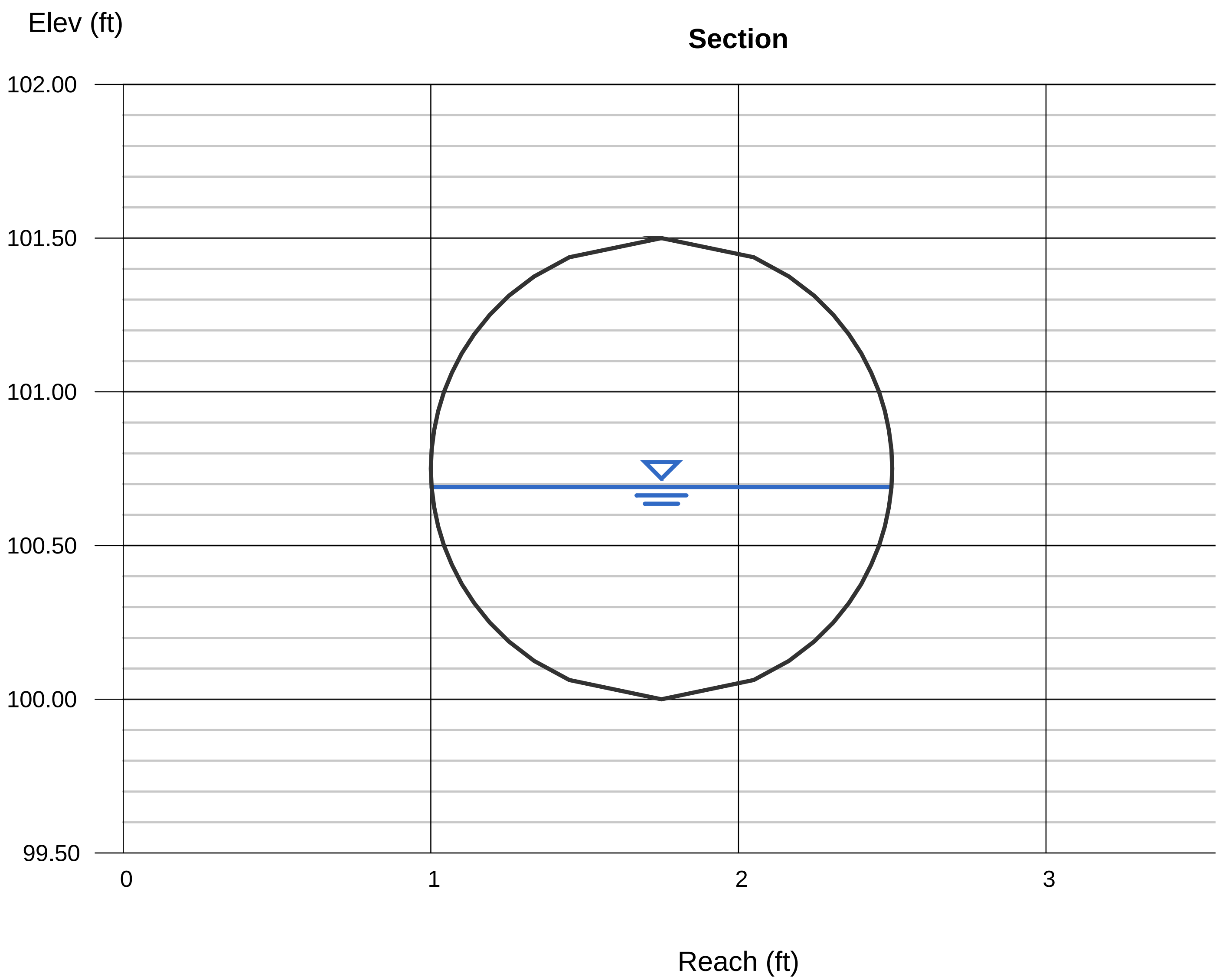
(E)18 IN. SDP - 2 CFS

Circular
Diameter (ft) = 1.50

Invert Elev (ft) = 100.00
Slope (%) = 0.20
N-Value = 0.013

Calculations
Compute by: Known Q
Known Q (cfs) = 2.00

Highlighted
Depth (ft) = 0.69
Q (cfs) = 2.000
Area (sqft) = 0.80
Velocity (ft/s) = 2.50
Wetted Perim (ft) = 2.24
Crit Depth, Yc (ft) = 0.54
Top Width (ft) = 1.50
EGL (ft) = 0.79



APPENDIX D
REFERENCE MATERIALS

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.

Find

The runoff coefficient, C, for the above watershed.

Solution:

Relief	0.14
Soil Infiltration	0.08
Vegetal Cover	0.04
Surface Storage	0.06
	C = 0.32

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.

Central Valley Regional Water Quality Control Board

8 February 2023

Tiffany Lightle
City of Redding
777 Cypress Avenue
Redding, CA 96001

COMMENTS ON SUBDIVISION MAP S-2023-00027, APN NUMBER 054-910-080, REDDING, SHASTA COUNTY

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is a responsible agency for this project, as defined by the California Environmental Quality Act (CEQA). On 24 January 2023, we received your request for comments on Subdivision Map S-2023-00027 (Project).

The applicant proposes to divide 5.0 acres into 41 lots. The lots will range in size from 3,200 square feet to 6,090 square feet. The Project site is located at the Southeast corner of Rancho Road and Shasta View Drive in Redding.

Based on our review of the information submitted for the proposed project, we have the following comments:

General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (CGP)

Construction activity, including demolition, resulting in a land disturbance of one acre or more must obtain coverage under the CGP. The Project must be conditioned to implement storm water pollution controls during construction and post-construction as required by the CGP. To apply for coverage under the CGP the property owner must submit Permit Registration Documents electronically prior to construction. Detailed information on the CGP can be found on the State Water Board website Water Boards Stormwater Construction Permits (https://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml).

Post-Construction Storm Water Requirements

Studies have found the amount of impervious surface in a community is strongly correlated with the impacts on community's water quality. New development and redevelopment result in increased impervious surfaces in a community. Post-construction programs and design standards are most efficient when they involve (i) low impact design; (ii) source controls; and (iii) treatment controls. To comply with Phase II Municipal Storm Water Permit requirements the City of Redding must ensure that new developments comply with specific design strategies and standards to provide source and treatment controls to minimize the short and long-term impacts on receiving water quality. The design standards include minimum sizing criteria for treatment controls and established maintenance requirements. The proposed project must be conditioned to comply with post-construction standards adopted by the City of Redding in compliance with their Phase II Municipal Storm Water Permit.

If you have any questions or comments regarding this matter, please contact me at (530) 224-4784 or by email at Jerred.Ferguson@waterboards.ca.gov.

Jerred Ferguson
Environmental Scientist
Storm Water & Water Quality Certification Unit

JTF: db

Transportation Impact Study for the Silverstone 5 Residential Subdivision

Prepared for the City of Redding

Submitted by
W-Trans

October 4, 2023

W-Trans

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Executive Summary

The Silverstone 5 Residential Subdivision Project would be located on the southeast corner of Shasta View Drive/Rancho Road in the City of Redding and involves development of 41 single-family dwellings. The proposed project is expected to generate an average of 387 trips per day, including 29 a.m. peak hour trips and 39 p.m. peak hour trips.

Pedestrian facilities are expected to provide adequate connectivity upon completion of the project. Bicycle facilities within the project study area are generally adequate and will improve upon completion of planned facilities included in the *City of Redding Active Transportation Plan* (ATP). Sidewalks or shared use pathways should be provided along the project frontages with Rancho Road and Shasta View Drive as part of the project dependent upon coordination with City staff. Additionally, it is recommended that the project's frontage improvements on Rancho Road should be designed to allow for the future provision of Class II buffered bike lanes, as identified in the City's ATP.

Based on state guidance and data contained in the countywide travel demand model and the *2018 Regional Transportation Plan and Sustainable Communities Strategy for the Shasta Region* (RTP), the project would have a less-than-significant impact on vehicle miles traveled (VMT) since the project is expected to have a daily VMT per capita that is more than 15 percent below the countywide average.

Vehicles would access the project site via a new public street which will form the southern leg of the existing Goodwater Avenue/Rancho Road intersection. This is proposed to be a right-in, right-out only connection, though full access would be maintained for Goodwater Avenue. The proposed turn restrictions at the project access point combined with use of the street connection to the Silverstone subdivision south of the project site would result in acceptable site access. Sight distances at the proposed connection location are adequate for entering and exiting drivers. To preserve existing sight lines, any new signage, monuments, or other structures to be placed near the project entrance should be positioned outside of the vision triangles of a driver waiting on the minor street approach.

As indicated on the tentative map, a hardscape median or raised delineator posts should be installed on Rancho Road to physically prohibit left turns to and from the project entrance, while maintaining full access for Goodwater Avenue. If a raised median is installed, it is recommended that the median be painted retro-reflective yellow and flanked with reflective raised pavement markers to improve visibility. A "Right Turn Only" pavement marking arrow and sign should be installed on the project approach, while signage indicating that left turns are not allowed should be installed to the east of the intersection facing westbound motorists.

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 and traffic from the proposed development would be expected to have a less-than-significant impact on emergency response times.

Maximum queues are expected to remain within the existing storage lengths for all study intersections for all evaluated scenarios. Additionally, all study intersections are expected to operate at acceptable Levels of Service for all scenarios with the exception of the stop-controlled approach at Rancho Road/Churn Creek Road, which would operate at LOS D under both the Baseline and Baseline plus Project scenarios during the a.m. peak hour; however, the proposed project would result in fewer than five additional seconds of delay so the effect would be considered acceptable.

The City of Redding has future plans to install a roundabout at the Rancho Road/Churn Creek Road intersection and consolidation with the adjacent Victor Avenue intersection. Traffic from the proposed project would represent less than 25 percent of the difference between Existing and Future volumes at this location; therefore, payment of the City's traffic impact fees is considered to be an adequate contribution towards the planned improvements. The existing two-lane configuration of Rancho Road is currently operating acceptably and is expected to continue doing so under the anticipated near-term volumes.

Introduction

This report presents an analysis of the potential transportation impacts and operational effects that would be associated with development of 41 single-family dwellings proposed to be located on the southeast corner of the Shasta View Drive/Rancho Road intersection 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 *Traffic Impact Analysis Guidelines*, January 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. Adequacy of parking is also addressed as a policy issue.

Applied Standards and Criteria

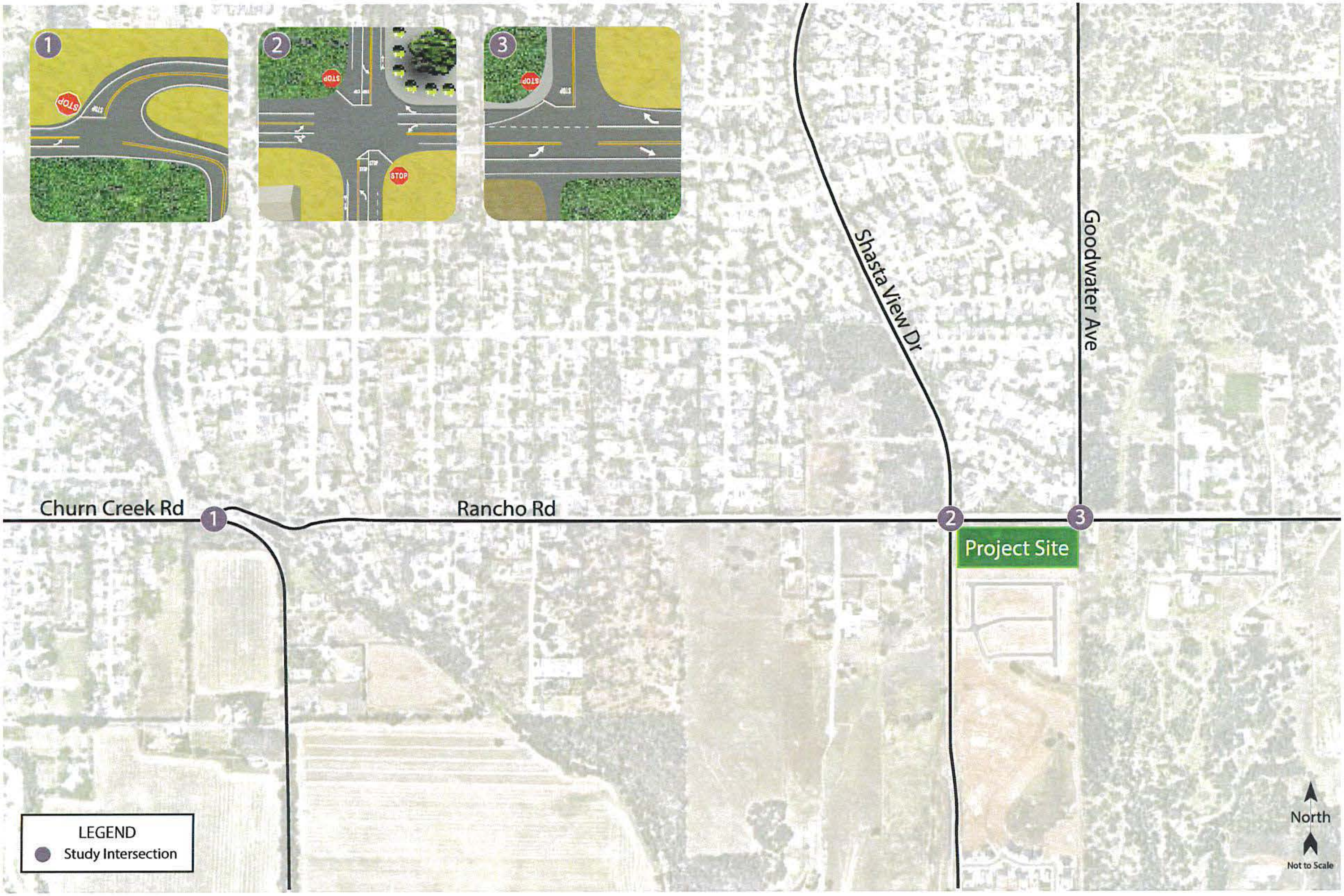
The report is organized to provide background data that supports the various aspects of the analysis, followed by the assessment of CEQA issues and then the evaluation of policy-related issues. The CEQA criteria evaluated are as follows.

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 proposed project includes 41 single-family dwellings to be located on the southeast corner of the Shasta View Drive/Rancho Road intersection in the City of Redding. Access would be provided via a new offset south leg of the existing Goodwater Avenue/Rancho Road intersection as well as a public street connection to the Silverstone subdivision to the south. The project access on Rancho Road as designed would facilitate full access into and out the existing Goodwater Avenue leg, but would only accommodate right turns into and out of the project site. The location of the project site is shown in Figure 1.



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Transportation Impact Study for the Silverstone 5 Residential Subdivision

Figure 1 – Study Area and Existing Lane Configurations

W-Trans

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 was selected with input from City staff and consists of the segment of Rancho Road between Shasta View Drive and Goodwater Avenue and the following intersections:

1. Churn Creek Road/Rancho Road
2. Shasta View Drive/Rancho Road
3. Goodwater Avenue/Rancho Road

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 first two study intersections on Thursday, October 6, 2022, and for the Goodwater Avenue/Rancho Road intersection on Tuesday, December 6, 2022. All counts were performed while local schools were in session.

Study Intersections

Churn Creek Road/Rancho Road is a tee intersection with stop control on the terminating Rancho Road approach. Although Rancho Road is an east-west street, the roadway is oriented north-south at the intersection with Churn Creek Road, though for the purposes of this analysis it was considered to run east-west to be consistent throughout the study area. Churn Creek Road was considered to be the west and south legs of the intersection.

Shasta View Drive/Rancho Road is a four-legged intersection with the northbound and southbound approaches stop-controlled. Left-turn lanes are provided on all four approaches and the stop-controlled Shasta View Drive approaches have flared right-turn lanes so that motorists turning right can move around those waiting to continue straight through the intersection.

Goodwater Avenue/Rancho Road is a three-legged intersection with the southbound Goodwater Avenue approach stop-controlled. The intersection has a westbound left-turn lane as well as a westbound acceleration lane for motorists to complete a left-turn from Goodwater Avenue onto Rancho Road in two stages. The proposed project would take access from a new offset south leg.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Study Roadway

Rancho Road is a two-lane minor arterial that runs east-west and provides access to the project site on the south side of the street. It has approximately 11 to 12 foot travel lanes, with one travel lane in each direction. The road has a speed limit of 45 mph and carries approximately 5,170 vehicles per day, calculated based on the p.m. peak hour volumes multiplied by ten.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue in the vicinity of the project site. 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 October 1, 2016, through September 30, 2021.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2019 Collision 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). The study intersections were compared to Statewide average rates for intersections with two-way stop controls in an urban environment. All three study intersections experienced collision rates higher than the statewide average, so the records were reviewed further.

Table 1 – Collision Rates for the Study Intersections

Study Intersection	Number of Collisions (2016-2021)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Churn Creek Rd/Rancho Rd	5	**0.26**	0.09
2. Shasta View Dr/Rancho Rd	3	**0.21**	0.14
3. Goodwater Ave/Rancho Rd	2	**0.21**	0.09

Note: c/mve = collisions per million vehicles entering; **bold** text = rate is higher than statewide average

Of the five collisions that were reported at Churn Creek Road/Rancho Road, two were overturn collisions, two were hit object collisions, and one was a sideswipe. Three of these were single vehicle collisions attributed to driving under the influence. The City's future plans to combine this intersection with the Victor Avenue intersection into a modern roundabout would be expected to have a beneficial impact on safety at this location.

Two out of the three collisions at Shasta View Drive/Rancho Road were broadside collisions, while the third involved a hit object. Two collisions were attributed to driving under the influence. Given the limited number of crashes and lack of similarity between them, as well as the involvement of impaired drivers, no remediation engineering measures appear necessary.

Of the two crashes at Goodwater Avenue/Rancho Road, one was a broadside and one was a rear-end collision. Only two crashes occurred, both of different types and in different directions, so no remediation measures are recommended.

Although only two to four collisions occurred at each intersection in a five-year period, given that more half (five out of nine) of the total crashes reported were attributed to driving under the influence, the City may wish to consider increasing law enforcement in this part of the City or conducting a DUI outreach campaign, which may have a beneficial impact on safety.

The collision rate calculations are provided in Appendix A.

Project Data

The project consists of 41 single-family dwellings to be accessed via a new offset south leg of the existing Goodwater Avenue/Rancho Road intersection, as well as a public street connection to the Silverstone subdivision to the south. The proposed tentative map is shown in Figure 2.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021, for "Single Family Detached Housing" (LU #210). Based on application of these rates, the proposed project would be expected to generate an average of 387 trips per day, including 29 trips during the a.m. peak hour and 39 trips during the p.m. peak hour. These results are summarized in Table 2.

Table 2 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Single-Family Detached Housing	41 du	9.43	387	0.70	29	7	22	0.94	39	24	15

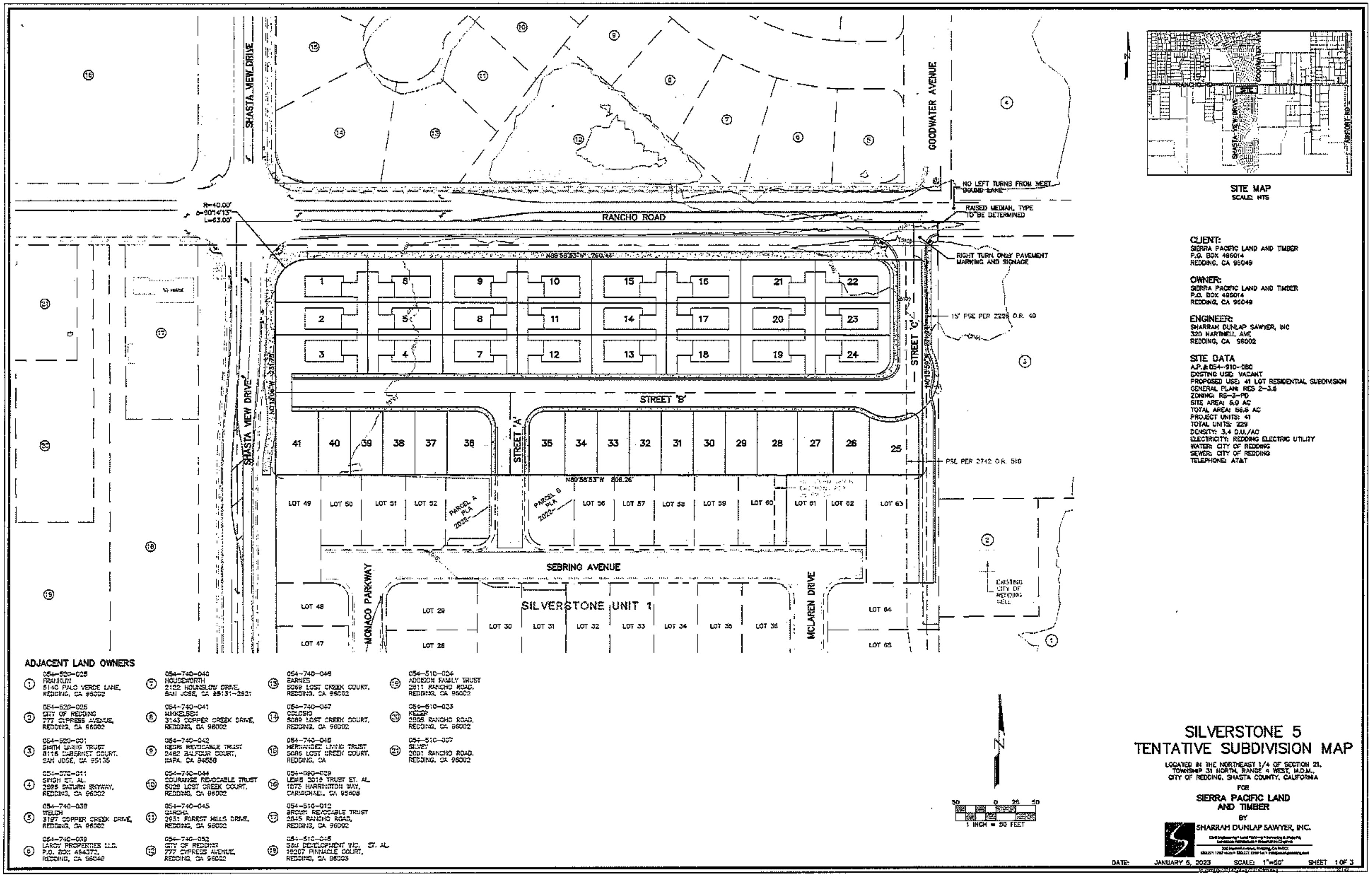
Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the surrounding roadway network was based on the trip distribution assumptions applied for the adjacent Stonecreek Subdivision (now Silverstone) project in its traffic study along with our familiarity with travel patterns in the area and likely origins and destinations for residents of the project. The applied trip distribution assumptions that were approved by City staff and resulting daily and peak hour trip totals are shown in Table 3.

Table 3 – Trip Distribution Assumptions

Route	Percent	Daily Trips	AM Trips	PM Trips
To/From Shasta View Dr North of Rancho Rd	20	77	6	8
To/From Rancho Rd East of Goodwater Ave	10	39	3	4
To/From Churn Creek Rd West of Rancho Rd	70	271	20	27
TOTAL	**100%**	**387**	**29**	**39**



Source: Sharrah Dunlap Sawyer, INC 1/13

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Transportation Impact Study for the Silverstone 5 Residential Subdivision
Figure 2 – Tentative Subdivision Map

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

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 the project vicinity, there are limited pedestrian facilities on Shasta View Drive and Rancho Road as the surrounding area is mostly undeveloped though the Silverstone development, which is located directly south of the proposed project site, is currently under construction.

- **Shasta View Drive** – In the project vicinity, sidewalks exist on the east side of Shasta View Drive to the north of Rancho Road and are currently being constructed along the Silverstone project frontage with Shasta View Drive to the south of the project site. As contained in the *City of Redding Active Transportation Plan* (ATP), a Class I multi-use pathway is planned along Shasta View Drive between Galaxy Way and Airport Road.
- **Rancho Road** – Sidewalks are provided on the north side of the street between Shasta View Drive and Goodwater Avenue as well as a short segment between Saratoga Drive and Bo Peep Lane. The City's ATP identifies a shared use pathway planned for Rancho Road between Bechelli Lane and Airport Road.

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. Collision records for the five-year period detailed above indicate that there were no reported collisions involving pedestrians at the study intersections.

Project Impacts on Pedestrian Facilities

Given that the surrounding land uses are mostly residential developments, pedestrian trips are expected to be limited; however, sidewalks or multi-use pathways should be provided along the project frontages with Shasta View Drive and Rancho Road. Additionally, sidewalks should be provided within the site itself on Project Streets A, B, and C along with ADA compliant curb ramps. With these improvements, the project site would be adequately connected to the surrounding pedestrian network. To facilitate implementation of planned improvements identified in the City's ATP, it is recommended that the applicant coordinate with the City to determine the scope and type of pedestrian facilities to be provided along the project frontages, whether they be in the form of a sidewalk or shared use pathway.

Finding – The tentative map identifies provision of sidewalks on all streets within the site as well as along the project frontages with Shasta View Drive and Rancho Road, which would provide adequate connectivity for pedestrians.

Recommendation – To facilitate implementation of planned improvements identified in the City's ATP, the applicant should coordinate with the City to determine the scope and type of pedestrian facilities to be provided along the project frontages to include either sidewalks or a shared use pathway.

Bicycle Facilities

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 vicinity, Class III bicycle routes are available on Rancho Road and Shasta View Drive. The segment of Shasta View Drive between Bolam Creek Road and Copper Creek Drive has Class II bicycle lanes, most of which are newly constructed buffered bike lanes. As outlined in the *GoShasta Regional Active Transportation Plan* and the *City of Redding Active Transportation Plan*, Class I multi-use pathways are planned on Shasta View Drive and Rancho Road and there are other several other planned bicycle facilities in the project vicinity, as summarized in Table 4.

Table 4 – Bicycle Facility Summary

Status Facility	Class	Length (miles)	Begin Point	End Point
Existing				
Shasta View Dr	IIB	1.40	Bolam Creek Rd	Copper Creek Dr
Shasta View Dr	III	2.80	Copper Creek Dr	SR 44 W Ramps
Rancho Rd	III	1.70	Airport Rd	Churn Creek Rd
Planned				
Shasta View Dr	I	2.80	Galaxy Wy	Airport Rd
Rancho Rd	I	1.70	Churn Creek Rd	Airport Rd
Shasta View Dr	IIB	0.95	Castlewood Dr	Copper Creek Dr
Rancho Rd	IIB	1.70	Airport Rd	Churn Creek Rd
Alta Mesa Dr	BB	2.00	Rancho Rd	Hartnell Ave
El Vista St	BB	0.60	Victor Ave	Saratoga Dr

Notes: IIB = Buffered Bike Lane; BB = Bike Boulevard
Source: *GoShasta Regional Active Transportation Plan*, Shasta Regional Transportation Agency (SRTA), 2018; *Active Transportation Plan*, City of Redding, 2018

Bicyclist Safety

Collision records for the study area were reviewed to determine if there had been any bicyclist-involved crashes. During the five-year study period previously noted there were no reported collisions involving a bicyclist at any of the study intersections.

Project Impacts on Bicycle Facilities

The existing bike facilities, including a combination of Class II and III facilities on Shasta View Drive and Rancho Road, together with the shared use of minor streets would provide adequate access for cyclists in the near-term. Connectivity for cyclists would be further improved with the provision of planned Class I multi-use paths and Class

II buffered bike lanes outlined in the City's ATP. Class II buffered bike lanes have already been constructed on Shasta View Drive along the project frontage, but the design of the project's frontage improvements on Rancho Road should allow for the future provision of Class II buffered bike lanes.

Finding – Existing bicycle facilities serving the project site are generally adequate and will be improved upon completion of planned bicycle projects in the surrounding vicinity.

Recommendation – The project's frontage improvements on Rancho Road should be designed to allow for the future provision of Class II buffered bike lanes, as identified in the City's ATP.

Transit Facilities

Existing Transit Facilities

The Redding Area Bus Authority (RABA) provides fixed-route bus service in the City of Redding and surrounding cities. As there are no transit stops within one-half mile of the project site, the project is not readily accessible by transit.

Although fixed route transit service is not readily accessible, 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 offers dial-a-ride service throughout the Cities of Shasta Lake, Redding, and Anderson during the same days and hours as the local bus routes. Passengers certified as eligible for the Americans with Disabilities Act (ADA) paratransit service receive reservation priority when calling one day or more in advance.

Impact on Transit Facilities

Demand for transit is anticipated to be minimal given the location of the project site and rural context. While the nearest bus stop is not within a half-mile walking distance, residents could bike to the nearest stop at El Vista Street/Alta Campo Drive, which is approximately 1.5 miles away from the site, and take their bike on the bus. Therefore, the limited access to transit in this part of the City is considered acceptable for the limited anticipated demand in the project area.

Finding – The limited access to transit is considered acceptable as minimal demand is anticipated given the location and context.

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. Under this guidance, residential developments that have a VMT per capita that is 15 percent or more below the existing average countywide residential VMT per capita would have a less-than-significant transportation impact.

The Shasta Regional Transportation Agency (SRTA) is in the process of conducting an extensive countywide VMT baseline analysis and updating the travel demand model to include readily available commercial and residential VMT information per capita along with screening maps that can be used to identify certain types of projects that can be presumed to have a less-than-significant impact. The updated model is not yet available; however, the existing model does include sufficient information to estimate a project's total VMT per capita (as opposed to residential VMT per capita) so it was relied on to assess the project's potential impacts. At the direction of City staff and has been applied for other projects within the City, the "2020 Project Average Daily VMT per capita" published in the SRTA *2018 Regional Transportation Plan and Sustainable Communities Strategy for the Shasta Region* (RTP) was used as the existing countywide baseline number.

Project Impact

The SRTA ShastaSIM travel demand model includes hundreds of traffic analysis zones (TAZs) within the region that contain information for scenario years between 2015 and 2040. The model has aggregate travel data for factors such as trips, distances traveled, total VMT, population, and employment. For TAZ 782, which is the zone in which the proposed project site is located, the projected total VMT in 2020 (the closest analysis year to the date of this analysis) is 22,373 miles per day. For a population of 1,502 persons, the total daily VMT per capita would be 14.9. Proposed projects are generally presumed to generate comparable travel patterns to similar land uses in their geographical area; therefore, the proposed subdivision would be expected to have a daily VMT per capita of 14.9.

As contained in the 2018 RTP, the projected total daily VMT per capita with implementation of the RTP initiatives is 26.8 miles per day in 2020. Applying OPR's guidance, a residential project generating a VMT that is 15 percent or more below this value, or 22.8 miles per capita per day or less, would have a less-than-significant VMT impact. The proposed project is expected to have a daily VMT per capita of 14.9, which is approximately 44 percent below the countywide average. Since this is more than 15 percent below the countywide average value, the project would have a less-than-significant transportation impact on VMT based on OPR's guidance. This information is summarized in Table 5.

Table 5 – Vehicle Miles Traveled Analysis Summary

VMT Metric	Countywide Baseline 2020 VMT Rate	Significance Threshold	TAZ 782 VMT Rate	Resulting Significance
Total VMT per Capita	26.8	22.8	14.9	Less than Significant

Note: VMT Rate is measured in total VMT/Capita, or the number of daily miles driven per resident

Finding – Based on OPR guidance and information contained within the SRTA travel demand model and the 2018 RTP, the proposed project's impact on VMT would be considered less than significant.

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 access(es) as well as 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 project site would be accessed via a new south leg of the existing Goodwater Avenue/Rancho Road intersection, as well as a public street connection to the Silverstone subdivision to the south. The new project access leg would be offset from the existing Goodwater Avenue leg, though the intersection would function as a four-legged intersection with side-street stop-controls. Due to the offset between the project access and Goodwater Avenue legs, channelization would be provided at the intersection to physically prohibit left turns into and out of the project site, while also accommodating full access for Goodwater Avenue. The channelization is anticipated to be in the form of a raised hardscape median or flexible delineator posts between the eastbound left-turn and through travel lanes. Associated pavement markings and signage would also need to be provided to alert motorists to the turn restrictions. As a result of the proposed turn restrictions, inbound trips from destinations to the east of the project site would be facilitated via the proposed connection to the neighboring subdivision to the south in the form of left turns at the Shasta View Drive/Rancho Road and Shasta View Drive/Silverstone Drive intersections. Similarly, outbound trips to destinations to the west of the project site would be via right turns at Shasta View Drive/Silverstone Drive and northbound left turns at Shasta View Drive/Rancho Road.

Finding – The proposed turn restrictions at the project access point on Rancho Road combined with use of the street connection to the Silverstone subdivision south of the project site would result in acceptable site access.

Recommendation – As indicated on the tentative map, a hardscape median or raised delineator posts should be installed on Rancho Road to physically prohibit left turns to and from the project entrance, while maintaining full access for Goodwater Avenue. If a raised median is installed, it is recommended that the median be painted retro-reflective yellow and flanked with reflective raised pavement markers to improve visibility. A "Right Turn Only" pavement marking arrow and sign should be installed on the project approach, while signage indicating that left turns are prohibited should be installed to the east of the intersection facing westbound motorists.

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 Rancho Road at the proposed location of the project access point were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distance at intersections of public streets is based on corner sight distances, with more sight distance needed for making a left turn versus a right turn, while recommended sight distances for minor street approaches that are either a private road or a driveway are based on stopping sight distance. Both use the approach travel speeds 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 or driveway is evaluated based on stopping sight distance criterion and the approach speed on the major street.

For the posted speed limit of 45 mph on Rancho Road, the minimum corner sight distance needed is 430 feet for right-turn movements; left turns would be physically prohibited at this location. Field measurements were obtained to and from the position of a vehicle waiting on the proposed new south leg approach of the Goodwater Avenue intersection and were determined to extend more than 500 feet to the west, which is more than adequate for the posted speed limit. Additionally, as Rancho Road is straight and flat adjacent to the project site, adequate sight lines are available for a following motorist to notice and react to a preceding vehicle slowing to turn right into the project site. To preserve existing sight lines, any new signage, monuments, or other structures to be placed near the project entrance should be positioned outside of the vision triangles of a driver waiting on the minor street approach.

Finding – Sight lines at the modified Goodwater Avenue/Rancho Road intersection would be adequate to accommodate right turns into and out of the project site.

Recommendation – To preserve existing sight lines, any new signage, monuments, or other structures to be placed near the project entrance should be positioned outside of the vision triangles of a driver waiting on the minor street approach.

Queuing

Queuing in the dedicated turn pockets at the unsignalized study intersections was evaluated using a methodology contained in "Estimating Maximum Queue Length at Unsignalized Intersections," John T. Gard, *ITE Journal*, November 2001 to determine if the addition of project trips would cause any queues to extend beyond the available stacking space. Maximum queue lengths were estimated by assuming vehicle lengths of 25 feet and multiplying that by the number of vehicles expected to queue. These queuing calculations are provided in Appendix B. Additionally, as Rancho Road/Shasta View Drive is planned to be signalized under Future Conditions, the 95th percentile queues in the turn lanes were obtained from the Vistro Level of Service outputs provided in Appendix C.

As summarized in Table 6, all predicted queue lengths are anticipated to remain within available stacking space at all study intersections for all scenarios evaluated.

Table 6 – 95th-Percentile Turn Queues

Study Intersection Turn Lane	Available Storage	Maximum Queues											
		AM Peak Hour						PM Peak Hour					
		E	E+P	B	B+P	F	F+P	E	E+P	B	B+P	F	F+P
1. Churn Creek Rd/Rancho Rd													
EB Left Turn	170	125	125	125	125	*	*	150	150	150	150	*	*
2. Rancho Rd/ Shasta View Dr													
NB Left Turn	200	50	50	50	50	120	120	50	50	50	50	70	71
SB Left Turn	280	150	150	150	150	62	63	75	75	75	100	39	43
EB Left Turn	330	50	50	50	50	46	46	75	75	75	75	90	90
WB Left Turn	245	25	25	25	25	14	14	25	25	25	25	35	35
3. Goodwater Ave/ Rancho Rd													
EB Left Turn	130	0	0	0	0	25	25	25	25	25	25	25	25

Notes: All distances are measured in feet; E = existing conditions; E+P = existing plus project conditions; B = baseline conditions; B+P = baseline plus project conditions; F = future conditions; F+P = future plus project conditions; *Intersection would become a roundabout in the future scenarios so the turn lane would no longer exist

Finding – The existing turn lanes at the study intersections have enough storage length for the estimated maximum queues; therefore, the proposed project's impact on queuing would be 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 project site would be accessed via a new southern leg of the existing Goodwater Avenue/Rancho Road intersection, as well as via a public street connection to the Silverstone subdivision to the south. While the site plan is still preliminary, it is anticipated that all aspects of the site, including street and 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. It should also be noted that the project site would have two access points so should one means of access be compromised during an emergency, responders would be able to use the other access point to reach the project site.

Off-Site Impacts

While the project would be expected to result in slight increases in delay for traffic in the surrounding vicinity, 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.

Capacity Analysis

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.

All study intersections are currently unsignalized and have one or two approaches stop controlled. Therefore, they were 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 Silverstone development is conditioned to install a traffic signal at the intersection of Rancho Road/ Shasta View Drive. Therefore, for all future scenarios this intersection was 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. For the purposes of this study, delays were calculated using optimized signal timing in the Vistro software package.

In the future, a roundabout will be constructed at the Rancho Road/Churn Creek Road intersection, which will then be merged with the Victor Avenue intersection; therefore, this intersection was evaluated using the FHWA Roundabout Method in the future scenarios, which is also contained within the Unsignalized Methodology of the HCM. This methodology determines intersection operation using a gap acceptance method along with basic geometric and volume data to calculate entering and circulating flows. This information is then translated to average vehicle delays, with LOS break points at the same delays as used in the two-way stop-controlled methodology.

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	Roundabout
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.	Delay of 0 to 10 seconds.
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.	Delay of 10 to 15 seconds.
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.	Delay of 15 to 25 seconds.
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.	Delay of 25 to 35 seconds.
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.	Delay of 35 to 50 seconds.
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.	Delay of more than 50 seconds.

Reference: *Highway Capacity Manual*, Transportation Research Board, 2018

Arterial Segment Level of Service Methodology

The City of Redding's Traffic Impact Analysis Guidelines, 2009, specifies two methods for analyzing urban street and roadway segment Levels of Service (LOS).

- **Method 1** uses average travel speed and the methods presented in chapter 15 of *HCM*, 2000. This method is not intended for application to a short roadway segment. While this method determines the directional LOS for each individual segment along a roadway, only the overall direction LOS should be used for identifying project impacts. The results for individual segments along the overall roadway should be provided for information only.
- **Method 2** uses the following peak hour service volumes listed in Table 4.5.E of the City's TIA Guidelines, shown in Table 8 below. In essence, congestion occurs as traffic volumes increase. Therefore, the higher the traffic volume the lower the Level of Service. For the purposes of this study, the segment of Rancho Road between Shasta View Drive and Goodwater Avenue was classified as a divided arterial with left turn lanes since the left turn lanes are provided along with a striped center median.

Table 8 – Maximum Peak Hour Volume Per Lane					
LOS	**Expy-High Access Control**	**Expy -Moderate Access Control**	**Divided Arterial (w/LTL)**	**Undivided Arterial (w/o LTL)**	**Collector**
A	570	520	500	410	270
B	660	610	560	470	340
C	760	700	650	540	410
D	850	790	730	610	470
E	950	870	810	680	540

Notes: Expy = Expressway; LTL = Left-Turn Lane; w/ = With; w/o= Without
Reference: *Highway Capacity Manual*, Transportation Research Board, 2000

Traffic Operation Standards

City of Redding

Per the *City of Redding 2000-2020 General Plan*, 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 the study roadway segment and 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.

The City of Redding allows operational deficiencies attributed to a project in a Cumulative (Baseline or Future) scenario to be adequately addressed via payment of the City's traffic impact fees (TIFs) if the improvement is included in the City's TIF program and the project's proportional share of the total growth in volumes at the intersection is less than 25 percent. However, if the project's proportional share of growth is 25 percent or more, then the necessary improvements must be constructed as part of the project with the potential for reimbursement in the form of impact fee credits.

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 for the intersections of Churn Creek Road/Rancho Road and Shasta View Drive/Rancho Road on Thursday, October 6, 2022, and for the Goodwater Avenue/Rancho Road intersection on Tuesday, December 6, 2022. Local schools were in session during these dates. Peak hour factors (PHFs) were calculated based on the counts obtained and used in the analysis for intersection Levels of Service, unless the PHF was calculated to be less than 0.85 in which case this value was used as a "floor" to avoid overly conservative results.

Intersection Levels of Service

Under Existing Conditions, all intersections operate acceptably at LOS A overall and LOS C or better on the minor street approaches. The existing traffic volumes are shown in Figure 3. A summary of the intersection Level of Service calculations is contained in Table 9, and copies of the calculations for all scenarios are provided in Appendix C.

Table 9 – Existing Peak Hour Intersection Levels of Service

Study Intersection *Approach*	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Churn Creek Rd/Rancho Rd	11.6	B	8.4	A
Westbound (Rancho Rd) Approach	*22.2*	*C*	*17.1*	*C*
2. Shasta View Dr/Rancho Rd	4.9	A	5.0	A
Northbound (Shasta View Dr) Approach	*15.2*	*C*	*20.1*	*C*
Southbound (Shasta View D) Approach	*13.2*	*B*	*14.5*	*B*
3. Goodwater Ave/Rancho Rd	1.5	A	0.7	A
Southbound (Goodwater Ave) Approach	*10.8*	*B*	*9.9*	*A*

Notes: 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*

Baseline Conditions

Intersection Levels of Service

Baseline (Existing plus Approved) operating conditions were assessed with traffic from approved or pending projects in the study area that could be operational in the next two to five years added to the Existing volumes. The following development project was identified by City staff to be included in the evaluation of Baseline Conditions.

- **Redding Distribution Facility** is a 250,956 square-foot distribution facility to be located at a currently undeveloped site south of Electro Way, north of Shasta View Drive, and east of Airport Road and Aviation Drive. As evaluated in the *Traffic Impact Study for the Redding Distribution Facility*, Kimley-Horn, 2021, the project is expected to generate 1,086 new daily trips, including 176 during the a.m. peak hour and 95 during the p.m. peak hour. The same trip distribution assumptions applied in the project's traffic study were applied in this analysis.

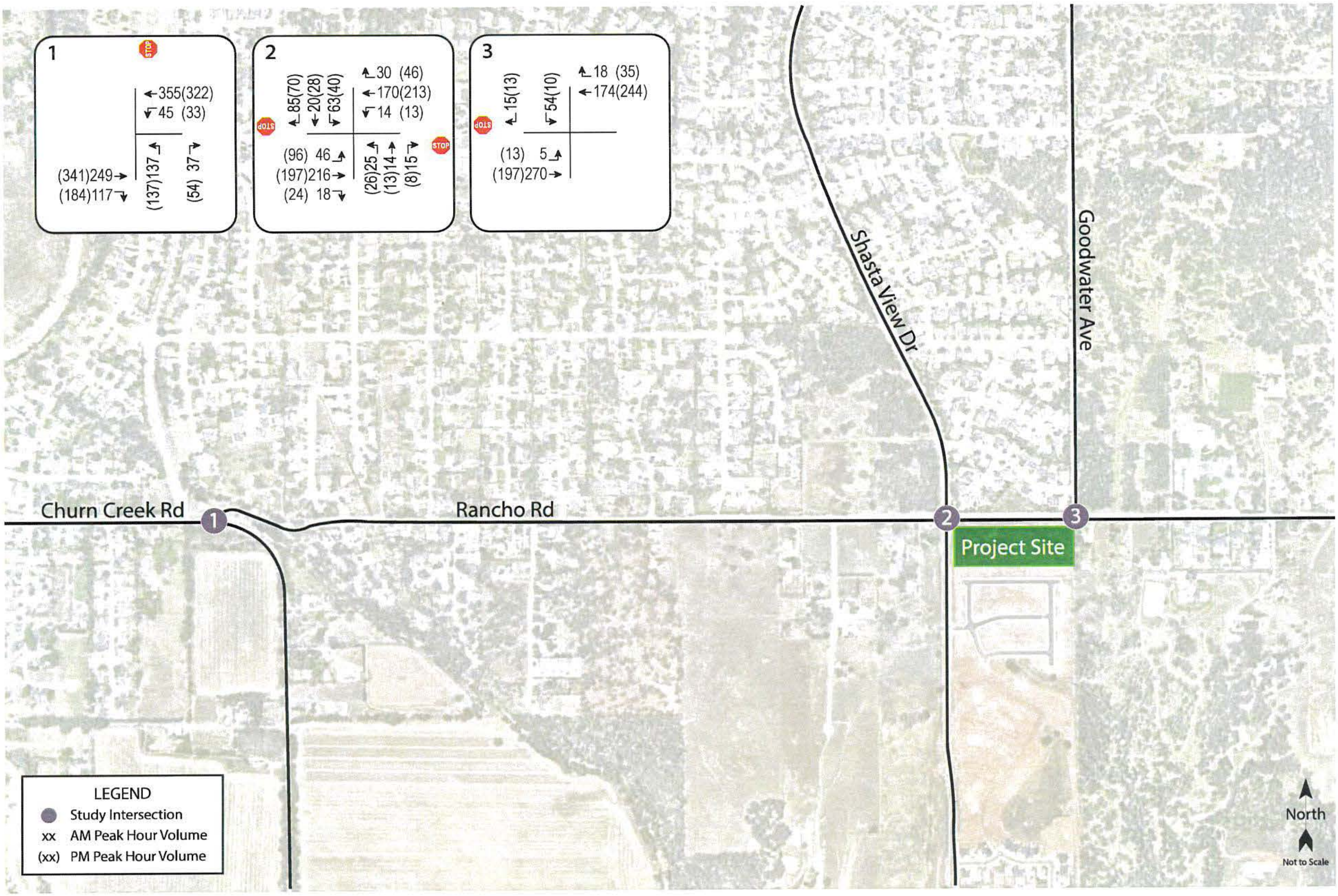

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Figure 3 – Existing Traffic Volumes

W-Trans

Upon adding trips associated with the pending development project to Existing volumes and with no changes to the existing intersection lane configurations and controls, Shasta View Drive/Rancho Road and Goodwater Avenue/Rancho Road would operate acceptably. However, the westbound Rancho Road approach to Churn Creek Road would operate at LOS D during the a.m. peak hour, which is considered unacceptable per City standards. These results are summarized in Table 10 and Baseline traffic volumes are shown in Figure 4.

Table 10 – Baseline Peak Hour Intersection Levels of Service				
Study Intersection *Approach*	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Churn Creek Rd/Rancho Rd	13.4	B	8.7	A
Westbound (Rancho Rd) Approach	***25.4***	***D***	*17.7*	*C*
2. Shasta View Dr/Rancho Rd	5.0	A	5.0	A
Northbound (Shasta View Dr) Approach	*16.3*	*C*	*20.6*	*C*
Southbound (Shasta View D) Approach	*14.6*	*B*	*15.8*	*C*
3. Goodwater Ave/Rancho Rd	1.4	A	0.6	A
Southbound (Goodwater Ave) Approach	*11.1*	*C*	*10.1*	*B*

Notes: 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

Although the stop-controlled Rancho Road approach to Churn Creek Road operates unacceptably during the a.m. peak hour under Baseline volumes, the intersection will operate acceptably upon construction of the planned roundabout which is identified in the City of Redding Capital Improvement Program and detailed in the *Churn Creek/Victor/Rancho Roundabout 30% Design Report.*

Future Conditions

Turning movement volumes for the study intersections for the horizon year of 2040 were obtained from the *Transportation Impact Analysis for the Stonecreek Subdivision* (now Silverstone), Kittelson & Associates, 2019, and used in this analysis to be consistent with other recent planning efforts in the vicinity.

Under the anticipated future volumes, and with implementation of planned infrastructure improvements including signalization of the Shasta View Drive/Rancho Road intersection and installation of a roundabout at the Churn Creek Road/Rancho Road intersection and consolidation with the adjacent Victor Avenue intersection, all three study intersections are expected to operate acceptably. Operating conditions are summarized in Table 12 and future turning movement volumes and intersection controls are shown in Figure 5.

Table 11 – Future Peak Hour Intersection Levels of Service				
Study Intersection *Approach*	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Churn Creek Rd/Rancho Rd-Victor Ave (Roundabout)	9.3	A	12.2	B
2. Shasta View Dr/Rancho Rd (Traffic Signal)	22.8	C	21.6	C
3. Goodwater Ave/Rancho Rd	1.4	A	0.8	A
Southbound (Goodwater Ave) Approach	*11.1*	*B*	*10.6*	*C*

Notes: 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*

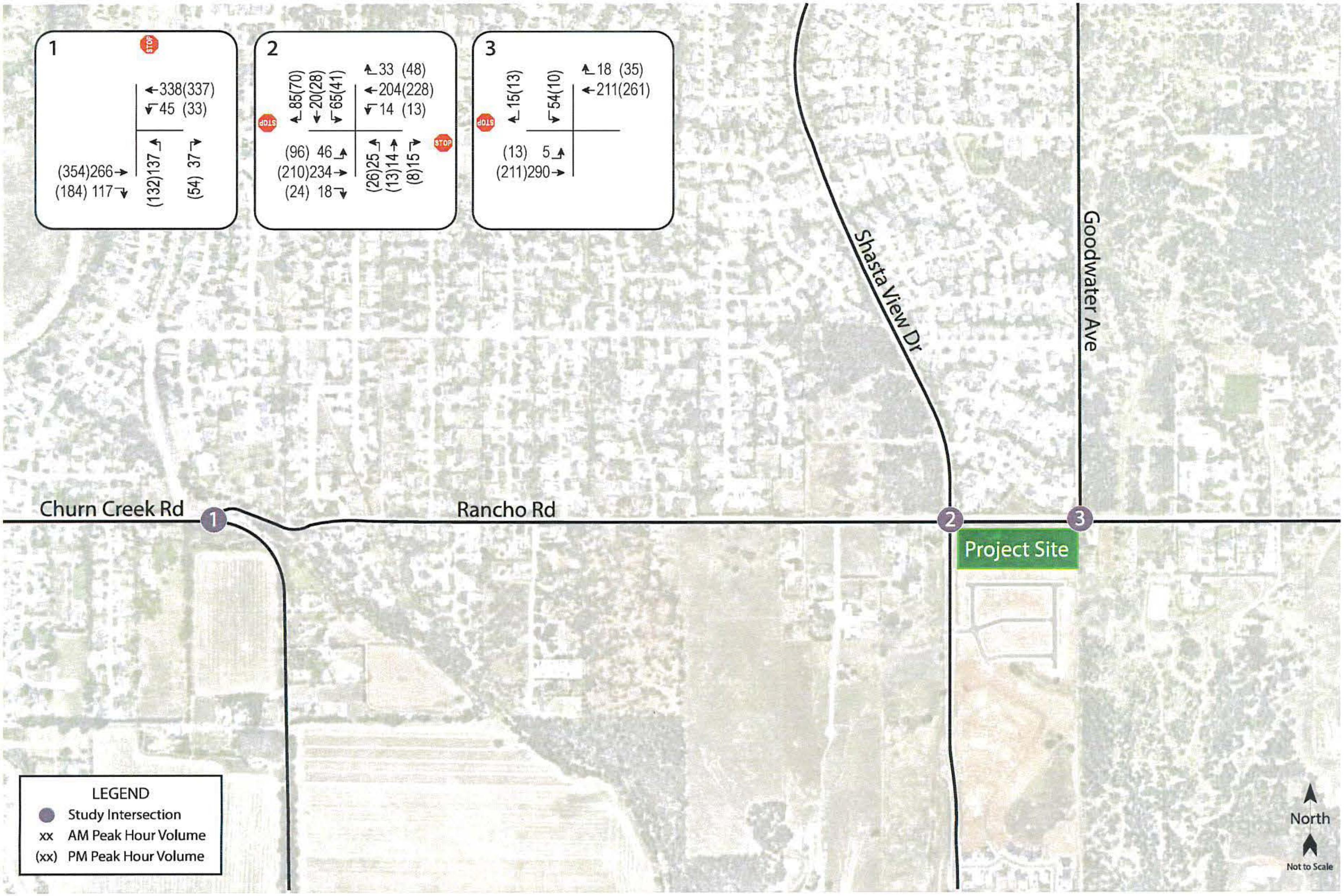

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Figure 4 – Baseline Traffic Volumes

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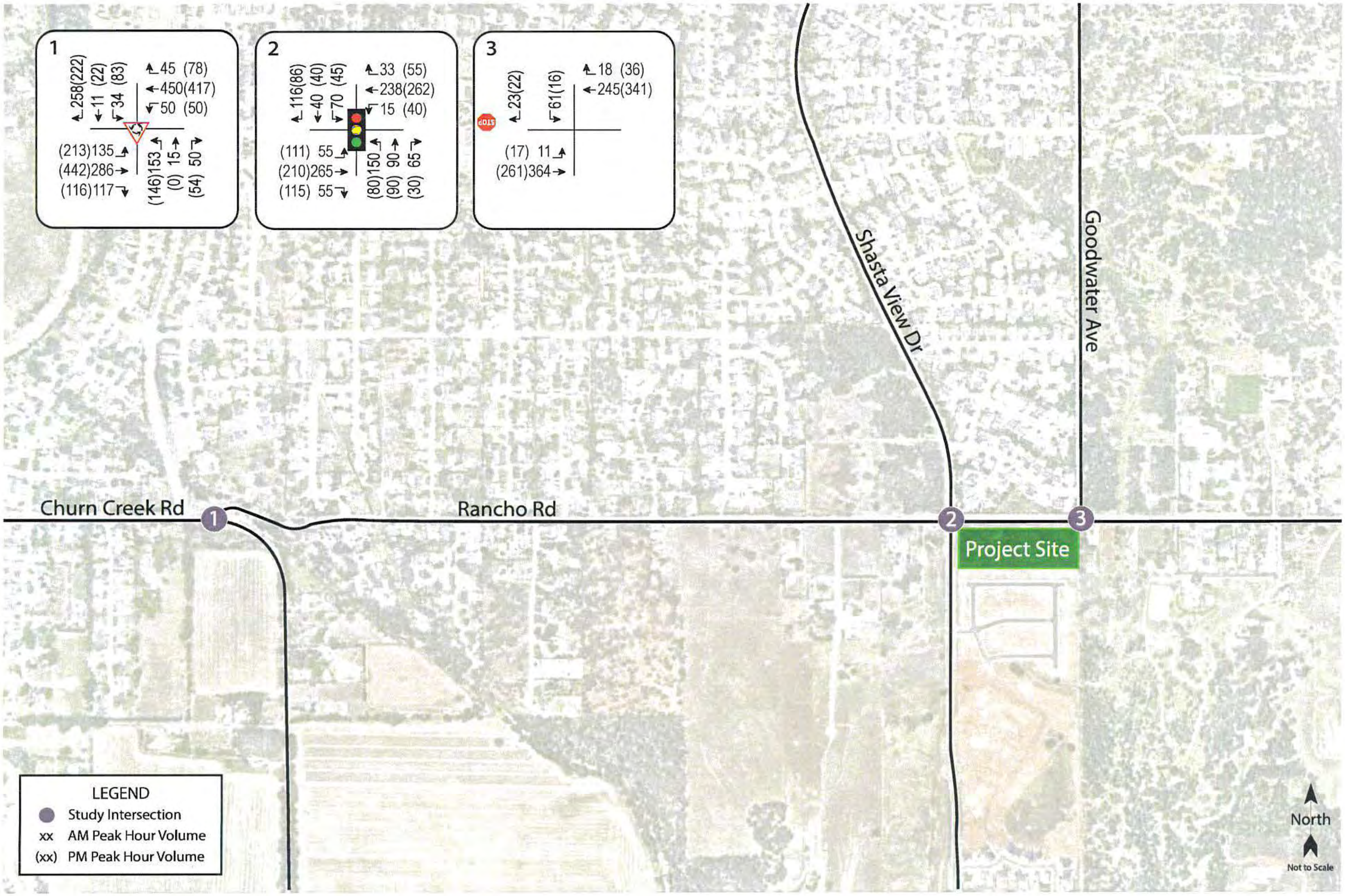

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Figure 5 – Future Traffic Volumes

W-Trans

Project Conditions

The plus Project Conditions analyses include evaluation of intersection operations with the addition of project-generated trips to the Existing, Baseline, and Future volumes. The operational analysis for the Goodwater Avenue/Rancho Road intersection is based on the proposed turn restrictions detailed above, including full access for Goodwater Avenue and right turns only for the project leg.

Intersection Operations

Existing plus Project Conditions

Upon the addition of project-related traffic to the existing volumes, the study intersections are expected to continue operating acceptably and the project's effect on operations would be considered acceptable. These results are summarized in Table 13. Project traffic volumes are shown in Figure 6.

Table 12 – 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/Rancho Rd	11.6	B	8.4	A	12.4	B	8.6	A
WB (Rancho Rd) Approach	*22.2*	*C*	*17.1*	*C*	*23.5*	*C*	*17.5*	*C*
2. Shasta View Dr/Rancho Rd	4.9	A	5.0	A	5.4	A	5.6	A
NB (Shasta View Dr) Approach	*15.2*	*C*	*20.1*	*C*	*16.8*	*C*	*22.5*	*C*
SB (Shasta View Dr) Approach	*13.2*	*B*	*14.5*	*B*	*13.8*	*B*	*16.3*	*C*
3. Goodwater Ave/Rancho Rd	1.5	A	0.7	A	1.5	A	0.7	A
SB (Goodwater Ave) Approach	*10.8*	*B*	*9.9*	*A*	*11.2*	*B*	*10.2*	*B*
NB (Project) Approach	--	--	--	--	*9.9*	*A*	*9.4*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; NB = Northbound; SB = Southbound; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

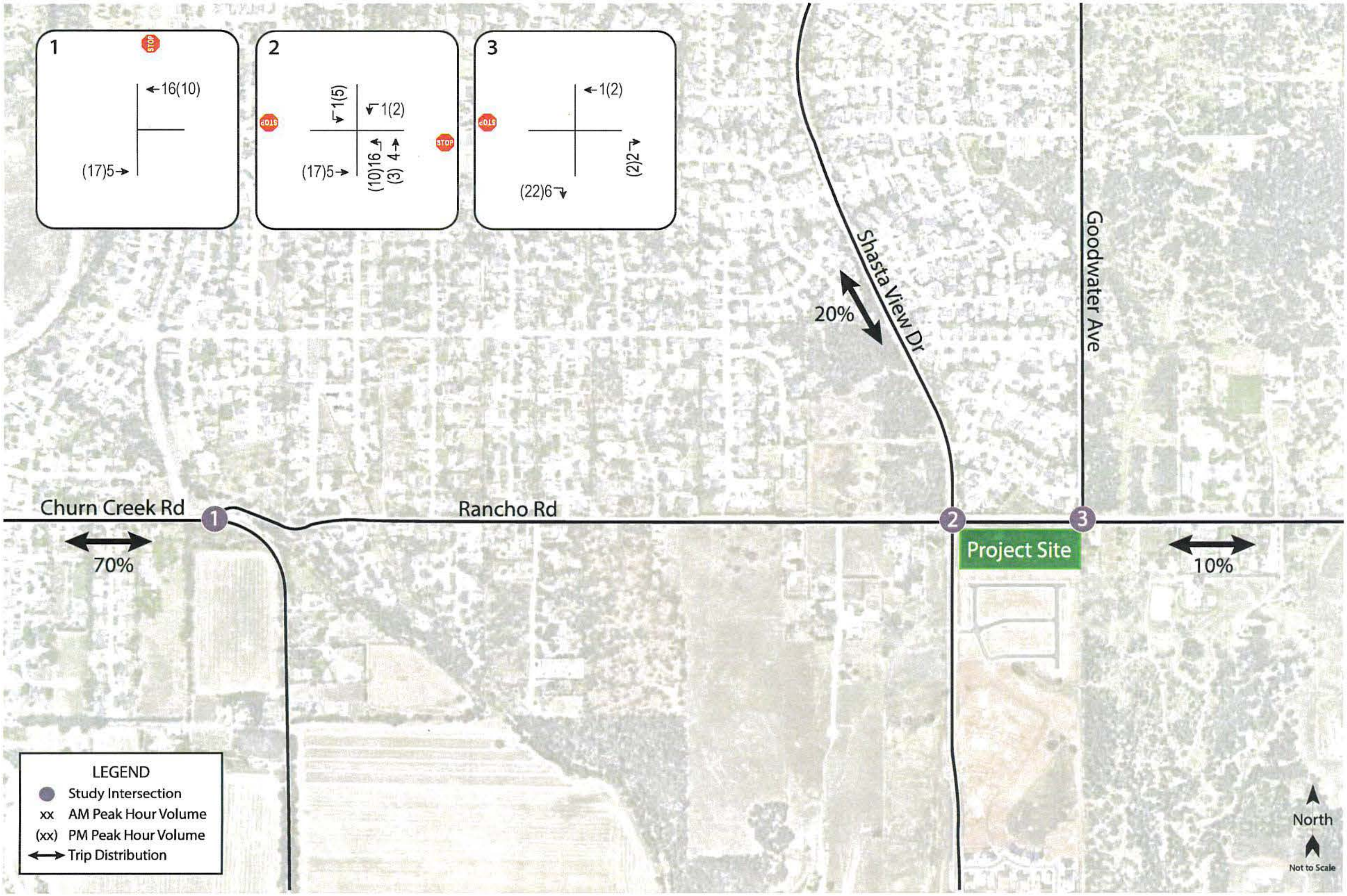

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Figure 6 – Project Traffic Volumes and Trip Distribution

Finding – The study intersections are expected to continue operating acceptably upon the addition of project-generated traffic and the project's effect on operation of the surrounding roadway network would therefore be considered acceptable.

Baseline plus Project Conditions

With project-related traffic added to Baseline volumes, the study intersections besides Churn Creek Road/ Rancho Road are expected to continue operating acceptably. These results are summarized in Table 14.

Table 13 – Baseline and Baseline plus Project Peak Hour Intersection Levels of Service

Study Intersection *Approach*	Baseline Conditions				Baseline plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Churn Creek Rd/Rancho Rd	13.4	B	8.7	A	14.4	C	9.0	A
WB (Rancho Rd) Approach	***25.4***	***D***	*17.7*	*C*	***27.4***	***D***	*18.2*	*C*
2. Shasta View Dr/Rancho Rd	5.0	A	5.0	A	5.5	A	5.5	A
NB (Shasta View Dr) Approach	*16.3*	*C*	*20.6*	*C*	*18.1*	*C*	*22.8*	*C*
SB (Shasta View Dr) Approach	*14.6*	*B*	*15.8*	*C*	*14.9*	*B*	*16.6*	*C*
3. Goodwater Ave/Rancho Rd	1.4	A	0.6	A	1.4	A	0.6	A
SB (Goodwater Ave) Approach	*11.1*	*C*	*10.1*	*B*	*11.6*	*B*	*10.3*	*B*
NB (Project) Approach	-	-	-	-	*10.1*	*B*	*9.5*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; NB = Northbound; SB = Southbound; WB = Westbound; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = deficient operation

Finding – All study intersections that would operate acceptably without the project would continue doing so upon the addition of project-generated traffic with slight increases in delays. Although LOS D operation is anticipated on the stop-controlled Rancho Road approach to Churn Creek Road, the project would increase the delay by fewer than five seconds so the projects effect would be considered acceptable under City policy.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, and with the planned infrastructure improvements, the study intersections are expected to operate acceptably. The Future plus Project operating conditions are summarized in Table 15.

Table 14– Future and Future plus Project Peak Hour Intersection Levels of Service								
Study Intersection	**Future Conditions**				**Future plus Project**			
Approach	**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Churn Creek Rd/Rancho Rd-Victor Ave (Roundabout)	9.3	A	12.2	B	9.5	A	12.6	B
2. Shasta View Dr/Rancho Rd (Traffic Signal)	22.8	C	21.6	C	23.1	C	21.8	C
3. Goodwater Ave/Rancho Rd	1.4	A	0.8	A	1.5	A	1.2	A
SB (Goodwater Ave) Approach	*11.1*	*B*	*10.6*	*B*	*11.6*	*B*	*10.9*	*B*
NB (Project) Approach	-	-	-	-	*10.3*	*B*	*9.7*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; NB = Northbound; SB = Southbound; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding – The study intersections will continue operating acceptably with project traffic added to the anticipated future volumes and with planned infrastructure improvements, at the same Levels of Service as without the project.

Proportional Share Calculations

The proportional share that project traffic would represent in comparison to the total growth anticipated under the City's General Plan was calculated for the intersection of Churn Creek Road/Rancho Road-Victor Avenue where a roundabout is planned to determine if payment of the City's required traffic impact fees would be sufficient to offset the cumulative effects of project traffic or if the project would need to construct the planned improvements now and seek reimbursement through the impact fee program. A proportional share calculation is not required for the traffic signal at Shasta View Drive/Rancho Road since it is already funded and under construction. The project's proportional share of traffic was calculated using the methodology published in *Caltrans Guide for the Preparation of Traffic Impact Studies,* which is summarized below:

$$P = T / (TB - TE), \text{ where}$$

P = Proportional Share
T = Project Trips During Affected Peak Hour
TB = Build-out Traffic Volume (including project trips)
TE = Existing Traffic Volume

The proportional share was calculated for each peak hour and the average value of both peak hours was used to determine the project's proportional share at the study intersection. Traffic from the proposed project would represent an average of 4.3 percent of the anticipated growth in peak hour traffic at Churn Creek Road/Rancho Road-Victor Avenue; therefore, payment of the City's impact fees would offset the cumulative effects of project traffic. The proportional share calculations is provided in Appendix D.

Finding – Project traffic would represent less than 25 percent of the difference between Existing and Future volumes at Churn Creek Road/Rancho Road-Victor Avenue; therefore, payment of the City's traffic impact fees is considered adequate contribution toward the planned future roundabout improvements.

Roadway Segment Levels of Service

At the request of City staff, a roadway segment operational analysis was performed for the segment of Rancho Road along the project frontage between Shasta View Drive and Goodwater Avenue to assist the City with planning for the future configuration of the corridor. Specifically, conditions were considered with traffic from the proposed project added to existing volumes, as well as a near-term scenario that includes traffic from the proposed project, Phase I of the Stillwater Business Park, and the Redding Distribution Center added to existing volumes.

Phase I of the Stillwater Business Park would generate approximately 259 eastbound trips and 41 westbound trips during the a.m. peak hour and 46 eastbound trips and 238 westbound trips during the p.m. peak hour. The Redding Distribution Center would generate about 20 eastbound and 37 westbound trips during the a.m. peak hour and 14 eastbound and 17 westbound trips during the p.m. peak hour. As shown in Tables 16 and Table 17, the existing configuration of Rancho Road consisting of a single travel lane in each direction with a striped center median and left turn lanes at intersections would continue operating acceptably at LOS C or better during both peak hours and all evaluated scenarios.

Table 15 – Existing and Existing plus Project Peak Hour Roadway Segment Levels of Service

Study Segment Direction	Existing Conditions				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	PH Vol/ Lane	LOS	PH Vol/ Lane	LOS	PH Vol/ Lane	LOS	PH Vol/ Lane	LOS
Rancho Rd								
Eastbound	294	A	245	A	300	A	215	A
Westbound	214	A	272	A	267	A	274	A

Notes: PH = Peak Hour; Vol/Lane = Volume per Lane; LOS = Level of Service

Table 16 – Near-Term and Near-Term plus Project Peak Hour Roadway Segment Levels of Service

Study Segment Direction	Near-Term Conditions				Near-Term plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	PH Vol/ Lane	LOS	PH Vol/ Lane	LOS	PH Vol/ Lane	LOS	PH Vol/ Lane	LOS
Rancho Rd								
Eastbound	573	C	305	A	579	C	327	A
Westbound	292	A	527	B	293	A	529	B

Notes: PH = Peak Hour; Vol/Lane = Volume per Lane; LOS = Level of Service

During the a.m. peak hour, an additional 151 eastbound trips and 437 westbound trips could be added to the near-term plus project volumes before the segment would reach LOS D, while an additional 403 eastbound trips and 201 westbound trips could be accommodated during the p.m. peak hour before the service level would drop to LOS D.

Parking

Jurisdiction parking supply requirements are based on the City of Redding Municipal Code, Chapter 18.41; Off-Street Parking and Loading for "Single-family dwelling". City standards require two covered parking spaces for each single-family dwelling. The proposed project is to consist of 41 single-family dwellings. Therefore, a minimum of 82 covered parking spaces are required. Although not shown on the tentative map, all dwellings are anticipated to have a garage that would accommodate two vehicles, which would satisfy City requirements.

Recommendation – A minimum of two covered parking spaces should be provided for each single-family dwelling in order to meet City Code.

Conclusions and Recommendations

Conclusions

- The proposed project is expected to generate an average of 387 daily trips, with 29 of those trips during the a.m. peak hour and 39 during the p.m. peak hour.
- The tentative map identifies provision of sidewalks on all streets within the site as well as along the project frontages with Shasta View Drive and Rancho Road, which would provide adequate connectivity for pedestrians. Bicycle facilities in the surrounding vicinity are generally adequate to serve project trips and will be further improved upon the completion of planned facilities identified in the City's active transportation planning documents.
- Transit facilities serving the project site are limited but are considered adequate due to the location of the project site and anticipated demand.
- Based on OPR guidance and information contained within the SRTA travel demand model and the 2018 RTP, the project's impact on VMT would be considered less-than-significant.
- The proposed turn restrictions at the project access point on Rancho Road combined with use of the street connection to the Silverstone subdivision south of the project site would result in acceptable site access.
- Adequate sight distances are available at the proposed south leg approach of the Goodwater Avenue intersection to accommodate right turns into and out of the project site.
- The existing turn lanes at the study intersections are long enough to accommodate the estimated maximum queues; therefore, the proposed project's impact on queuing would be less-than-significant.
- 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.
- The study intersections are expected to continue operating acceptably upon the addition of project-generated traffic to existing traffic volumes and the project's effect on operation of the surrounding roadway network would therefore be considered acceptable.
- With traffic associated with pending development in the project vicinity added to existing volumes the stop-controlled approach at the Churn Creek Road/Rancho Road intersection would deteriorate to LOS D during the a.m. peak hour, which would be considered unacceptable. However, the proposed project would add less than five seconds of additional delay to this approach so the project's effect would be considered acceptable.
- With the addition of project trips to the anticipated future volumes, and with implementation of planned infrastructure improvements including a roundabout at Churn Creek Road/Rancho Road and a traffic signal at Shasta View Drive/Rancho Road, all three study intersections are expected to operate acceptably.
- Traffic from the proposed project would represent less than 25 percent of the difference between Existing and Future volumes at Churn Creek Road/Rancho Road-Victor Avenue; therefore, payment of the City's traffic impact fees is considered adequate contribution toward the planned future roundabout improvements.
- The segment of Rancho Road between Shasta View Drive and Goodwater Avenue would continue operating acceptably in the existing configuration with traffic from the proposed project, the Redding Distribution Center, and Phase I of the Stillwater Business Park added to existing volumes.

Recommendations

- Sidewalks or shared use pathways should be provided along the project frontages with Rancho Road and Shasta View Drive as part of the project dependent upon coordination with City staff.
- The project's frontage improvements on Rancho Road should be designed to allow for the future provision of Class II buffered bike lanes, as identified in the City's ATP.
- As indicated on the tentative map, a hardscape median or raised delineator posts should be installed on Rancho Road to physically prohibit left turns to and from the project entrance, while maintaining full access for Goodwater Avenue. If a raised median is installed, it is recommended that the median be painted retro-reflective yellow and flanked with reflective raised pavement markers to improve visibility. A "Right Turn Only" pavement marking arrow and sign should be installed on the project approach, while signage indicating that left turns are not allowed should be installed to the east of the intersection facing westbound motorists.
- To preserve existing sight lines, any new signage, monuments, or other structures to be placed near the project entrance should be positioned outside of the vision triangles of a driver waiting on the minor street approach.
- A minimum of two covered parking spaces should be provided per single-family dwelling in order to satisfy City Code requirements.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Associate Engineer	Cameron Nye, EIT
Assistant Engineer	Valerie Haines, EIT
Graphics	Cameron Wong
Editing/Formatting	Alex Scrobonia, Hannah Yung-Boxdell, Jessica Bender
Quality Control	Dalene J. Whitlock, PE, PTOE

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RED021

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Appendix A

Collision Rate Calculations

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Intersection Collision Rate Worksheet

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Intersection # 1: Churn Creek Rd & Rancho Rd

Date of Count: Thursday, October 6, 2022

Number of Collisions: 5
Number of Injuries: 2
Number of Fatalities: 0
Average Daily Traffic (ADT): 10700
Start Date: October 1, 2016
End Date: September 30, 2021
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{5 \quad x \quad 1{,}000{,}000}{10{,}700 \quad x \quad 365 \quad x \quad 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.26 c/mve	0.0%	40.0%
Statewide Average*	0.09 c/mve	1.2%	46.9%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 2: Rancho Rd & Shasta View Dr

Date of Count: Thursday, October 6, 2022

Number of Collisions: 3
Number of Injuries: 2
Number of Fatalities: 0
Average Daily Traffic (ADT): 7700
Start Date: October 1, 2016
End Date: September 30, 2021
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Stop & Yield Controls
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{3 \quad x \quad 1{,}000{,}000}{7{,}700 \quad x \quad 365 \quad x \quad 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.21 c/mve	0.0%	66.7%
Statewide Average*	0.14 c/mve	1.1%	46.2%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

RED021

Intersection # 3: Rancho Rd & Goodwater Ave
Date of Count: Tuesday, December 6, 2022

Number of Collisions: 2
Number of Injuries: 2
Number of Fatalities: 0
Average Daily Traffic (ADT): 5100
Start Date: October 1, 2016
End Date: September 30, 2021
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{2 \quad x \quad 1{,}000{,}000}{5{,}100 \quad x \quad 365 \quad x \quad 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.21 c/mve	0.0%	100.0%
Statewide Average*	0.09 c/mve	1.2%	46.9%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 4: &
Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

RED021

Intersection # 5: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad \text{x} \quad 1{,}000{,}000}{0 \quad \text{x} \quad 365 \quad \text{x} \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 6: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad \text{x} \quad 1{,}000{,}000}{0 \quad \text{x} \quad 365 \quad \text{x} \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

RED021

Intersection # 7: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 8: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

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Intersection # 9: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 10: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

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Intersection # 11: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{0 \times 365 \times 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 12: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{0 \times 365 \times 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

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Intersection # 13: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1,000,000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 14: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1,000,000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

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Intersection # 15: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{0 \times 365 \times 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 16: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{0 \times 365 \times 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

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Intersection # 17: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 18: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

RED021

Intersection # 19: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 20: &

Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{0 \quad x \quad 365 \quad x \quad 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.00 c/mve	0.0%	0.0%
Statewide Average*	0.26 c/mve	1.5%	41.4%

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Appendix B

Queuing Calculations

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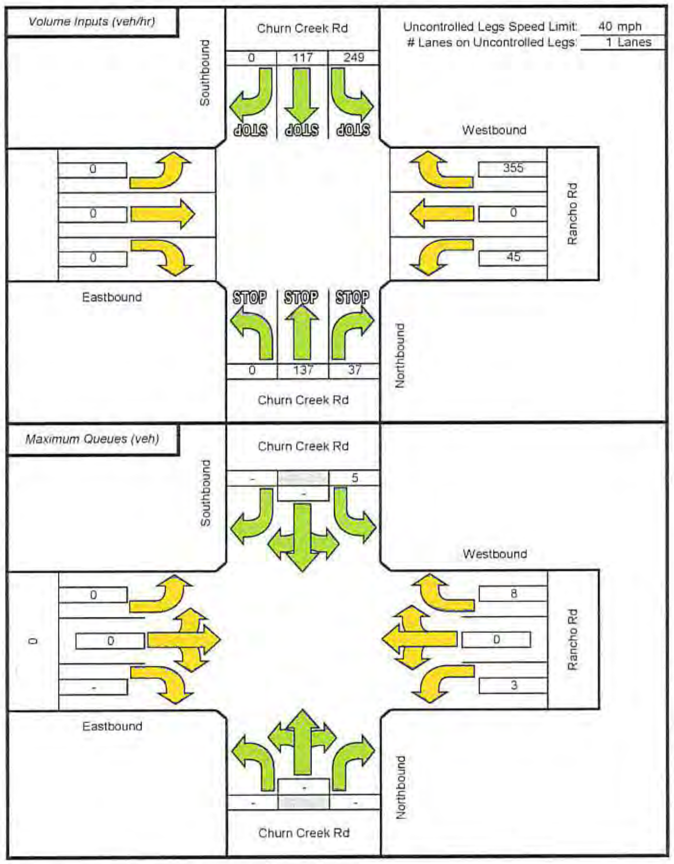
Maximum Queue Length
Two-Way Stop-Controlled Intersections

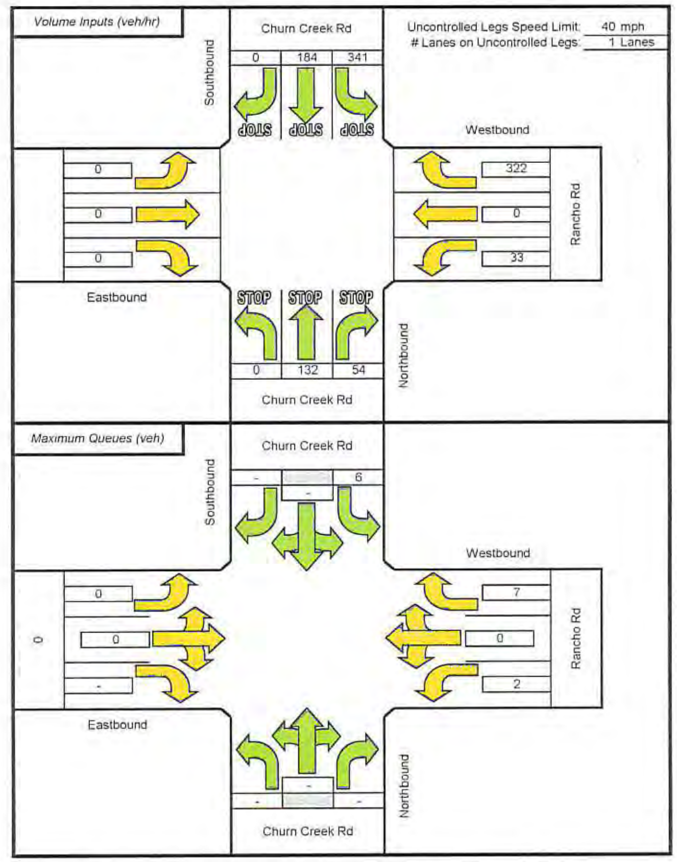
Through Street: Churn Creek Rd
Side Street: Rancho Rd
Scenario: Existing AM
Stop Controlled Legs: East/West



Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Churn Creek Rd
Side Street: Rancho Rd
Scenario: Existing PM
Stop Controlled Legs: East/West

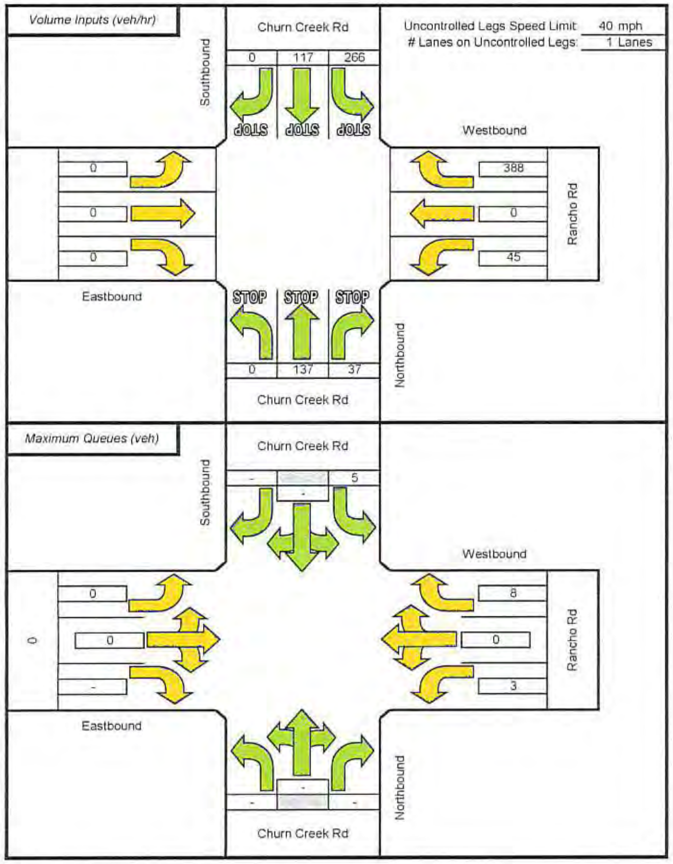


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Churn Creek Rd
Side Street: Rancho Rd

Scenario: Baseline AM
Stop Controlled Legs: East/West

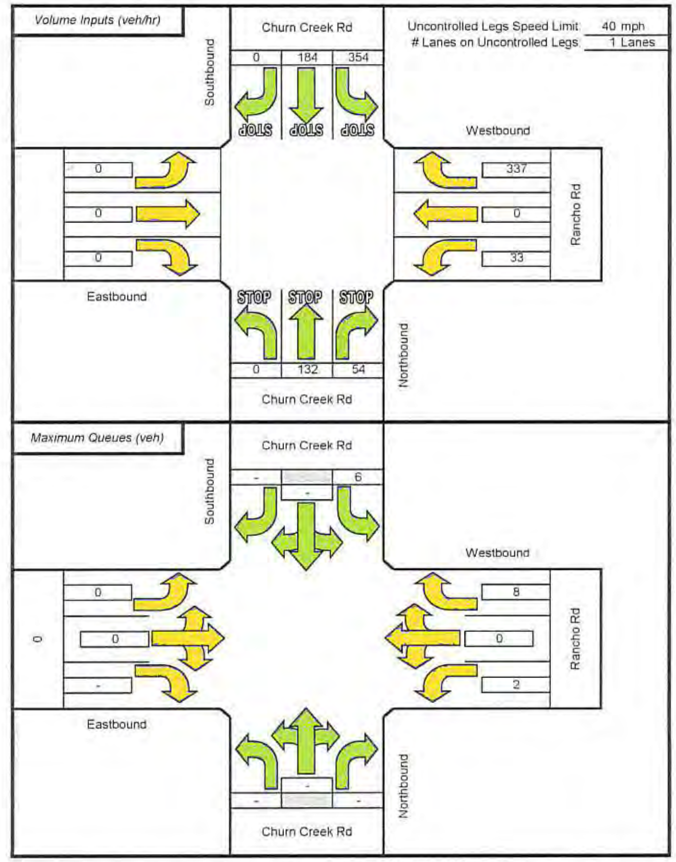


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Churn Creek Rd
Side Street: Rancho Rd

Scenario: Baseline PM
Stop Controlled Legs: East/West

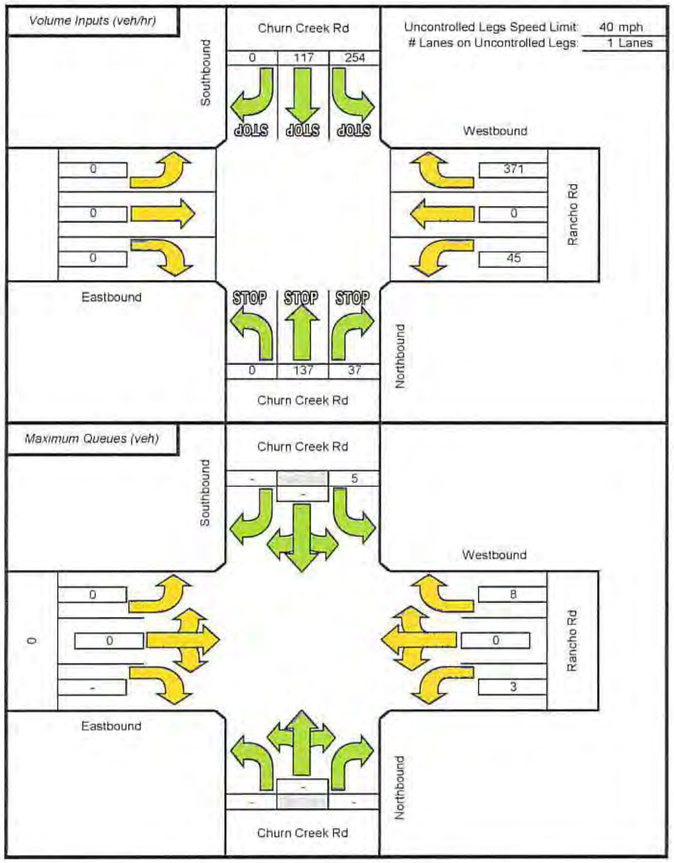


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Churn Creek Rd
Side Street: Rancho Rd

Scenario: Existing plus Project AM
Stop Controlled Legs: East/West

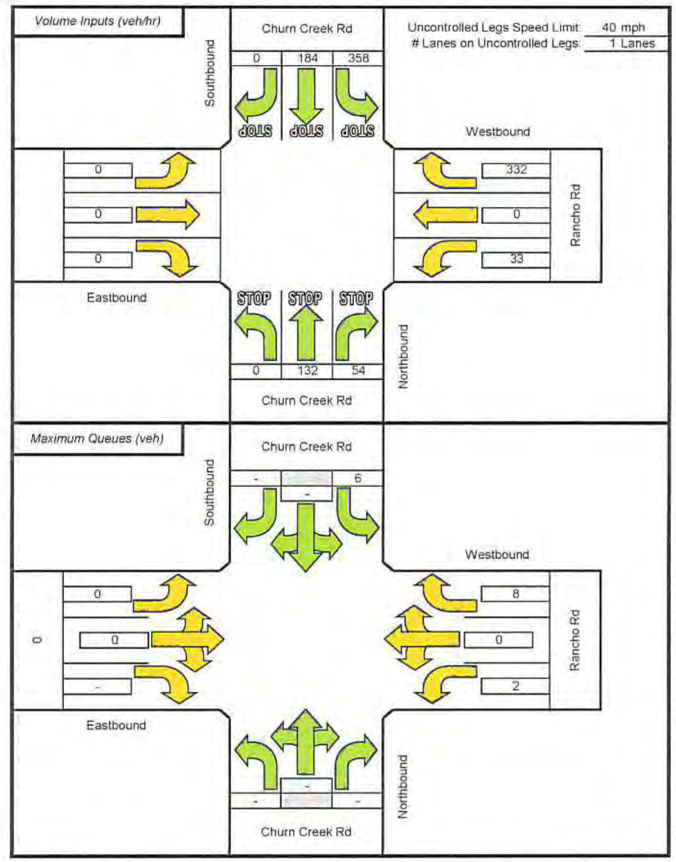


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Churn Creek Rd
Side Street: Rancho Rd

Scenario: Existing plus Project PM
Stop Controlled Legs: East/West

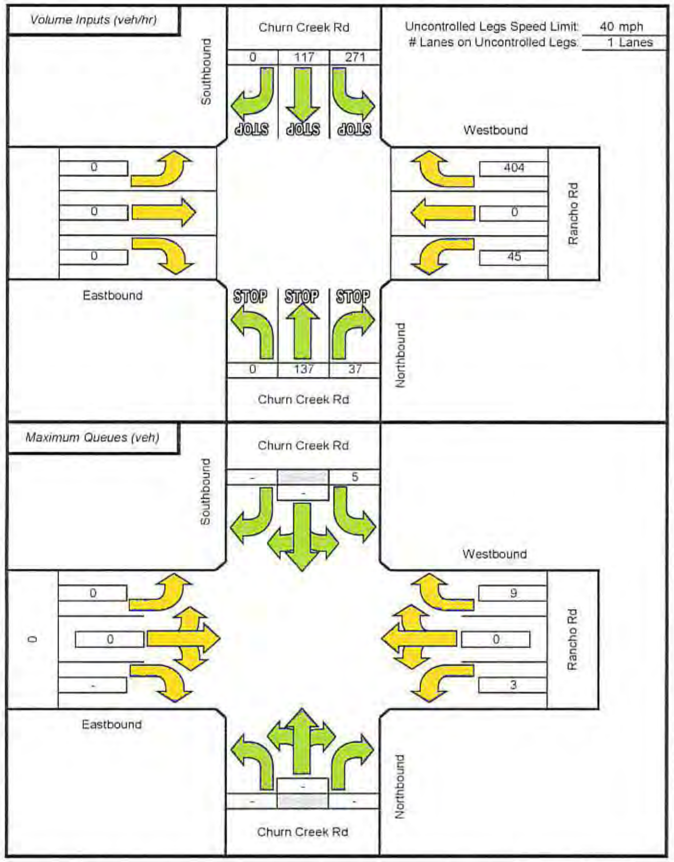


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Churn Creek Rd
Side Street: Rancho Rd

Scenario: Baseline plus Project AM
Stop Controlled Legs: East/West

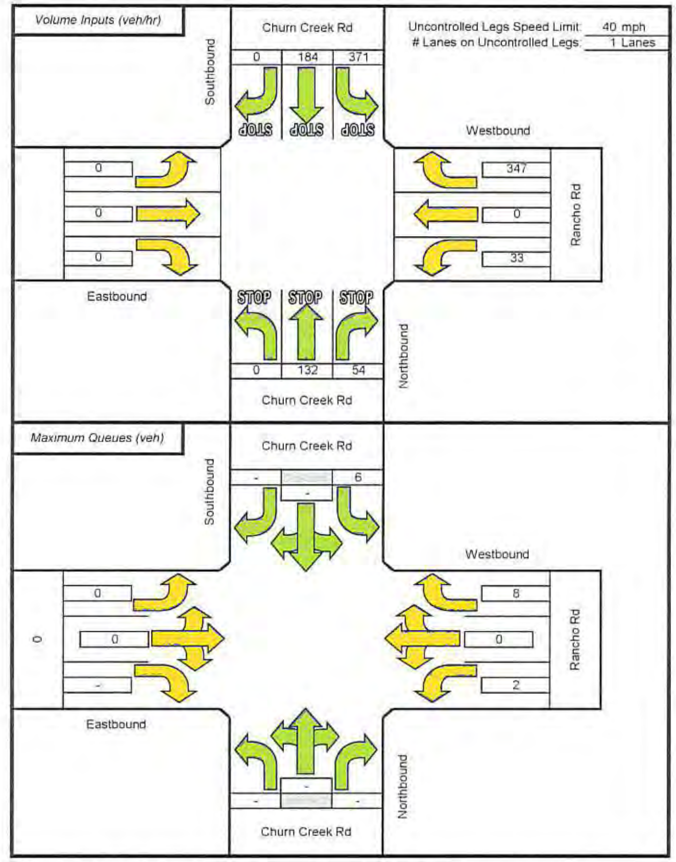


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Churn Creek Rd
Side Street: Rancho Rd

Scenario: Baseline plus Project PM
Stop Controlled Legs: East/West

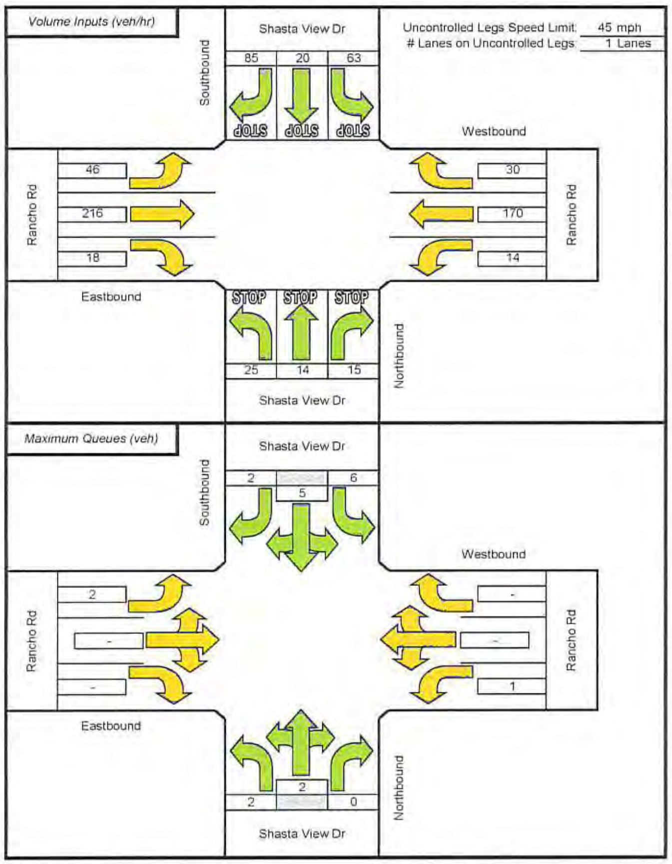


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Existing AM
Stop Controlled Legs: North/South

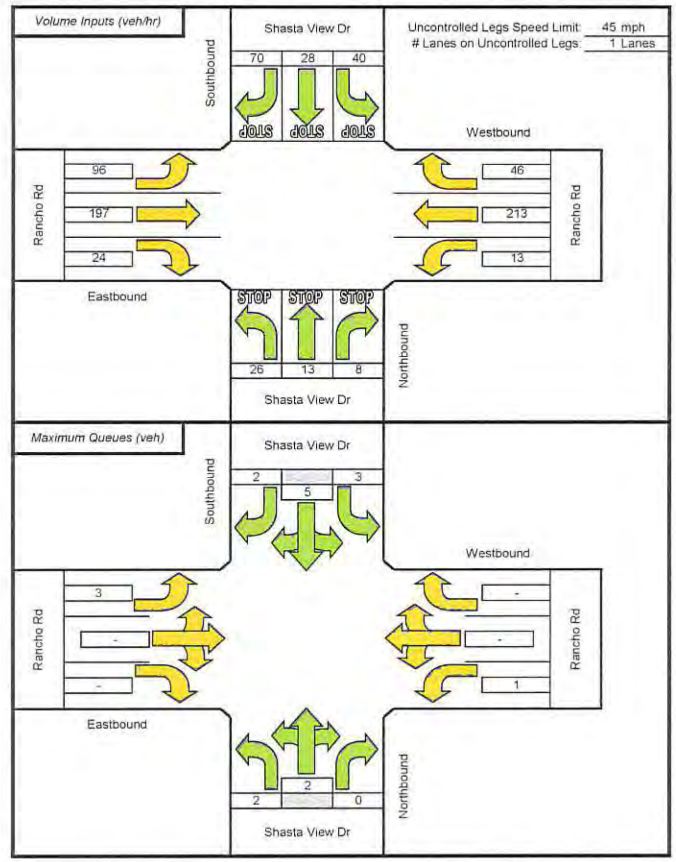


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Existing PM
Stop Controlled Legs: North/South

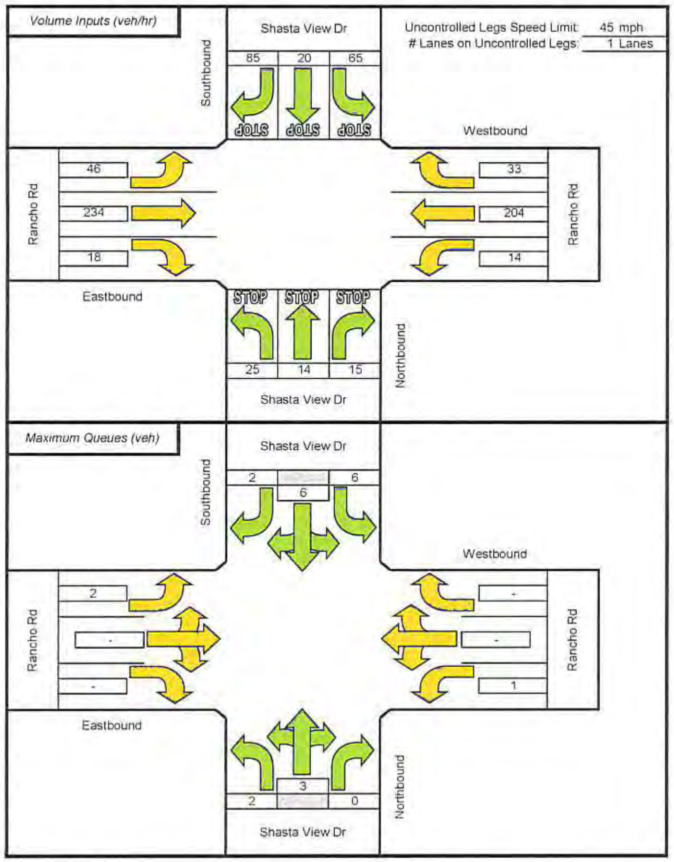


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Baseline AM
Stop Controlled Legs: North/South

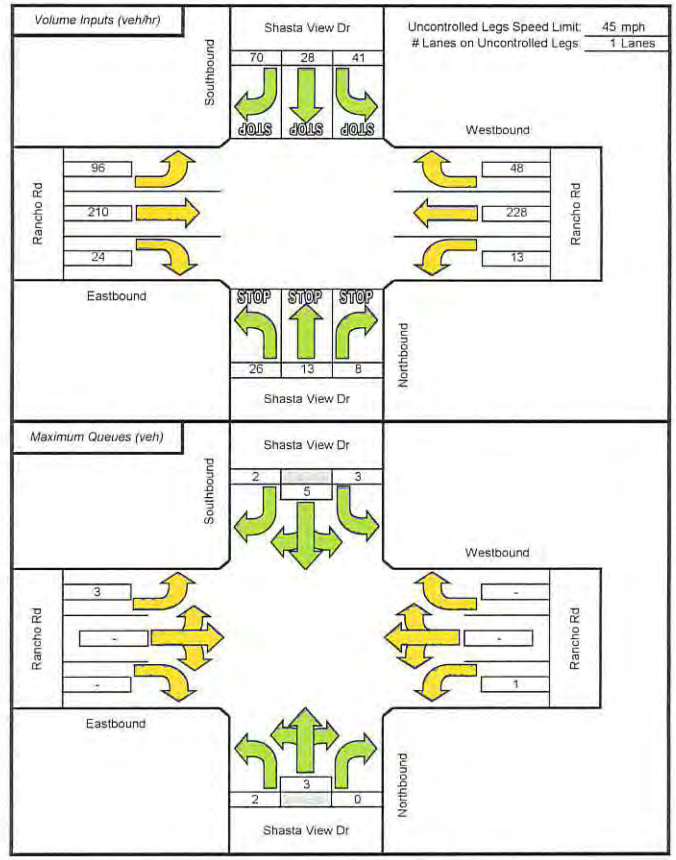


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Baseline PM
Stop Controlled Legs: North/South

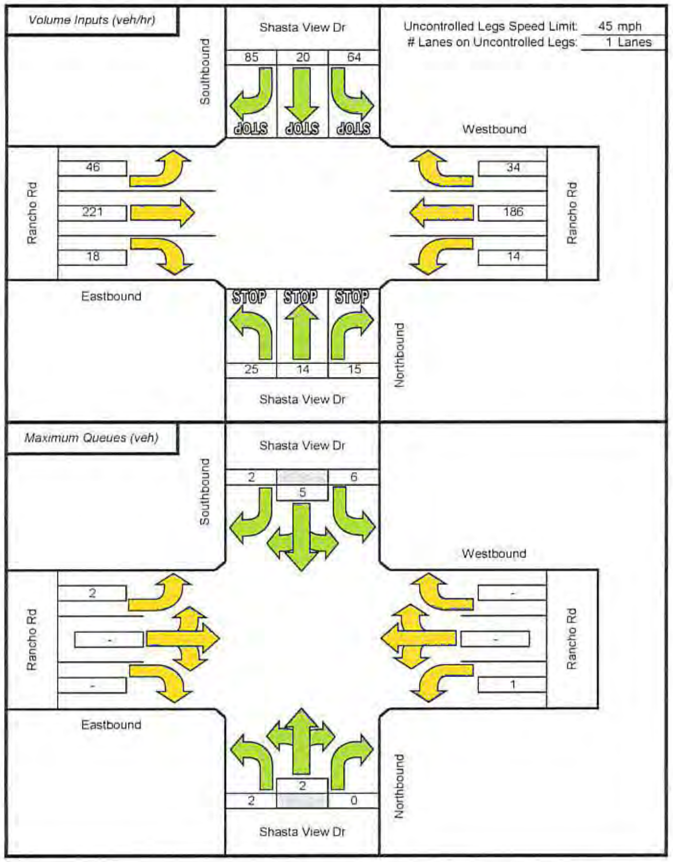


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Existing plus Project AM
Stop Controlled Legs: North/South

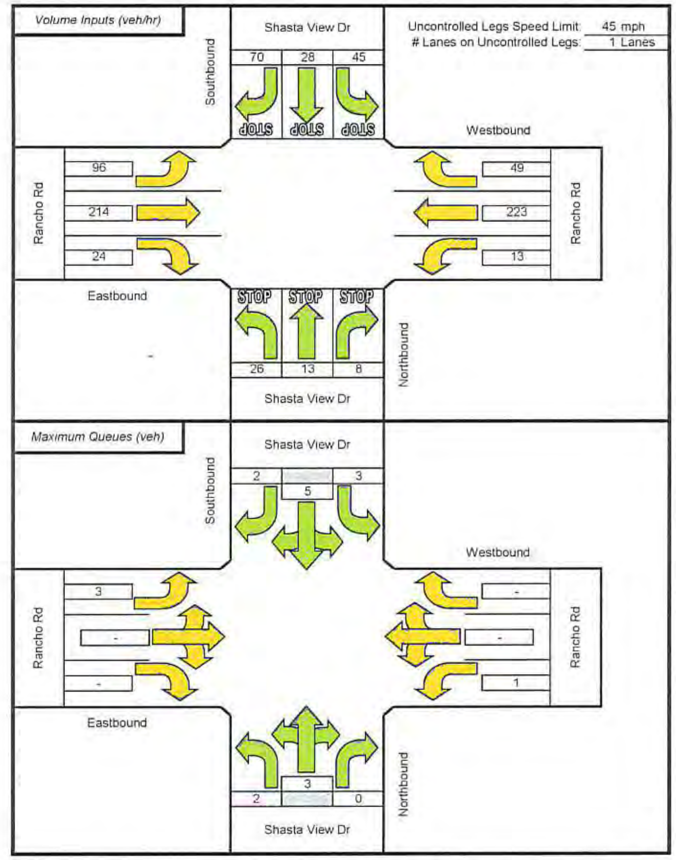


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Existing plus Project PM
Stop Controlled Legs: North/South

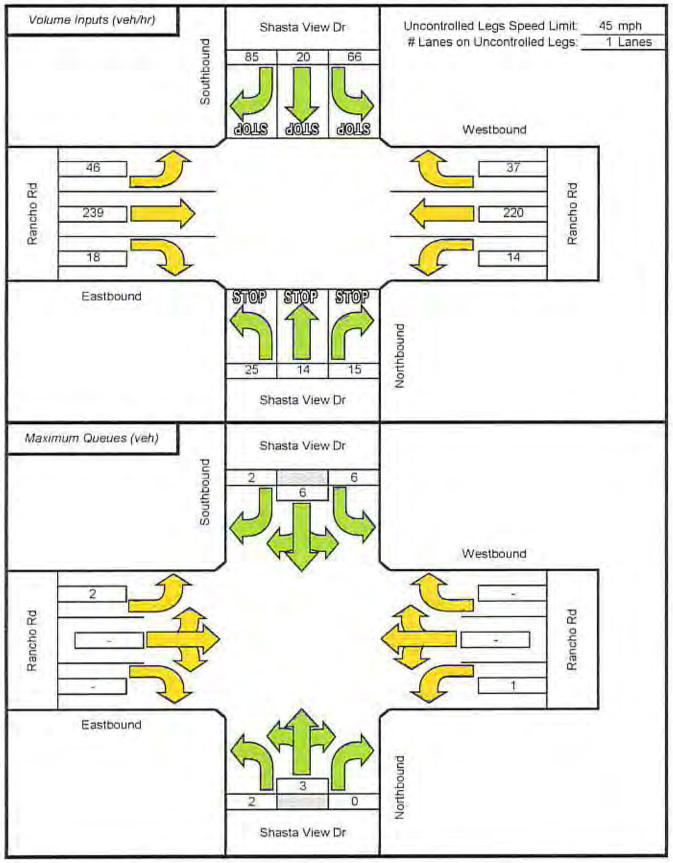


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Baseline plus Project AM
Stop Controlled Legs: North/South

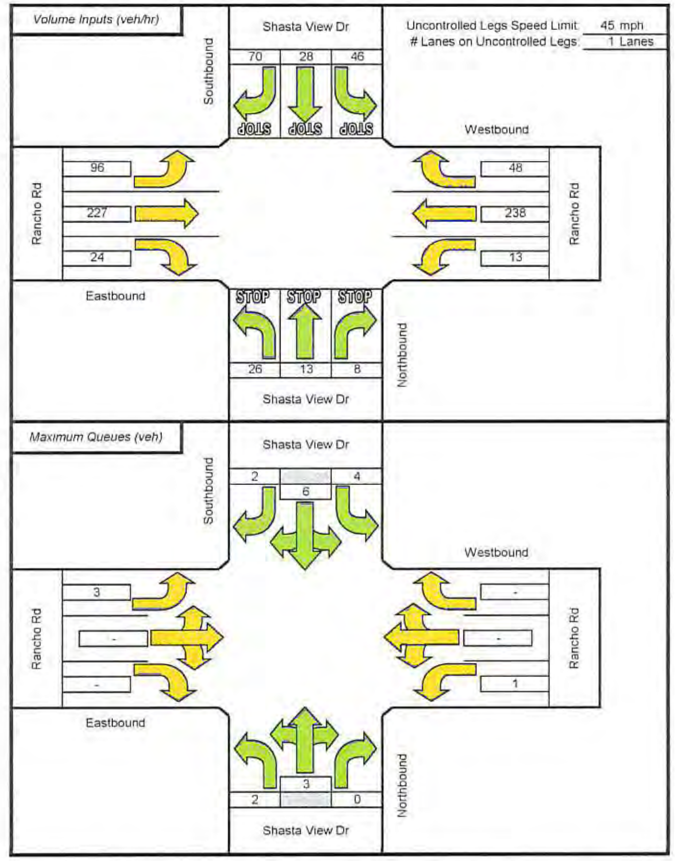


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Shasta View Dr

Scenario: Baseline PM
Stop Controlled Legs: North/South

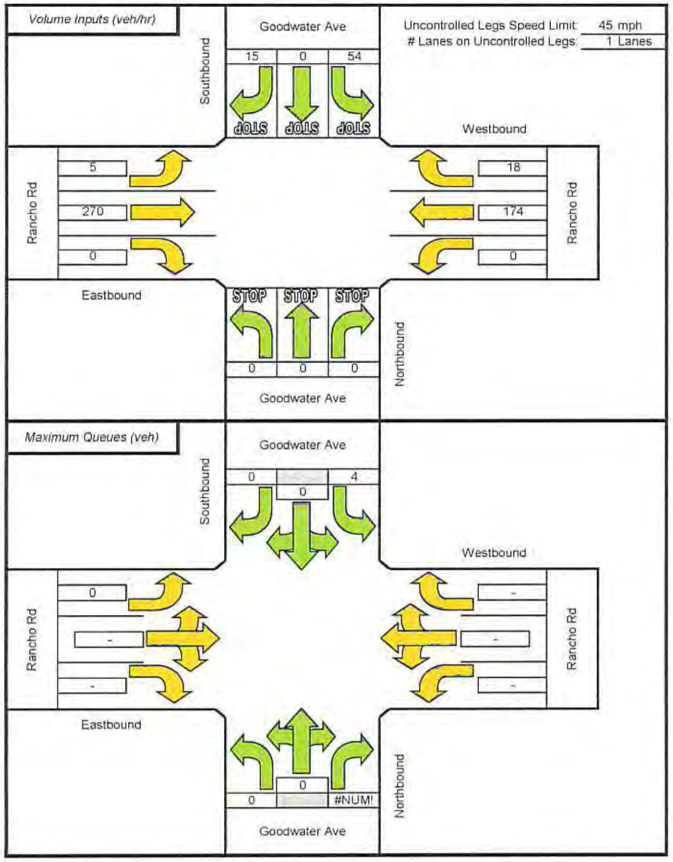


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Existing AM
Stop Controlled Legs: North/South

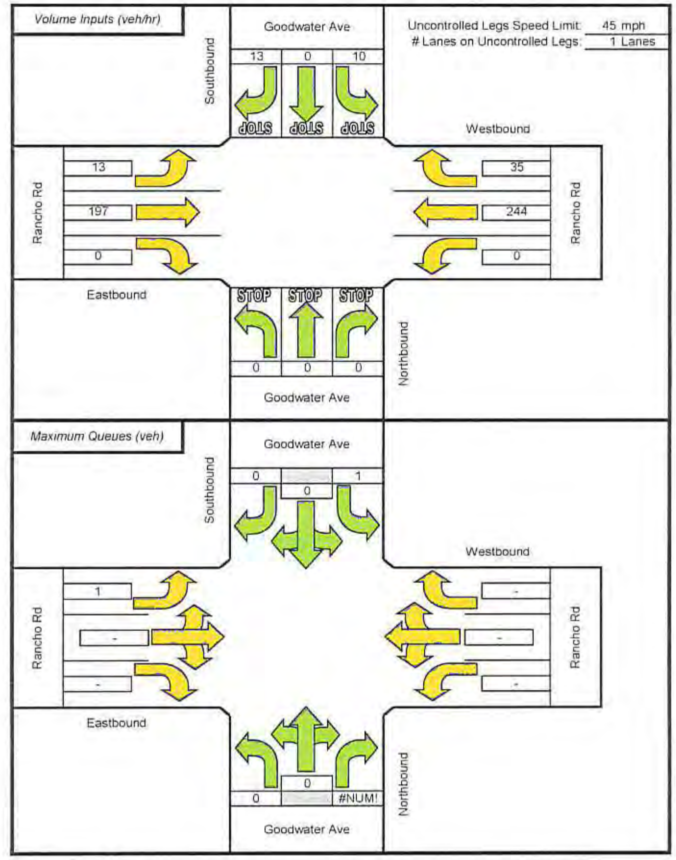


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Existing PM
Stop Controlled Legs: North/South

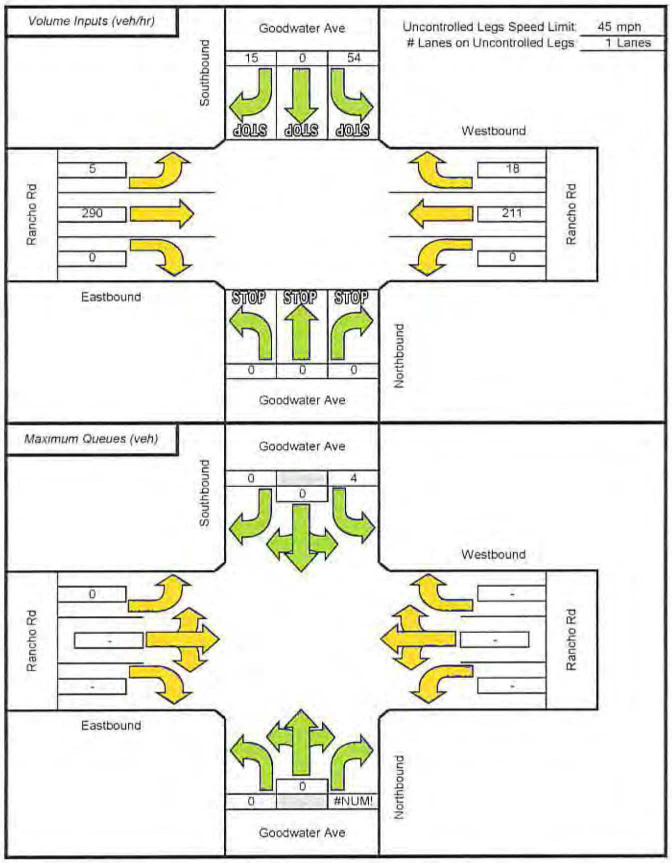


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Baseline AM
Stop Controlled Legs: North/South

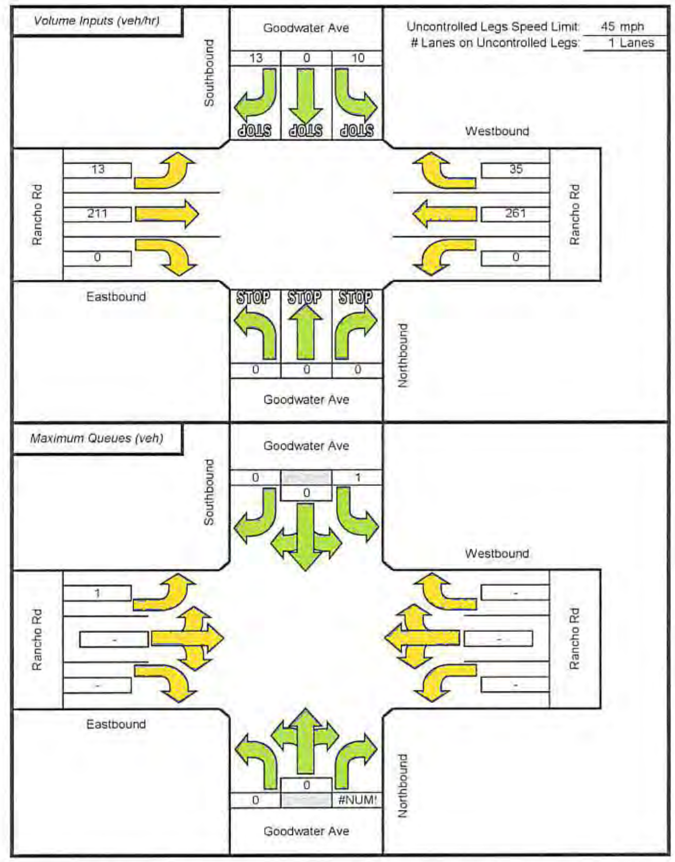


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Baseline PM
Stop Controlled Legs: North/South

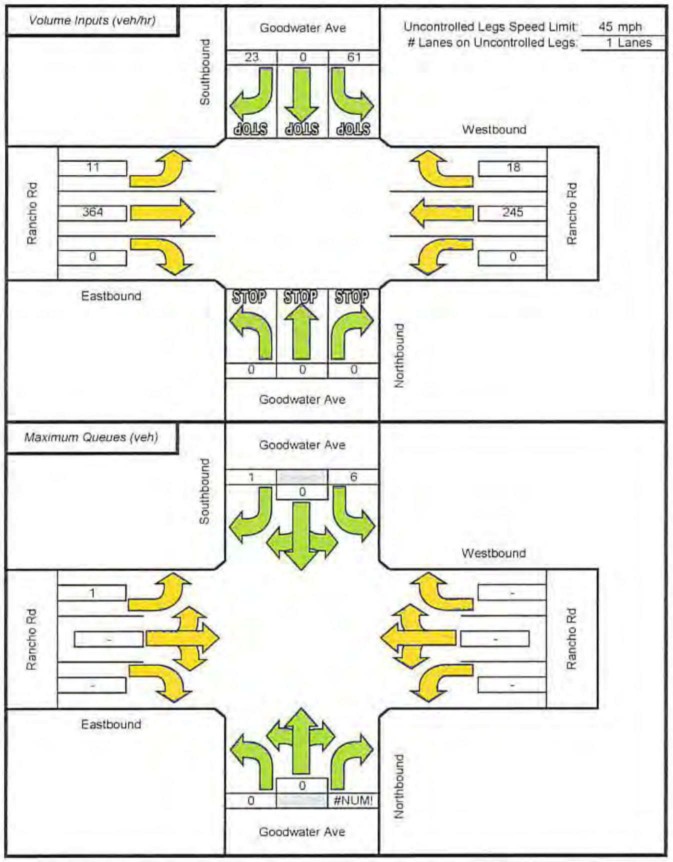


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Future AM
Stop Controlled Legs: North/South

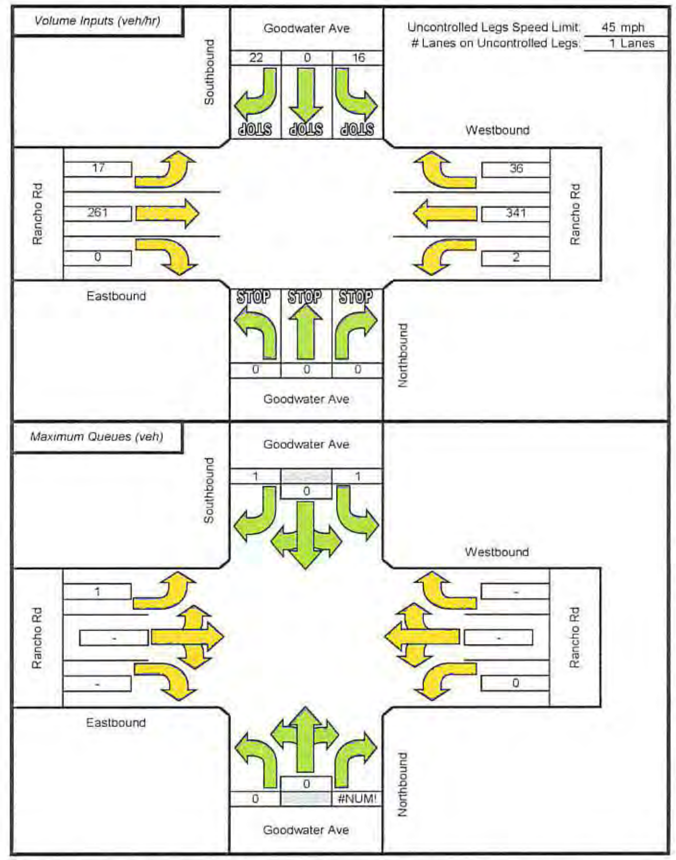


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Future PM
Stop Controlled Legs: North/South

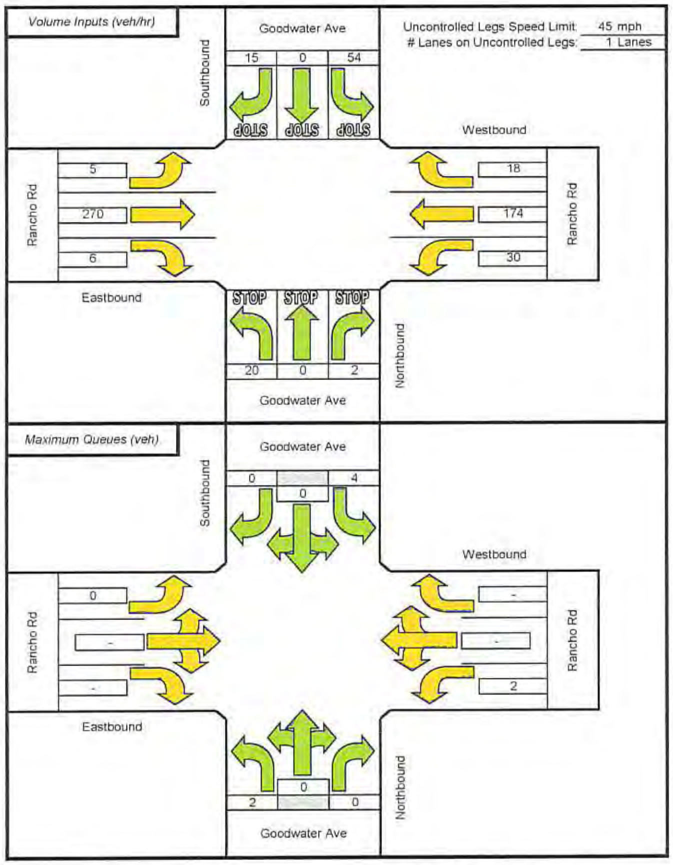


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Existing plus Project AM
Stop Controlled Legs: North/South

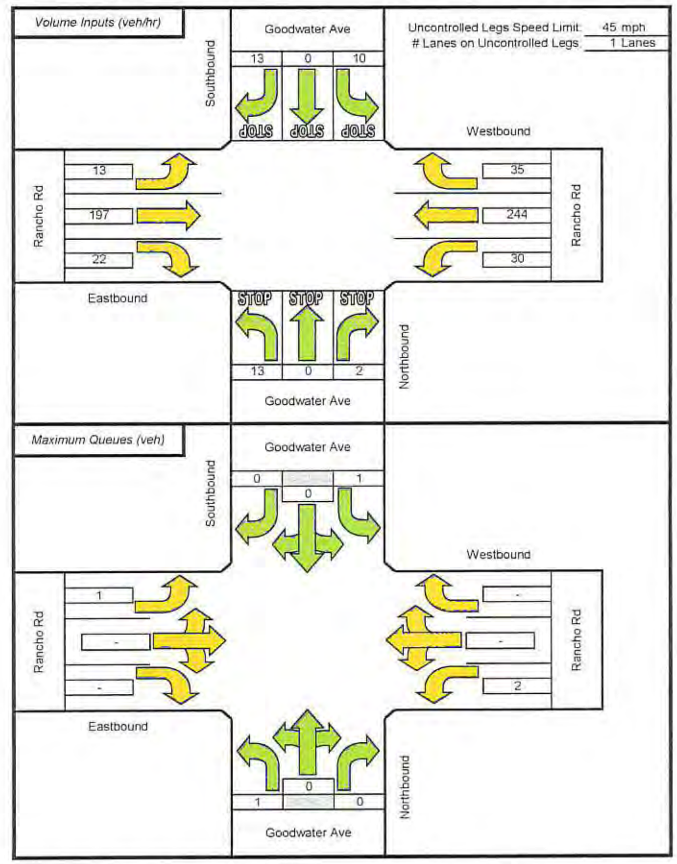


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Existing plus Project PM
Stop Controlled Legs: North/South

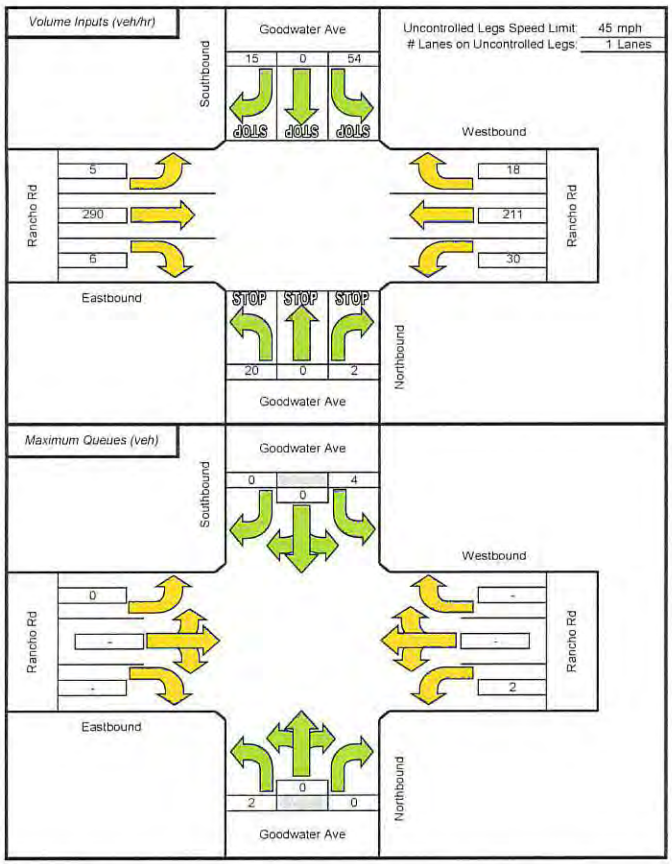


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Baseline plus Project AM
Stop Controlled Legs: North/South

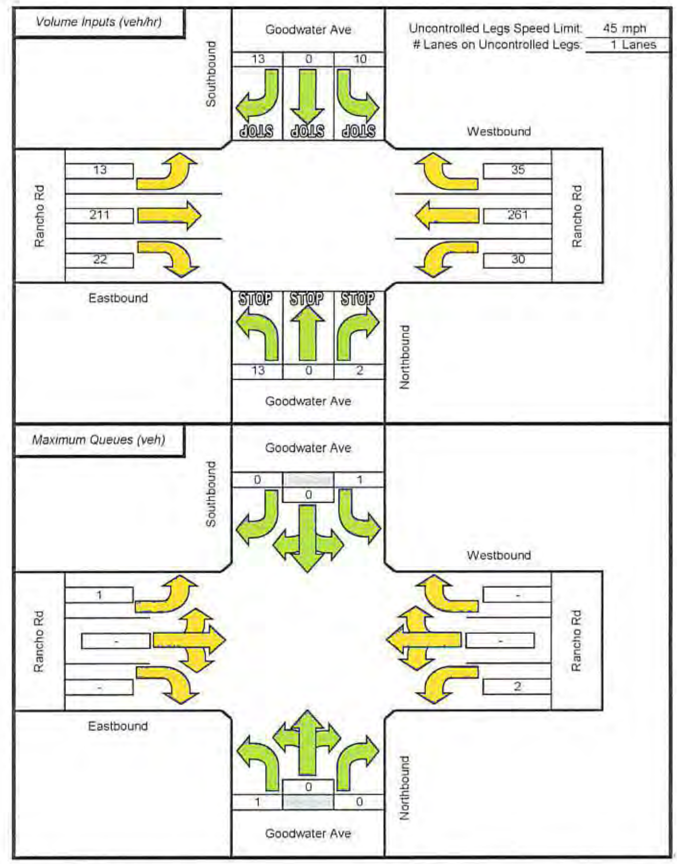


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Baseline plus Project PM
Stop Controlled Legs: North/South

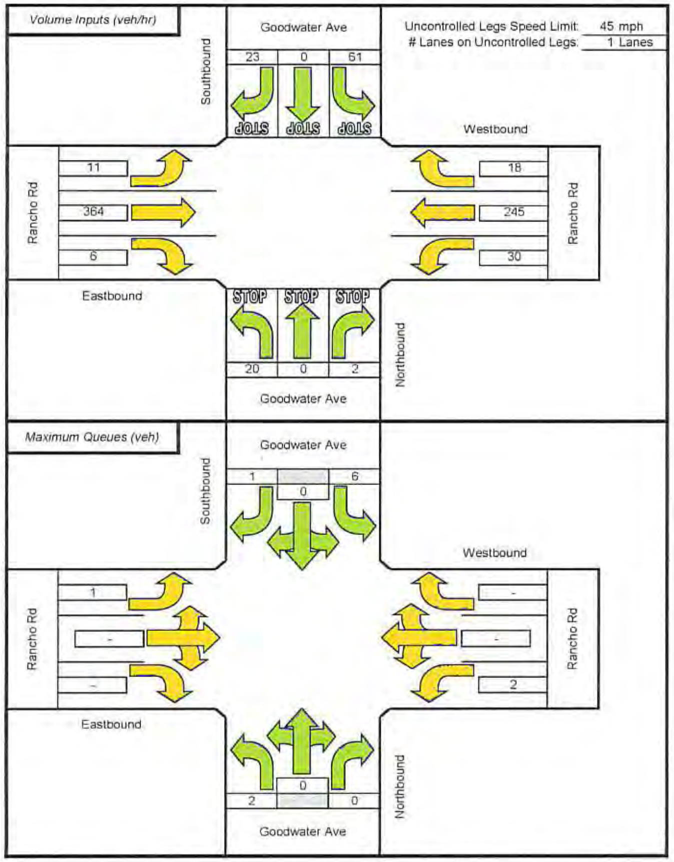


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Future plus Project AM
Stop Controlled Legs: North/South

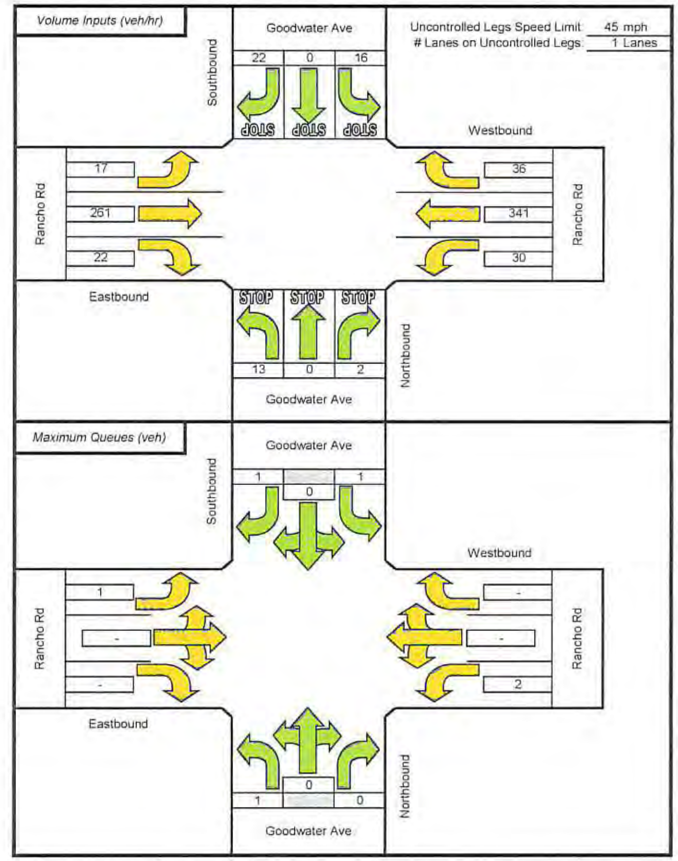


Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Maximum Queue Length
Two-Way Stop-Controlled Intersections

Through Street: Rancho Rd
Side Street: Goodwater Ave

Scenario: Future plus Project PM
Stop Controlled Legs: North/South



Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

Appendix C

Intersection Level of Service Calculations

W-Trans

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Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type	Two-way stop	Delay (sec / veh)	24.7
Analysis Method	HCM 6th Edition	Level Of Service	C
Analysis Period	15 minutes	Volume to Capacity (v/c)	0.117

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	137	37	249	117	45	355
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	137	37	249	117	45	355
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	11	73	34	13	104
Total Analysis Volume [veh/h]	161	44	293	138	53	418
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.21		0.12	0.59
d_M, Delay for Movement [s/veh]			8.27		24.71	21.85
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.80	0.00	5.79	5.79
95th-Percentile Queue Length [ft/ln]	0.00	0.00	19.88	0.00	144.79	144.79
d_A, Approach Delay [s/veh]	0.00		5.63		22.17	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	11.62					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type	Two-way stop	Delay (sec / veh)	18.4
Analysis Method	HCM 6th Edition	Level Of Service	C
Analysis Period:	15 minutes	Volume to Capacity (v/c)	0.098

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	25	14	15	63	20	85	46	216	18	14	170	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	14	15	63	20	85	46	216	18	14	170	30
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	4	4	18	6	25	13	63	5	4	49	9
Total Analysis Volume [veh/h]	29	16	17	73	23	99	53	251	21	16	198	35
Pedestrian Volume [ped/h]	1			0			0			1		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.04	0.02	0.20	0.06	0.12	0.04			0.01		
d_M, Delay for Movement [s/veh]	18.45	14.78	9.86	17.25	14.73	9.73	7.81			7.83		
Movement LOS	C	B	A	C	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.32	0.13	0.13	0.73	0.40	0.40	0.12	0.00	0.00	0.04	0.00	0.00
95th-Percentile Queue Length [ft/ln]	8.05	3.33	3.33	18.29	9.94	9.94	3.10	0.00	0.00	0.94	0.00	0.00
d_A, Approach Delay [s/veh]	15.15			13.14			1.27			0.50		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	4.86											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.097

Intersection Setup

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]			130.00			230.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Base Volume Input [veh/h]	54	15	5	270	174	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	15	5	270	174	18
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	4	1	78	51	5
Total Analysis Volume [veh/h]	63	17	6	314	202	21
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	Yes		
Storage Area [veh]	1		
Two-Stage Gap Acceptance	Yes		
Number of Storage Spaces in Median	2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.02	0.00			
d_M, Delay for Movement [s/veh]	11.04	9.77	7.69			
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.32	0.32	0.01	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	8.07	8.07	0.34	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.77		0.14		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.46					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type	Two-way stop	Delay (sec / veh)	20.9
Analysis Method	HCM 6th Edition	Level Of Service	C
Analysis Period	15 minutes	Volume to Capacity (v/c)	0.090

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	132	54	341	184	33	322
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	132	54	341	184	33	322
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	14	91	49	9	86
Total Analysis Volume [veh/h]	140	57	363	196	35	343
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.26		0.09	0.47
d_M, Delay for Movement [s/veh]			8.44		20.92	16.66
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	1.03	0.00	3.53	3.53
95th-Percentile Queue Length [ft/ln]	0.00	0.00	25.82	0.00	88.22	88.22
d_A, Approach Delay [s/veh]	0.00		5.48		17.05	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	8.39					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	24.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.137

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	26	13	8	40	28	70	96	197	24	21	213	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	13	8	40	28	70	96	197	24	21	213	46
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	4	2	11	8	20	28	57	7	6	61	13
Total Analysis Volume [veh/h]	30	15	9	46	32	80	110	226	28	24	245	53
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.05	0.01	0.16	0.11	0.10	0.09			0.02		
d_M, Delay for Movement [s/veh]	24.11	18.17	9.95	20.39	17.50	9.95	8.12			7.80		
Movement LOS	C	C	A	C	C	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.47	0.17	0.17	0.58	0.36	0.36	0.29	0.00	0.00	0.06	0.00	0.00
95th-Percentile Queue Length [ft/ln]	11.72	4.19	4.19	14.48	9.00	9.00	7.14	0.00	0.00	1.40	0.00	0.00
d_A, Approach Delay [s/veh]	20.10			14.52			2.45			0.58		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	4.97											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.015

Intersection Setup

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]			130.00			230.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Base Volume Input [veh/h]	10	13	13	197	244	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	13	13	197	244	35
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	3	3	51	64	9
Total Analysis Volume [veh/h]	10	14	14	205	254	36
Pedestrian Volume [ped/h]	0		2		2	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	Yes		
Storage Area [veh]	1		
Two-Stage Gap Acceptance	Yes		
Number of Storage Spaces in Median	2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.02	0.01			
d_M, Delay for Movement [s/veh]	10.43	9.66	7.86			
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.03	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.37	1.37	0.83	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.98		0.50		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.66					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	28.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.120

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	137	37	266	117	45	388
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	137	37	266	117	45	388
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	11	78	34	13	114
Total Analysis Volume [veh/h]	161	44	313	138	53	456
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.22		0.12	0.64
d_M, Delay for Movement [s/veh]			8.33		28.17	25.10
Movement LOS	A	A	A	A	D	D
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.86	0.00	7.06	7.06
95th-Percentile Queue Length [ft/ln]	0.00	0.00	21.62	0.00	176.48	176.48
d_A, Approach Delay [s/veh]	0.00		5.78		25.42	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	13.35					
Intersection LOS	D					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	20.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.109

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	25	14	15	65	20	85	46	234	18	14	204	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	14	15	65	20	85	46	234	18	14	204	33
Peak Hour Factor	0.8600	0.8600	0.8560	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	4	4	19	6	25	13	68	5	4	59	10
Total Analysis Volume [veh/h]	29	16	18	76	23	99	53	272	21	16	237	38
Pedestrian Volume [ped/h]	1			0			0			1		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	0	0		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.05	0.02	0.23	0.06	0.12	0.04			0.01		
d_M, Delay for Movement [s/veh]	20.15	15.99	10.34	19.05	16.33	10.76	7.91			7.88		
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.36	0.23	0.23	0.87	0.69	0.69	0.13	0.00	0.00	0.04	0.00	0.00
95th-Percentile Queue Length [ft/ln]	9.05	5.64	5.64	21.70	17.15	17.15	3.22	0.00	0.00	0.96	0.00	0.00
d_A, Approach Delay [s/veh]	16.29			14.59			1.21			0.43		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	4.97											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type	Two-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.102

Intersection Setup

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]			130.00			230.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Base Volume Input [veh/h]	54	15	5	290	211	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	15	5	290	211	18
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	4	1	84	61	5
Total Analysis Volume [veh/h]	63	17	6	337	245	21
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	Yes		
Storage Area [veh]	1		
Two-Stage Gap Acceptance	Yes		
Number of Storage Spaces in Median	2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.02	0.00			
d_M, Delay for Movement [s/veh]	11.34	10.05	7.79			
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.34	0.34	0.01	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	8.47	8.47	0.35	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	11.07		0.14		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.35					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type	Two-way stop	Delay (sec / veh):	21.7
Analysis Method	HCM 6th Edition	Level Of Service:	C
Analysis Period	15 minutes	Volume to Capacity (v/c):	0.091

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	132	54	354	184	33	337
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	132	54	354	184	33	337
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	14	94	49	9	90
Total Analysis Volume [veh/h]	140	57	377	196	35	359
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.27		0.09	0.50
d_M, Delay for Movement [s/veh]			8.49		21.74	17.31
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	1.09	0.00	3.84	3.84
95th-Percentile Queue Length [ft/ln]	0.00	0.00	27.17	0.00	95.98	95.98
d_A, Approach Delay [s/veh]	0.00		5.58		17.70	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	8.74					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	24.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.141

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	26	13	8	41	28	70	96	210	24	13	228	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	13	8	41	28	70	96	210	24	13	228	48
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	4	2	12	8	20	28	60	7	4	66	14
Total Analysis Volume [veh/h]	30	15	9	47	32	80	110	241	28	15	262	55
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	0	0		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.05	0.01	0.17	0.11	0.10	0.09			0.01		
d_M, Delay for Movement [s/veh]	24.63	18.62	10.28	20.80	19.07	11.46	8.18			7.81		
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.48	0.21	0.21	0.61	0.79	0.79	0.29	0.00	0.00	0.04	0.00	0.00
95th-Percentile Queue Length [ft/ln]	12.03	5.22	5.22	15.17	19.86	19.86	7.27	0.00	0.00	0.88	0.00	0.00
d_A, Approach Delay [s/veh]	20.57			15.75			2.37			0.35		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	5.01											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	10.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.015

Intersection Setup

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]			130.00			230.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Base Volume Input [veh/h]	10	13	13	211	261	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	13	13	211	261	35
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	3	3	55	68	9
Total Analysis Volume [veh/h]	10	14	14	220	272	36
Pedestrian Volume [ped/h]	0		2		2	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	Yes		
Storage Area [veh]	1		
Two-Stage Gap Acceptance	Yes		
Number of Storage Spaces in Median	2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.02	0.01			
d_M, Delay for Movement [s/veh]	10.57	9.77	7.91			
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.06	0.06	0.03	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.40	1.40	0.85	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.10		0.47		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.62					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Roundabout	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	11.00	11.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	0		0	0		0
Entry Pocket Length [ft]												
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	40.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Base Volume Input [veh/h]	153	15	50	34	11	258	135	286	117	50	450	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	153	15	50	34	11	258	135	286	117	50	450	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	4	13	9	3	65	34	72	29	13	113	11
Total Analysis Volume [veh/h]	153	15	50	34	11	258	135	286	117	50	450	45
Pedestrian Volume [ped/h]				0								

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	464			666			97			309		
Exiting Flow Rate [veh/h]	182			199			878			377		
Demand Flow Rate [veh/h]	153	15	50	34	11	258	135	286	117	50	450	45
Adjusted Demand Flow Rate [veh/h]	153	15	50	34	11	258	135	286	117	50	450	45

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]				
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]				
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	223	310	549	556
Capacity of Entry and Bypass Lanes [veh/h]	860	700	1251	1007
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	843	686	1226	988
X, volume / capacity	0.26	0.44	0.44	0.55

Movement, Approach, & Intersection Results

Lane LOS	A	B	A	B
95th-Percentile Queue Length [veh]	1.03	2.27	2.29	3.48
95th-Percentile Queue Length [ft]	25.83	56.67	57.16	86.98
Approach Delay [s/veh]	7.05	11.55	7.41	10.81
Approach LOS	A	B	A	B
Intersection Delay [s/veh]	9.30			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type	Signalized	Delay (sec / veh)	22.8
Analysis Method	HCM 6th Edition	Level Of Service	C
Analysis Period	15 minutes	Volume to Capacity (v/c)	0.363

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	150	90	65	70	40	116	55	265	55	15	238	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]			0			0			0			0
Total Hourly Volume [veh/h]	150	90	65	70	40	116	55	265	55	15	238	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	23	16	18	10	29	14	66	14	4	60	8
Total Analysis Volume [veh/h]	150	90	65	70	40	116	55	265	55	15	238	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]												
Local Bus Stopping Rate [/h]			0			0			0			0
v_do, Outbound Pedestrian Volume crossing major stree	0			0			0			1		
v_di, Inbound Pedestrian Volume crossing major street [	1			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor stree	1			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [	0			0			1			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	
Offset Reference	
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	3	8		7	4		5	2		1	6	
Auxiliary Signal Groups												
Lead / Lag	Lead			Lead			Lead			Lead		
Minimum Green [s]	5	10		5	10		5	10		5	10	
Maximum Green [s]	30	30		30	30		30	30		30	30	
Amber [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All red [s]	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Split [s]	23	22		20	19		9	19		9	19	
Vehicle Extension [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Walk [s]		5			5			5			5	
Pedestrian Clearance [s]		13			10			10			10	
Delayed Vehicle Green [s]	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
I2, Clearance Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]												
Detector Length [ft]												
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C	R
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]									
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	13	4	10	3	36	1	34	34
g / C, Green / Cycle	0.11	0.19	0.05	0.14	0.05	0.51	0.02	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.08	0.09	0.04	0.09	0.03	0.18	0.01	0.13	0.02
s, saturation flow rate [veh/h]	1781	1739	1781	1653	1781	1815	1781	1870	1589
c, Capacity [veh/h]	196	333	98	226	87	917	36	891	758
d1, Uniform Delay [s]	30.39	25.20	32.65	28.90	32.79	10.43	34.02	11.03	9.83
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.16	1.01	9.23	3.72	7.35	1.05	7.72	0.73	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.46	0.71	0.69	0.63	0.35	0.42	0.27	0.04
d, Delay for Lane Group [s/veh]	36.55	26.20	41.88	32.61	40.15	11.48	41.75	11.76	9.93
Lane Group LOS	D	C	D	C	D	B	D	B	A
Critical Lane Group	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50th-Percentile Queue Length [veh/ln]	2.67	2.25	1.37	2.60	1.03	2.61	0.31	1.98	0.24
50th-Percentile Queue Length [ft/ln]	66.72	56.13	34.19	64.88	25.70	65.23	7.79	49.48	6.12
95th-Percentile Queue Length [veh/ln]	4.80	4.04	2.46	4.67	1.65	4.70	0.56	3.56	0.44
95th-Percentile Queue Length [ft/ln]	120.10	101.04	61.53	116.79	46.26	117.42	14.02	89.07	11.02

Movement, Approach, & Intersection Results

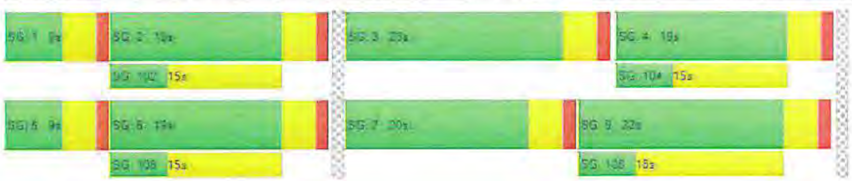
d_M, Delay for Movement [s/veh]	36.55	26.20	26.20	41.88	32.61	32.61	40.15	11.48	11.48	41.75	11.76	9.93
Movement LOS	D	C	C	D	C	C	D	B	B	D	B	A
d_A, Approach Delay [s/veh]	31.29			35.48			15.68			13.12		
Approach LOS	C			D			B			B		
d_I, Intersection Delay [s/veh]	22.82											
Intersection LOS	C											
Intersection V/C	0.363											

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	26.64	26.64	26.64	26.64
I_p,int, Pedestrian LOS Score for Intersection	2.086	2.082	2.358	2.371
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	513	428	428	428
d_b, Bicycle Delay [s]	19.37	21.67	21.67	21.67
I_b,int, Bicycle LOS Score for Intersection	2.063	1.933	2.178	2.032
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.102

Intersection Setup

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]			130.00			230.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Base Volume Input [veh/h]	61	23	11	364	245	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	61	23	11	364	245	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	6	3	91	61	5
Total Analysis Volume [veh/h]	61	23	11	364	245	18
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	Yes		
Storage Area [veh]	1		
Two-Stage Gap Acceptance	Yes		
Number of Storage Spaces in Median	2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.03	0.01			
d_M, Delay for Movement [s/veh]	11.52	10.03	7.79			
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.34	0.34	0.03	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	8.49	8.49	0.64	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	11.11		0.23		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.41					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Roundabout	Delay (sec / veh):	12.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	11.00	11.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	0		0	0		0
Entry Pocket Length [ft]												
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	40.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Base Volume Input [veh/h]	146	27	54	83	22	222	213	442	116	50	417	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	146	27	54	83	22	222	213	442	116	50	417	78
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	7	14	21	6	56	53	111	29	13	104	20
Total Analysis Volume [veh/h]	146	27	54	83	22	222	213	442	116	50	417	78
Pedestrian Volume [ped/h]				0								

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	753			625			158			394		
Exiting Flow Rate [veh/h]	192			324			801			591		
Demand Flow Rate [veh/h]	146	27	54	83	22	222	213	442	116	50	417	78
Adjusted Demand Flow Rate [veh/h]	146	27	54	83	22	222	213	442	116	50	417	78

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]				
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]				
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	232	334	787	556
Capacity of Entry and Bypass Lanes [veh/h]	641	730	1175	924
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	628	715	1152	906
X, volume / capacity	0.36	0.46	0.67	0.60

Movement, Approach, & Intersection Results

Lane LOS	B	B	B	B
95th-Percentile Queue Length [veh]	1.65	2.41	5.45	4.15
95th-Percentile Queue Length [ft]	41.13	60.22	136.35	103.83
Approach Delay [s/veh]	10.75	11.49	12.56	12.81
Approach LOS	B	B	B	B
Intersection Delay [s/veh]	12.23			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Signalized	Delay (sec / veh):	21.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.328

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	80	90	30	45	40	86	111	210	115	40	262	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]			0			0			0			0
Total Hourly Volume [veh/h]	80	90	30	45	40	86	111	210	115	40	262	55
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	23	8	11	10	22	28	53	29	10	66	14
Total Analysis Volume [veh/h]	80	90	30	45	40	86	111	210	115	40	262	55
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]												
Local Bus Stopping Rate [/h]			0			0			0			0
v_do, Outbound Pedestrian Volume crossing major stree		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing major street [		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing minor stree		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing minor street [		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	
Offset Reference	
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	3	8		7	4		5	2		1	6	
Auxiliary Signal Groups												
Lead / Lag	Lead			Lead			Lead			Lead		
Minimum Green [s]	5	10		5	10		5	10		5	10	
Maximum Green [s]	30	30		30	30		30	30		30	30	
Amber [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All red [s]	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Split [s]	12	22		9	19		20	24		15	19	
Vehicle Extension [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Walk [s]		5			5			5			5	
Pedestrian Clearance [s]		13			10			10			10	
Delayed Vehicle Green [s]	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Rest In Walk		No			No			No			No	
l1, Start-Up Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
l2, Clearance Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]												
Detector Length [ft]												
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C	R
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]									
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	10	3	9	6	38	3	35	35
g / C, Green / Cycle	0.06	0.15	0.04	0.13	0.08	0.54	0.04	0.50	0.50
(v / s)_i Volume / Saturation Flow Rate	0.04	0.07	0.03	0.08	0.06	0.18	0.02	0.14	0.03
s, saturation flow rate [veh/h]	1781	1791	1781	1669	1781	1760	1781	1870	1589
c, Capacity [veh/h]	107	264	78	219	148	951	72	931	792
d1, Uniform Delay [s]	32.49	27.37	32.96	28.70	31.49	9.09	33.08	10.30	9.17
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.89	1.22	6.65	2.39	7.35	0.98	6.45	0.75	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.75	0.45	0.58	0.58	0.75	0.34	0.55	0.28	0.07
d, Delay for Lane Group [s/veh]	42.38	28.59	39.61	31.09	38.84	10.07	39.52	11.05	9.34
Lane Group LOS	D	C	D	C	D	B	D	B	A
Critical Lane Group	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50th-Percentile Queue Length [veh/ln]	1.57	1.83	0.86	2.03	2.00	2.39	0.78	2.29	0.43
50th-Percentile Queue Length [ft/ln]	39.22	45.66	21.52	50.72	49.93	59.78	19.42	57.13	10.70
95th-Percentile Queue Length [veh/ln]	2.82	3.29	1.55	3.65	3.60	4.30	1.40	4.11	0.77
95th-Percentile Queue Length [ft/ln]	70.60	82.18	38.74	91.30	89.88	107.60	34.96	102.83	19.26

Movement, Approach, & Intersection Results

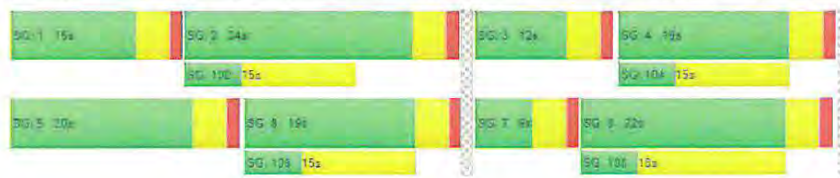
d_M, Delay for Movement [s/veh]	42.38	28.59	28.59	39.61	31.09	31.09	38.84	10.07	10.07	39.52	11.05	9.34
Movement LOS	D	C	C	D	C	C	D	B	B	D	B	A
d_A, Approach Delay [s/veh]	34.11			33.33			17.40			13.98		
Approach LOS	C			C			B			B		
d_I, Intersection Delay [s/veh]	21.56											
Intersection LOS	C											
Intersection V/C	0.328											

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	26.64	26.64	26.64	26.64
I_p,int, Pedestrian LOS Score for Intersection	2.079	2.091	2.350	2.277
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	513	428	570	428
d_b, Bicycle Delay [s]	19.37	21.67	17.92	21.67
I_b,int, Bicycle LOS Score for Intersection	1.890	1.842	2.279	2.149
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

Intersection Setup

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]			130.00			230.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Goodwater Ave		Rancho Rd		Rancho Rd	
Base Volume Input [veh/h]	16	22	17	261	341	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	16	22	17	261	341	36
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	6	4	65	85	9
Total Analysis Volume [veh/h]	16	22	17	261	341	36
Pedestrian Volume [ped/h]	0		2		2	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	Yes		
Storage Area [veh]	1		
Two-Stage Gap Acceptance	Yes		
Number of Storage Spaces in Median	2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.03	0.01			
d_M, Delay for Movement [s/veh]	11.10	10.25	8.09			
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.10	0.10	0.04	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	2.44	2.44	1.09	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.61		0.49		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.78					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	26.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.118

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	137	37	249	117	45	355
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	5	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	137	37	254	117	45	371
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	11	75	34	13	109
Total Analysis Volume [veh/h]	161	44	299	138	53	436
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.21		0.12	0.61
d_M, Delay for Movement [s/veh]			8.29		26.15	23.23
Movement LOS	A	A	A	A	D	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.82	0.00	6.35	6.35
95th-Percentile Queue Length [ft/ln]	0.00	0.00	20.40	0.00	158.73	158.73
d_A, Approach Delay [s/veh]	0.00		5.67		23.54	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	12.37					
Intersection LOS	D					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	19.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.164

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	25	14	15	63	20	85	46	216	18	14	170	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	16	4	0	1	0	0	0	5	0	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	18	15	64	20	85	46	221	18	15	170	30
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	5	4	19	6	25	13	64	5	4	49	9
Total Analysis Volume [veh/h]	48	21	17	74	23	99	53	257	21	17	198	35
Pedestrian Volume [ped/h]	1			0			0			1		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	0	0		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.06	0.02	0.21	0.06	0.12	0.04			0.01		
d_M, Delay for Movement [s/veh]	19.70	15.32	10.32	17.73	15.50	10.39	7.81			7.84		
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.58	0.25	0.25	0.77	0.64	0.64	0.12	0.00	0.00	0.04	0.00	0.00
95th-Percentile Queue Length [ft/ln]	14.44	6.37	6.37	19.24	16.02	16.02	3.10	0.00	0.00	1.01	0.00	0.00
d_A, Approach Delay [s/veh]	16.78			13.76			1.25			0.53		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	5.43											
Intersection LOS	C											

Generated with PTV VISTRO

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Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.105

Intersection Setup

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]			12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	1		0	0		1
Entry Pocket Length [ft]							130.00					230.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]			0	54	0	15	5	270	0		174	18
Base Volume Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Heavy Vehicles Percentage [%]			2.00	2.00	2.00	2.00	2.00	2.00	2.00		2.00	2.00
Growth Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
In-Process Volume [veh/h]			0	0	0	0	0	0	0		0	0
Site-Generated Trips [veh/h]			2	0	0	0	0	0	6		1	0
Diverted Trips [veh/h]			0	0	0	0	0	0	0		0	0
Pass-by Trips [veh/h]			0	0	0	0	0	0	0		0	0
Existing Site Adjustment Volume [veh/h]			0	0	0	0	0	0	0		0	0
Other Volume [veh/h]			0	0	0	0	0	0	0		0	0
Total Hourly Volume [veh/h]			2	54	0	15	5	270	6		175	18
Peak Hour Factor			0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600		0.8600	0.8600
Other Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Total 15-Minute Volume [veh/h]			1	16	0	4	1	78	2		51	5
Total Analysis Volume [veh/h]			2	63	0	17	6	314	7		203	21
Pedestrian Volume [ped/h]	0			0			0			0		

Generated with PTV VISTRO

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Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane		Yes		
Storage Area [veh]		1		
Two-Stage Gap Acceptance	No	Yes		
Number of Storage Spaces in Median		2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.00	0.10	0.00	0.02	0.00					
d_M, Delay for Movement [s/veh]			9.99	11.55		9.85	7.69					
Movement LOS			A	B		A	A	A	A		A	A
95th-Percentile Queue Length [veh/ln]			0.01	0.35		0.35	0.01	0.00	0.00		0.00	0.00
95th-Percentile Queue Length [ft/ln]			0.21	8.75		8.75	0.34	0.00	0.00		0.00	0.00
d_A, Approach Delay [s/veh]	9.99			11.19			0.14			0.00		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	1.52											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	21.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.092

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	132	54	341	184	33	322
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	17	0	0	10
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	132	54	358	184	33	332
Peak Hour Factor	0.9420	0.9420	0.9420	0.9420	0.9420	0.9420
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	14	95	49	9	88
Total Analysis Volume [veh/h]	140	57	380	195	35	352
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.27		0.09	0.49
d_M, Delay for Movement [s/veh]			8.50		21.51	17.05
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	1.10	0.00	3.71	3.71
95th-Percentile Queue Length [ft/ln]	0.00	0.00	27.46	0.00	92.82	92.82
d_A, Approach Delay [s/veh]	0.00		5.61		17.46	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	8.61					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	26.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.197

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	26	13	8	40	28	70	96	197	24	21	213	46
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	10	3	0	5	0	0	0	17	0	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	36	16	8	45	28	70	96	214	24	23	213	46
Peak Hour Factor	0.8680	0.8680	0.8680	0.8680	0.8680	0.8680	0.8680	0.8680	0.8680	0.8680	0.8680	0.8680
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	5	2	13	8	20	28	62	7	7	61	13
Total Analysis Volume [veh/h]	41	18	9	52	32	81	111	247	28	26	245	53
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	0	0		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.07	0.01	0.20	0.11	0.10	0.09			0.02		
d_M, Delay for Movement [s/veh]	26.55	19.10	10.50	21.93	19.40	11.38	8.12			7.85		
Movement LOS	D	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.71	0.25	0.25	0.72	0.80	0.80	0.29	0.00	0.00	0.06	0.00	0.00
95th-Percentile Queue Length [ft/ln]	17.84	6.28	6.28	17.90	20.07	20.07	7.21	0.00	0.00	1.54	0.00	0.00
d_A, Approach Delay [s/veh]	22.46			16.26			2.34			0.63		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	5.64											
Intersection LOS	D											

Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	10.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]			12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	1		0	0		1
Entry Pocket Length [ft]							130.00					230.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]			0	10	0	13	13	197	0		244	35
Base Volume Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Heavy Vehicles Percentage [%]			2.00	2.00	2.00	2.00	2.00	2.00	2.00		2.00	2.00
Growth Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
In-Process Volume [veh/h]			0	0	0	0	0	0	0		0	0
Site-Generated Trips [veh/h]			2	0	0	0	0	0	22		2	0
Diverted Trips [veh/h]			0	0	0	0	0	0	0		0	0
Pass-by Trips [veh/h]			0	0	0	0	0	0	0		0	0
Existing Site Adjustment Volume [veh/h]			0	0	0	0	0	0	0		0	0
Other Volume [veh/h]			0	0	0	0	0	0	0		0	0
Total Hourly Volume [veh/h]			2	10	0	13	13	197	22		246	35
Peak Hour Factor			0.9600	0.9600	1.0000	0.9600	0.9600	0.9600	0.9600		0.9600	0.9600
Other Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Total 15-Minute Volume [veh/h]			1	3	0	3	3	51	6		64	9
Total Analysis Volume [veh/h]			2	10	0	14	14	205	23		256	36
Pedestrian Volume [ped/h]	0			0			2			2		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane		Yes		
Storage Area [veh]		1		
Two-Stage Gap Acceptance	No	Yes		
Number of Storage Spaces in Median		2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.00	0.02	0.00	0.02	0.01					
d_M, Delay for Movement [s/veh]			9.40	10.83		9.67	7.87					
Movement LOS			A	B		A	A	A	A		A	A
95th-Percentile Queue Length [veh/ln]			0.01	0.05		0.05	0.03	0.00	0.00		0.00	0.00
95th-Percentile Queue Length [ft/ln]			0.18	1.37		1.37	0.84	0.00	0.00		0.00	0.00
d_A, Approach Delay [s/veh]	9.40			10.15			0.46			0.00		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	0.67											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type	Two-way stop	Delay (sec / veh)	30.2
Analysis Method	HCM 6th Edition	Level Of Service	D
Analysis Period	15 minutes	Volume to Capacity (v/c)	0.121

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	137	37	266	117	45	388
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	5	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	137	37	271	117	45	404
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	11	80	34	13	119
Total Analysis Volume [veh/h]	161	44	319	138	53	475
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.23		0.12	0.67
d_M, Delay for Movement [s/veh]			8.35		30.23	27.09
Movement LOS	A	A	A	A	D	D
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.89	0.00	7.78	7.78
95th-Percentile Queue Length [ft/ln]	0.00	0.00	22.15	0.00	194.43	194.43
d_A, Approach Delay [s/veh]	0.00		5.83		27.40	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	14.40					
Intersection LOS	D					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	21.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.183

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	25	14	15	65	20	85	46	234	18	14	204	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	16	4	0	1	0	0	0	5	0	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	18	15	66	20	85	46	239	18	15	204	33
Peak Hour Factor	0.8600	0.8600	0.8560	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	5	4	19	6	25	13	69	5	4	59	10
Total Analysis Volume [veh/h]	48	21	18	77	23	99	53	278	21	17	237	38
Pedestrian Volume [ped/h]	1			0			0			1		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	0	0		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.06	0.02	0.24	0.06	0.12	0.04			0.01		
d_M, Delay for Movement [s/veh]	21.73	16.28	10.56	19.84	16.46	10.78	7.91			7.90		
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.65	0.28	0.28	0.91	0.69	0.69	0.13	0.00	0.00	0.04	0.00	0.00
95th-Percentile Queue Length [ft/ln]	16.36	6.98	6.98	22.87	17.23	17.23	3.22	0.00	0.00	1.03	0.00	0.00
d_A, Approach Delay [s/veh]	18.10			14.86			1.19			0.46		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	5.47											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.110

Intersection Setup

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]			12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	1		0	0		1
Entry Pocket Length [ft]							130.00					230.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	30.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]			0	54	0	15	5	290	0		211	18
Base Volume Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Heavy Vehicles Percentage [%]			2.00	2.00	2.00	2.00	2.00	2.00	2.00		2.00	2.00
Growth Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
In-Process Volume [veh/h]			0	0	0	0	0	0	0		0	0
Site-Generated Trips [veh/h]			2	0	0	0	0	0	6		1	0
Diverted Trips [veh/h]			0	0	0	0	0	0	0		0	0
Pass-by Trips [veh/h]			0	0	0	0	0	0	0		0	0
Existing Site Adjustment Volume [veh/h]			0	0	0	0	0	0	0		0	0
Other Volume [veh/h]			0	0	0	0	0	0	0		0	0
Total Hourly Volume [veh/h]			2	54	0	15	5	290	6		212	18
Peak Hour Factor			0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600		0.8600	0.8600
Other Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Total 15-Minute Volume [veh/h]			1	16	0	4	1	84	2		62	5
Total Analysis Volume [veh/h]			2	63	0	17	6	337	7		247	21
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane		Yes		
Storage Area [veh]		1		
Two-Stage Gap Acceptance	No	Yes		
Number of Storage Spaces in Median		2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.00	0.11	0.00	0.02	0.00					
d_M, Delay for Movement [s/veh]			10.14	11.92		10.16	7.79					
Movement LOS			B	B		B	A	A	A		A	A
95th-Percentile Queue Length [veh/ln]			0.01	0.37		0.37	0.01	0.00	0.00		0.00	0.00
95th-Percentile Queue Length [ft/ln]			0.21	9.26		9.26	0.35	0.00	0.00		0.00	0.00
d_A, Approach Delay [s/veh]	10.14			11.55			0.13			0.00		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	1.42											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	22.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.094

Intersection Setup

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	11.00	11.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]			170.00			
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]						
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Churn Creek Rd		Churn Creek Rd		Rancho Rd	
Base Volume Input [veh/h]	132	54	354	184	33	337
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	17	0	0	10
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	132	54	371	184	33	347
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	14	99	49	9	92
Total Analysis Volume [veh/h]	140	57	395	196	35	369
Pedestrian Volume [ped/h]						

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]			
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.28		0.09	0.51
d_M, Delay for Movement [s/veh]			8.55		22.46	17.79
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	1.16	0.00	4.06	4.06
95th-Percentile Queue Length [ft/ln]	0.00	0.00	28.95	0.00	101.55	101.55
d_A, Approach Delay [s/veh]	0.00		5.71		18.20	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	9.00					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Two-way stop	Delay (sec / veh):	27.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.200

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	26	13	8	41	28	70	96	210	24	13	228	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	10	3	0	5	0	0	0	17	0	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	36	16	8	46	28	70	96	227	24	15	228	48
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	5	2	13	8	20	28	65	7	4	66	14
Total Analysis Volume [veh/h]	41	18	9	53	32	80	110	261	28	17	262	55
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	0	0		
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.07	0.01	0.20	0.11	0.10	0.09			0.01		
d_M, Delay for Movement [s/veh]	26.96	19.28	10.61	22.30	19.56	11.53	8.18			7.87		
Movement LOS	D	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.73	0.25	0.25	0.74	0.81	0.81	0.29	0.00	0.00	0.04	0.00	0.00
95th-Percentile Queue Length [ft/ln]	18.16	6.36	6.36	18.60	20.29	20.29	7.27	0.00	0.00	1.01	0.00	0.00
d_A, Approach Delay [s/veh]	22.76			16.55			2.25			0.40		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	5.50											
Intersection LOS	D											

Intersection Level Of Service Report
Intersection 3: Goodwater Ave & Rancho Rd

Control Type	Two-way stop	Delay (sec / veh):	11.0
Analysis Method	HCM 6th Edition	Level Of Service:	B
Analysis Period	15 minutes	Volume to Capacity (v/c):	0.017

Intersection Setup

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]			12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	1		0	0		1
Entry Pocket Length [ft]							130.00					230.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	30.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]			0	10	0	13	13	211	0		261	35
Base Volume Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Heavy Vehicles Percentage [%]			2.00	2.00	2.00	2.00	2.00	2.00	2.00		2.00	2.00
Growth Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
In-Process Volume [veh/h]			0	0	0	0	0	0	0		0	0
Site-Generated Trips [veh/h]			2	0	0	0	0	0	22		2	0
Diverted Trips [veh/h]			0	0	0	0	0	0	0		0	0
Pass-by Trips [veh/h]			0	0	0	0	0	0	0		0	0
Existing Site Adjustment Volume [veh/h]			0	0	0	0	0	0	0		0	0
Other Volume [veh/h]			0	0	0	0	0	0	0		0	0
Total Hourly Volume [veh/h]			2	10	0	13	13	211	22		263	35
Peak Hour Factor			0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600		0.9600	0.9600
Other Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Total 15-Minute Volume [veh/h]			1	3	0	3	3	55	6		68	9
Total Analysis Volume [veh/h]			2	10	0	14	14	220	23		274	36
Pedestrian Volume [ped/h]	0			0			2			2		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane		Yes		
Storage Area [veh]		1		
Two-Stage Gap Acceptance	No	Yes		
Number of Storage Spaces in Median		2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.00	0.02	0.00	0.02	0.01					
d_M, Delay for Movement [s/veh]			9.49	11.00		9.78	7.91					
Movement LOS			A	B		A	A	A	A		A	A
95th-Percentile Queue Length [veh/ln]			0.01	0.06		0.06	0.03	0.00	0.00		0.00	0.00
95th-Percentile Queue Length [ft/ln]			0.19	1.40		1.40	0.85	0.00	0.00		0.00	0.00
d_A, Approach Delay [s/veh]	9.49			10.29			0.43			0.00		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	0.64											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Roundabout	Delay (sec / veh):	9.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	11.00	11.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	0		0	0		0
Entry Pocket Length [ft]												
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	40.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Base Volume Input [veh/h]	153	15	50	34	11	258	135	286	117	50	450	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	5	0	0	16	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	153	15	50	34	11	258	135	291	117	50	466	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	4	13	9	3	65	34	73	29	13	117	11
Total Analysis Volume [veh/h]	153	15	50	34	11	258	135	291	117	50	466	45
Pedestrian Volume [ped/h]				0								

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	469			682			97			309		
Exiting Flow Rate [veh/h]	182			199			895			383		
Demand Flow Rate [veh/h]	153	15	50	34	11	258	135	291	117	50	466	45
Adjusted Demand Flow Rate [veh/h]	153	15	50	34	11	258	135	291	117	50	466	45

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]				
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]				
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	223	310	554	573
Capacity of Entry and Bypass Lanes [veh/h]	856	689	1251	1007
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	839	675	1226	988
X, volume / capacity	0.26	0.45	0.44	0.57

Movement, Approach, & Intersection Results

Lane LOS	A	B	A	B
95th-Percentile Queue Length [veh]	1.04	2.33	2.32	3.69
95th-Percentile Queue Length [ft]	26.01	58.24	58.08	92.34
Approach Delay [s/veh]	7.10	11.86	7.47	11.18
Approach LOS	A	B	A	B
Intersection Delay [s/veh]	9.52			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Signalized	Delay (sec / veh):	23.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.376

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	150	90	65	70	40	116	55	265	55	15	238	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	16	4	0	1	0	0	0	5	0	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]			0			0			0			0
Total Hourly Volume [veh/h]	166	94	65	71	40	116	55	270	55	16	238	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	24	16	18	10	29	14	68	14	4	60	8
Total Analysis Volume [veh/h]	166	94	65	71	40	116	55	270	55	16	238	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]												
Local Bus Stopping Rate [/h]			0			0			0			0
v_do, Outbound Pedestrian Volume crossing major stree	0			0			0			1		
v_di, Inbound Pedestrian Volume crossing major street [	1			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor stree	1			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [	0			0			1			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	
Offset Reference	
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	3	8		7	4		5	2		1	6	
Auxiliary Signal Groups												
Lead / Lag	Lead			Lead			Lead			Lead		
Minimum Green [s]	5	10		5	10		5	10		5	10	
Maximum Green [s]	30	30		30	30		30	30		30	30	
Amber [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All red [s]	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Split [s]	23	22		20	19		9	19		9	19	
Vehicle Extension [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Walk [s]		5			5			5			5	
Pedestrian Clearance [s]		13			10			10			10	
Delayed Vehicle Green [s]	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
I2, Clearance Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]												
Detector Length [ft]												
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C	R
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]									
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	14	4	10	3	35	1	33	33
g / C, Green / Cycle	0.12	0.20	0.05	0.14	0.05	0.50	0.02	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.04	0.09	0.03	0.18	0.01	0.13	0.02
s, saturation flow rate [veh/h]	1781	1742	1781	1653	1781	1815	1781	1870	1589
c, Capacity [veh/h]	214	351	99	226	87	897	37	872	741
d1, Uniform Delay [s]	29.99	24.64	32.64	28.90	32.79	10.95	33.97	11.46	10.21
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.94	0.91	9.40	3.72	7.35	1.14	7.52	0.77	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.45	0.72	0.69	0.63	0.36	0.43	0.27	0.04
d, Delay for Lane Group [s/veh]	35.93	25.55	42.04	32.61	40.15	12.08	41.50	12.23	10.33
Lane Group LOS	D	C	D	C	D	B	D	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.93	2.27	1.39	2.60	1.03	2.76	0.33	2.04	0.25
50th-Percentile Queue Length [ft/ln]	73.13	56.70	34.74	64.88	25.70	68.92	8.22	50.98	6.30
95th-Percentile Queue Length [veh/ln]	5.27	4.08	2.50	4.67	1.85	4.96	0.59	3.67	0.45
95th-Percentile Queue Length [ft/ln]	131.63	102.06	62.54	116.79	46.26	124.05	14.80	91.77	11.35

Movement, Approach, & Intersection Results

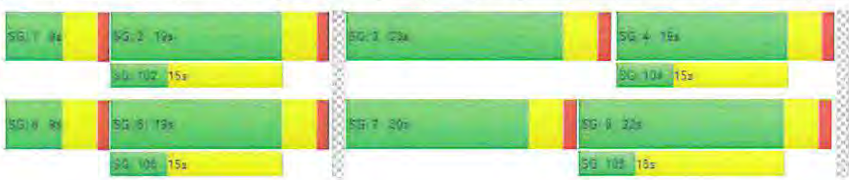
d_M, Delay for Movement [s/veh]	35.93	25.55	25.55	42.04	32.61	32.61	40.15	12.08	12.08	41.50	12.23	10.33
Movement LOS	D	C	C	D	C	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	30.85			35.56			16.14			13.65		
Approach LOS	C			D			B			B		
d_I, Intersection Delay [s/veh]	23.09											
Intersection LOS	C											
Intersection V/C	0.376											

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	26.64	26.64	26.64	26.64
I_p,int, Pedestrian LOS Score for Intersection	2.094	2.084	2.368	2.373
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	513	428	428	428
d_b, Bicycle Delay [s]	19.37	21.67	21.67	21.67
I_b,int, Bicycle LOS Score for Intersection	2.096	1.934	2.187	2.033
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Rancho Rd & Goodwater Ave

Control Type:	Two-way stop	Delay (sec / veh):	12.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.111

Intersection Setup

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]			12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	1		0	0		1
Entry Pocket Length [ft]							130.00					230.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	30.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]			0	61	0	23	11	364	0		245	18
Base Volume Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Heavy Vehicles Percentage [%]			2.00	2.00	2.00	2.00	2.00	2.00	2.00		2.00	2.00
Growth Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
In-Process Volume [veh/h]			0	0	0	0	0	0	0		0	0
Site-Generated Trips [veh/h]			2	0	0	0	0	0	6		1	0
Diverted Trips [veh/h]			0	0	0	0	0	0	0		0	0
Pass-by Trips [veh/h]			0	0	0	0	0	0	0		0	0
Existing Site Adjustment Volume [veh/h]			0	0	0	0	0	0	0		0	0
Other Volume [veh/h]			0	0	0	0	0	0	0		0	0
Total Hourly Volume [veh/h]			2	61	0	23	11	364	6		246	18
Peak Hour Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Other Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Total 15-Minute Volume [veh/h]			1	15	0	6	3	91	2		62	5
Total Analysis Volume [veh/h]			2	61	0	23	11	364	6		246	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane		Yes		
Storage Area [veh]		1		
Two-Stage Gap Acceptance	No	Yes		
Number of Storage Spaces in Median		2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.00	0.11	0.00	0.03	0.01					
d_M, Delay for Movement [s/veh]			10.32	12.14		10.13	7.79					
Movement LOS			B	B		B	A	A	A		A	A
95th-Percentile Queue Length [veh/ln]			0.01	0.37		0.37	0.03	0.00	0.00		0.00	0.00
95th-Percentile Queue Length [ft/ln]			0.22	9.32		9.32	0.64	0.00	0.00		0.00	0.00
d_A, Approach Delay [s/veh]	10.32			11.59			0.22			0.00		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	1.48											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 1: Churn Creek Rd & Rancho Rd

Control Type:	Roundabout	Delay (sec / veh):	12.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	11.00	11.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	0		0	0		0
Entry Pocket Length [ft]												
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	40.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	Churn Creek Rd			Victor Ave			Churn Creek Rd			Rancho Rd		
Base Volume Input [veh/h]	146	27	54	83	22	222	213	442	116	50	417	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	17	0	0	10	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	146	27	54	83	22	222	213	459	116	50	427	78
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	7	14	21	6	56	53	115	29	13	107	20
Total Analysis Volume [veh/h]	146	27	54	83	22	222	213	459	116	50	427	78
Pedestrian Volume [ped/h]				0								

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	770			635			158			394		
Exiting Flow Rate [veh/h]	192			324			811			608		
Demand Flow Rate [veh/h]	146	27	54	83	22	222	213	459	116	50	427	78
Adjusted Demand Flow Rate [veh/h]	146	27	54	83	22	222	213	459	116	50	427	78

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]				
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]				
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	232	334	804	567
Capacity of Entry and Bypass Lanes [veh/h]	630	722	1175	924
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	617	708	1152	906
X, volume / capacity	0.37	0.46	0.68	0.61

Movement, Approach, & Intersection Results

Lane LOS	B	B	B	B
95th-Percentile Queue Length [veh]	1.69	2.45	5.77	4.32
95th-Percentile Queue Length [ft]	42.21	61.28	144.28	108.10
Approach Delay [s/veh]	11.04	11.69	13.03	13.12
Approach LOS	B	B	B	B
Intersection Delay [s/veh]	12.59			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 2: Shasta View Dr & Rancho Rd

Control Type:	Signalized	Delay (sec / veh):	21.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.343

Intersection Setup

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	11.00	11.00	11.00	11.00	12.00	12.00	12.00	11.00	11.00	11.00	12.00	11.00
No. of Lanes in Entry Pocket	1		0	1		0	1		0	1		1
Entry Pocket Length [ft]	200.00			280.00			330.00			245.00		245.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	35.00			35.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Shasta View Dr			Shasta View Dr			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]	80	90	30	45	40	86	111	210	115	40	262	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	10	3	0	5	0	0	0	17	0	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]			0			0			0			0
Total Hourly Volume [veh/h]	90	93	30	50	40	86	111	227	115	42	262	55
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	23	8	13	10	22	28	57	29	11	66	14
Total Analysis Volume [veh/h]	90	93	30	50	40	86	111	227	115	42	262	55
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]												
Local Bus Stopping Rate [/h]			0			0			0			0
v_do, Outbound Pedestrian Volume crossing major stree	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor stree	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	
Offset Reference	
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	3	8		7	4		5	2		1	6	
Auxiliary Signal Groups												
Lead / Lag	Lead			Lead			Lead			Lead		
Minimum Green [s]	5	10		5	10		5	10		5	10	
Maximum Green [s]	30	30		30	30		30	30		30	30	
Amber [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All red [s]	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Split [s]	12	22		9	19		20	24		15	19	
Vehicle Extension [s]	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Walk [s]		5			5			5			5	
Pedestrian Clearance [s]		13			10			10			10	
Delayed Vehicle Green [s]	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Rest In Walk		No			No			No			No	
l1, Start-Up Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
l2, Clearance Lost Time [s]	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]												
Detector Length [ft]												
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C	R
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]									
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	11	3	9	6	37	3	35	35
g / C, Green / Cycle	0.07	0.15	0.05	0.13	0.08	0.53	0.04	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.03	0.08	0.06	0.19	0.02	0.14	0.03
s, saturation flow rate [veh/h]	1781	1793	1781	1669	1781	1765	1781	1870	1589
c, Capacity [veh/h]	120	272	83	219	148	939	75	918	780
d1, Uniform Delay [s]	32.18	27.13	32.87	28.70	31.49	9.54	33.03	10.59	9.44
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.01	1.17	6.95	2.39	7.35	1.09	6.52	0.78	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.75	0.45	0.61	0.58	0.75	0.36	0.56	0.29	0.07
d, Delay for Lane Group [s/veh]	41.19	28.30	39.82	31.09	38.84	10.63	39.54	11.38	9.61
Lane Group LOS	D	C	D	C	D	B	D	B	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.73	1.86	0.96	2.03	2.00	2.62	0.81	2.33	0.44
50th-Percentile Queue Length [ft/ln]	43.24	46.50	23.90	50.73	49.93	65.62	20.36	58.30	10.92
95th-Percentile Queue Length [veh/ln]	3.11	3.35	1.72	3.65	3.60	4.72	1.47	4.20	0.79
95th-Percentile Queue Length [ft/ln]	77.82	83.71	43.02	91.31	89.88	118.12	36.65	104.94	19.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	41.19	28.30	28.30	39.82	31.09	31.09	38.84	10.63	10.63	39.54	11.38	9.61
Movement LOS	D	C	C	D	C	C	D	B	B	D	B	A
d_A, Approach Delay [s/veh]		33.74			33.57			17.54			14.40	
Approach LOS		C			C			B			B	
d_I, Intersection Delay [s/veh]						21.83						
Intersection LOS						C						
Intersection V/C						0.343						

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	26.64	26.64	26.64	26.64
I_p,int, Pedestrian LOS Score for Intersection	2.085	2.094	2.363	2.282
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	513	428	570	428
d_b, Bicycle Delay [s]	19.37	21.67	17.92	21.67
I_b,int, Bicycle LOS Score for Intersection	1.911	1.850	2.307	2.152
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Rancho Rd & Goodwater Ave

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.029

Intersection Setup

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]			12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00
No. of Lanes in Entry Pocket	0		0	0		0	1		0	0		1
Entry Pocket Length [ft]							130.00					230.00
No. of Lanes in Exit Pocket	0		0	0		0	0		0	0		0
Exit Pocket Length [ft]												
Speed [mph]	30.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Driveway			Goodwater Ave			Rancho Rd			Rancho Rd		
Base Volume Input [veh/h]			0	16	0	22	17	261	0		341	36
Base Volume Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Heavy Vehicles Percentage [%]			2.00	2.00	2.00	2.00	2.00	2.00	2.00		2.00	2.00
Growth Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
In-Process Volume [veh/h]			0	0	0	0	0	0	0		0	0
Site-Generated Trips [veh/h]			2	0	0	0	0	0	22		2	0
Diverted Trips [veh/h]			0	0	0	0	0	0	0		0	0
Pass-by Trips [veh/h]			0	0	0	0	0	0	0		0	0
Existing Site Adjustment Volume [veh/h]			0	0	0	0	0	0	0		0	0
Other Volume [veh/h]			0	0	0	0	0	0	0		0	0
Total Hourly Volume [veh/h]			2	16	0	22	17	261	22		343	36
Peak Hour Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Other Adjustment Factor			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		1.0000	1.0000
Total 15-Minute Volume [veh/h]			1	4	0	6	4	65	6		86	9
Total Analysis Volume [veh/h]			2	16	0	22	17	261	22		343	36
Pedestrian Volume [ped/h]	0			0			2			2		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane		Yes		
Storage Area [veh]		1		
Two-Stage Gap Acceptance	No	Yes		
Number of Storage Spaces in Median		2		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio			0.00	0.03	0.00	0.03	0.01					
d_M, Delay for Movement [s/veh]			9.73	11.65		10.27	8.10					
Movement LOS			A	B		B	A	A	A		A	A
95th-Percentile Queue Length [veh/ln]			0.01	0.10		0.10	0.04	0.00	0.00		0.00	0.00
95th-Percentile Queue Length [ft/ln]			0.20	2.44		2.44	1.10	0.00	0.00		0.00	0.00
d_A, Approach Delay [s/veh]	9.73			10.85			0.46			0.00		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	0.79											
Intersection LOS	B											

Appendix D

Proportional Share Calculations

W-Trans

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Equitable Share Calculations
TIS for the Silverstone 5 Residential Subdivision Project

	AM	PM
Project Trips (T)	21	27

Total Volume Entering the Intersection of
Churn Creek Rd/Rancho Rd

	AM	PM
Existing	940	1066
Future Year	1897	1484

Description of Project Improvement:

Install a roundabout and consolidate with Victor Avenue

Calculation of Project Share

P = T / (TB - TE)
where:
P = Equitable Share
T = Project trips during the affected peak hour
TB = Build-out volumes
TE = Existing volumes

T	21	27
TB	1897	1484
TE	940	1066
P	2.2%	6.5%

Average
4.3%

SILVERSTONE SUBDIVISION, UNIT 5

MITIGATION MONITORING PROGRAM CONTENTS

This document is the Mitigation Monitoring Program (MMP) for the Tentative Subdivision Map Application S-2023-00027 and Amendment Application AMND-2024-00226 to Planned Development Plan PD-2019-00309, for Sierra Pacific Land and Timber. The MMP includes a brief discussion of the legal basis for and the 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 Sierra Pacific Land and Timber. 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 the Subdivision Application S-2023-00027 and Amendment Application AMND-2024-00226 to Planned Development Plan PD-2019-00309, Sierra Pacific Land and Timber. 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 REDDING SCHOOL OF THE ARTS HIGH SCHOOL MMP

Mitigation Measure	Timing/Implementation	Enforcement/Monitoring	Verification (Date and Initials)
Noise			
Mitigation 1: A minimum 6-foot-high masonry sound wall shall be constructed at the boundaries of both Rancho Road and Shasta View Drive right-of-ways adjacent to all residential lots. The walls shall be constructed of decorative masonry materials that have a density of four pounds per square foot and designed to reduce noise levels to 60 dB Ldn/CNEL or less. The wall design shall incorporate materials providing two distinct surface reliefs, columns/pilasters articulated a minimum of two inches from the face of the wall, and a cap feature. The wall aesthetic design shall be approved by the Development Services Director.	Prior to issuance of a building permit.	Planning Division Building Division	